

## Understanding Public Concerns About Fake News: Linking Social Media News Use, Cognitive Elaboration, and Perceived Fake News Exposure

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Over the past decade, the exponential growth of information consumption through social media has reshaped the media landscape in most liberal democracies. This shift has introduced significant challenges, particularly the spread of fake news and growing concerns—whether real or perceived—about its potential effects. In this study, we propose an overarching moderated mediation model to explain citizens' concerns about fake news. Drawing on panel survey data from Spain ( $N = 570$ ), our findings reveal that social media news consumption is positively associated with individuals' cognitive elaboration of fake news, which, in turn, influences their level of concern about fake news. However, this indirect effect is significantly stronger among individuals who perceive themselves as highly exposed to fake news on social media. Overall, our study advances the current understanding of the effects of social media news consumption, highlighting the crucial role of cognitive elaboration in shaping concerns about fake news, alongside the perceived intensity of fake news exposure in digital media environments.

*Keywords: fake news, fake news concerns, perceived fake news exposure, social media*

Social media have become a primary source of news and information for many people (Kümpel, 2022; Pew Research Center, 2024; Waruwu et al., 2021). These platforms make information more accessible than ever, but they also create an environment where false or misleading content can spread easily (Allcott & Gentzkow, 2017; Vosoughi et al., 2018), heightening concerns about the reliability of the information people encounter online (Farkas, 2023; Jang et al., 2019). This is why extensive scholarly attention has been given to this research domain—that is, the role of social media as a main vehicle for fake news—for the last decade (Broda & Strömbäck, 2024; Guess et al., 2020).

However, less is known about how social media users process and react to the fake news they encounter daily (Chang, 2021; Gil de Zúñiga et al., 2025). Some individuals may dismiss fake news, while

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others may contemplate it, trying to interpret what they see (Wieland & Kleinen-von Königslöw, 2020). This mental effort, known as cognitive elaboration—the extent to which individuals actively reflect on and process information (Eveland, 2001)—may play a significant role in shaping how people perceive their information environment. While prior research has shown that cognitive elaboration can promote knowledge acquisition and political participation through critical thinking and issue engagement (Eveland, 2001; Gil de Zúñiga et al., 2021; Shahin et al., 2021; Su et al., 2024), its role in influencing individuals' perceptions of information integrity and related concerns remains underexplored.

To address this gap, the current study seeks to explore the conditions under which social media news consumption leads to heightened concerns about fake news, focusing specifically on the role of cognitive elaboration (Eveland, 2001). Drawing on a two-wave online survey of Spanish adults, this study examines the relationship between social media news use and concerns about fake news and the extent to which cognitive elaboration on fake news mediates this relationship. Additionally, we investigate whether perceived exposure to fake news moderates this relationship. We expect individuals who believe they have frequently encountered fake news to experience heightened cognitive engagement as a defensive response, thereby intensifying their concerns about it. Given the subjective nature of fake news identification (Schulz et al., 2020), perceived exposure—rather than actual exposure—could be a more meaningful predictor of individuals' cognitive and emotional responses to fake news.

Fake news is a subset of disinformation, and it refers to news-like content designed to deceive. In this study, we use the term fake news as an umbrella term that includes disinformation and information with unclear intent (i.e., misinformation), for practical reasons. In Spain, the term "fake news" (noticias falsas) is more commonly used to describe false information than "disinformation" (desinformación) in everyday language (Blanco-Herrero et al., 2021). The preference for "fake news" also reflects a broader trend in public discourse and media coverage (Catalina García et al., 2024).

This study contributes to the growing body of research on misinformation and news consumption on social media by examining the cognitive mechanisms that might drive public concerns about fake news circulating online. This study's focus on cognitive elaboration offers insights into how individuals mentally engage with fake news and how their engagement influences attitudes toward the broader information ecosystem.

## **Literature Review**

### ***Social Media and Concern About Fake News***

Social media have transformed how individuals encounter, engage with, and evaluate information by creating a unique information environment (Kümpel, 2022). Anyone can easily produce and distribute content on social media without going through conventional quality-control processes (Hermida et al., 2014). Such content, generated by ordinary users and often taking the form of news despite not adhering to journalistic norms, tends to circulate alongside information from reliable sources, with no clear cues distinguishing the two (Waruwu et al., 2021). Furthermore, content on social media—whether user-

generated or journalistic—spreads more rapidly and broadly through individual users' sharing behavior and algorithmic curation than was possible in the traditional media landscape (Bakshy et al., 2015).

Such transformations in information consumption may democratize information production and access, but they also accuse social media of providing a fertile ground for low-quality information, such as fake news (Allcott & Gentzkow, 2017). A growing body of research offers empirical evidence for such accusations. Studies suggest that fake news is more frequently shared among social media users than traditional news consumers (Jang et al., 2019) and that fake news spreads faster and reaches broader audiences on social media than accurate information (Vosoughi et al., 2018). While this does not necessarily mean that all social media users are habitually exposed to falsehoods (e.g., Guess et al., 2020), it is apparent that the chance of encountering misleading information is higher when using social media to get news than when using traditional news sources such as newspapers and television news.

Moreover, it has become common practice on many social media platforms to put fact-checking labels on posts that contain false or misleading information after verification by third-party fact-checkers, experts, or other users (Jia & Lee, 2024). It is therefore reasonable to assume that individuals who use social media more frequently for news are more likely to encounter both verified and unverified fake news, which might lead them to perceive their information environment as polluted. Bolstering this speculation, studies show that frequent social media use increases exposure to fake news, thereby heightening concerns about news reliability (Tandoc et al., 2020) and critical evaluation of news sources over time (Pennycook & Rand, 2019). Research also found that individuals who read debunked stories on social media tended to develop higher levels of concern about fake news over time (Clayton et al., 2020).

In addition to possible exposure to false content, individuals who consume news through social media may be exposed to public discourse or journalistic accounts on the quality of online information. Social media users often encounter opinion-based news content, such as commentary from traditional news outlets and news influencers, across platforms (Stocking et al., 2024). For those who use social media for news, their news-related engagement may direct them more often toward this type of content than general social media users (Bakshy et al., 2015). Considering the prevalence of media and elite discourses around fake news and its potential harms (Farkas, 2023; Van Duyn & Collier, 2019), individuals who use social media for news are more likely to come across such narratives, which might heighten their concerns (Jungheer & Rauchfleisch, 2022).

Taken together, we predict that the more people consume news from social media, the greater their concerns about their media environment being polluted with fake news because of possible exposure to either false content or discourse around it. While the reverse direction (i.e., fake news concerns subsequently shaping media choices) is also plausible, our theoretical interest lies in examining whether news use on social media itself functions as a trigger for such concerns. We also emphasize that our focus is on social media news use as a general practice, which captures the shared concerns about information pollution across platforms, rather than platform-level differences. In other words, our study investigates the extent to which news consumption on social media in general cultivates awareness of and worry about fake news in the broader information environment.

*H1: Social media news use in  $W^1$  is positively associated with concerns about fake news in  $W^2$ .*

### ***Cognitive Elaboration of Fake News and Its Consequences***

As discussed above, individuals who consume news through social media are exposed to a large volume of information, including both real and fake news. However, they do not process all information—accurate or inaccurate—with the same level of scrutiny (Wieland & Kleinen-von Königslöw, 2020). Some information is ignored or briefly scanned, whereas certain information may prompt more deliberate engagement by stimulating cognitive elaboration (Shahin et al., 2021).

Cognitive elaboration involves reflecting on and analyzing information an individual encounters (Gil de Zúñiga et al., 2021). Unlike passive information processing, cognitive elaboration represents active mental engagement, requiring people to exert cognitive efforts to evaluate the information they encounter, integrate it with prior knowledge, and deliberate on its effects (Eveland, 2001). Individuals are more likely to learn from a given information, derive new implications from it, and even form attitudes toward an issue the information addresses when they engage in elaborative processing (Eveland, 2001). Despite these advantages, people may not always process information this way because it requires considerable cognitive resources (Petty & Cacioppo, 1986).

Research has shown that individuals tend to engage in elaborative processing when the information is personally relevant (Haugtvedt & Strathman, 1990) or perceived as questionable, unexpected, challenging their existing knowledge (O’Keefe, 2013; Petty & Cacioppo, 1986; Trumbo & McComas, 2003) or humorous (Heiss & Matthes, 2021). While these studies treat cognitive elaboration as a mental process activated by exposure to a particular message, individuals may also deliberately reflect on a certain type of message or message addressing a specific issue. For instance, some people may exert cognitive effort when processing news overall, while for others, only news stories relevant to them (e.g., immigration) elicit elaboration.

Focusing on issues of relevance, we argue that the evaluation of relevance and subsequent elaboration can be shaped by a broader media and social environment. Individuals are likely to perceive an issue as relevant and actively process information about it when the issue becomes salient because of intensive media coverage (Ho et al., 2013). The COVID-19 pandemic exemplifies this pattern, as people were more likely to engage in thoughtful information processing because of its high personal relevance and extensive media coverage (Lee et al., 2023). Similarly, fake news has become a global concern in recent years, with many perceiving it as a direct threat to themselves and society (Knuutila et al., 2022; Poushter et al., 2022). In particular, those who use social media for news consumption are more likely to perceive fake news as relevant and reflect on it, given their greater exposure to both fake news—whether self-identified or flagged by others—and surrounding media discourse (Allcott & Gentzkow, 2017; Jungherr & Rauchfleisch, 2022). Following this reasoning, we anticipate that the more people use social media for news, the more likely they are to engage in elaboration, reflecting on the pervasiveness and implications of fake news they directly encounter or learn about through the media.

*H2: Social media news use in  $W^1$  is positively associated with cognitive elaboration of fake news in  $W^2$ .*

Cognitive elaboration is known to have significant downstream effects on individuals' attitudes, behaviors, and knowledge acquisition (Barden & Tormala, 2014; Heiss & Matthes, 2021; Shahin et al., 2021). In the context of fake news, the more individuals mentally engage with fake news, the more likely they are to perceive it as a societal problem that demands attention (Chang, 2021). More specifically, people who devote more mental effort to thinking about fake news are likely to exhibit greater concern about its potential societal harms, such as the erosion of trust in journalism and the broader information ecosystem (Wagner & Boczkowski, 2019). This process suggests that elaboration may play a critical role in shaping concerns about fake news, and such elaboration effects may occur over time, as individuals could develop concerns about it by repeatedly encountering and reflecting on problematic content on social media. This relationship provides a logical basis for the following hypotheses:

*H3: Cognitive elaboration of fake news in  $W^1$  is positively associated with concerns about fake news in  $W^2$ .*

### ***Perceived Fake News Exposure as a Moderator***

Expanding the link between social media news use and cognitive elaboration of fake news, we expect this relationship may not apply universally to all social media news users because individuals engage with content or issues differently. This is where the role of perceived exposure to fake news comes in. We argue that perceived fake news exposure—the extent to which people believe they have encountered false or misleading information mimicking the news format—can moderate the relationship between social media news use and cognitive elaboration of fake news.

The moderating effect of perceived fake news exposure can be understood through the concept of perceived threat. Individuals may allocate greater cognitive resources to think about the authenticity of the information they encounter because perceived fake news exposure may create a sense of vulnerability (Kim & Dennis, 2019). Put differently, individuals with higher perceived exposure to fake news are more likely to engage in cognitive elaboration as a coping mechanism, partly because of their heightened awareness of information insufficiency. This process aligns with the findings that users who feel inundated by fake news are more likely to scrutinize news content (Pennycook & Rand, 2019).

It is worth noting that we rely on perceived exposure to fake news rather than actual exposure in examining the relationships addressed in this study. Perceptions matter, especially in personalized media environments (Johnson & John, 2025), because such perceptions shape interpretations of the broader media landscape and influence attitudes and behaviors, even when they do not accurately reflect reality (Swart et al., 2022). In the context of fake news exposure, perceptions are even more consequential than actual exposure for two reasons.

First, research has shown that people's actual exposure to fake news is far less common than expected (González-Bailón et al., 2023; Guess et al., 2020), whereas there have been numerous "alarmist" discourses around fake news overstating its prevalence and danger (Jungherr & Rauchfleisch, 2022). Since people worldwide consider fake news a major threat to their country (Knuutila et al., 2022; Poushter et al.,

2022), these threat perceptions may reflect their perceived exposure to false content, shaped in part by alarmist discourses, rather than actual exposure.

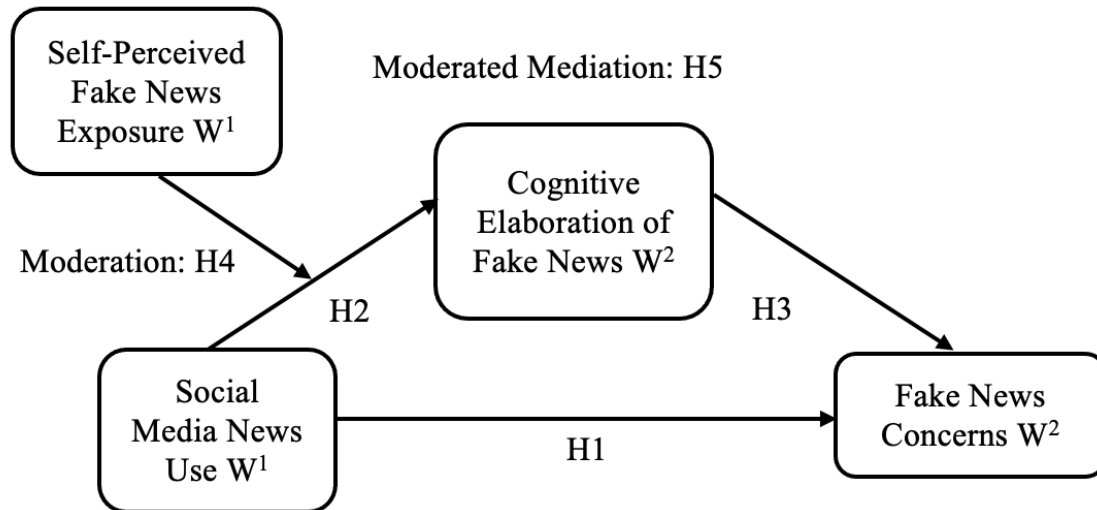
Moreover, even when individuals are actually exposed to fake news, they may not recognize it as such at the time, and the same information can be perceived either as fake or genuine depending on one's political beliefs (Nielsen & Graves, 2017), which makes measuring actual exposure to fake news through self-reporting challenging. Instead, perceived exposure to fake news could provide significant insights into understanding people's cognitive responses to fake news and their perception of its potential harms. These theoretical and practical considerations, as well as prior findings, lead to the hypothesis that perceived fake news exposure intensifies the positive relationship between social media news use and cognitive elaboration.

*H4: The relationship between social media news use in  $W^1$  and cognitive elaboration of fake news in  $W^2$  is moderated by self-perceived fake news exposure in  $W^1$ . Specifically, the positive association between social media news use and cognitive elaboration of fake news is only significant at higher levels of self-perceived fake news exposure.*

Based on the aforementioned reasoning, the association between social media use for news and concerns about fake news may appear intuitive, yet the mechanisms driving this relationship warrant investigation. By integrating the relationships addressed in H2 and H3, we assume that social media news use can be indirectly associated with concerns about fake news through cognitive elaboration: Social media news use influences cognitive elaboration on fake news, which subsequently heightens concerns about it. However, we also anticipate that this indirect relationship might be a moderated mediation process, which means that the indirect effects of social media news use on fake news concerns could be contingent on one's perceived exposure to fake news. In other words, individuals are more likely to engage with fake news and develop stronger concerns because of their heightened vigilance when they perceive a greater level of exposure to fake news. These dynamics emphasize both the cognitively mediated process of threat perception and the conditional nature of this relationship.

*H5: Social media news use in  $W^1$  positively impacts cognitive elaboration of fake news in  $W^2$ , which subsequently increases citizens' fake news concerns in  $W^2$ , but this indirect effect occurs only at high levels of self-perceived fake news exposure in  $W^1$ .*

Figure 1 graphically represents the conceptual model with predictions.



**Figure 1. Conceptual model of the conditional indirect effect of social media news use on fake news concerns.**

### Methods

The survey instrument used in this study was developed using the Qualtrics Web service and subsequently distributed by this polling company. The data analyzed were drawn from a large research project examining the impact of fake news on Spanish citizens. The study employed a longitudinal design, comprising two waves of a panel survey conducted in April 2022 (Wave 1:  $n = 1,299$ ) and July 2022 (Wave 2:  $n = 570$ ), to test the hypotheses and address the research questions. The first wave of the survey was designed to be representative of the Spanish population based on demographic quotas (e.g., age, gender, education level) and geographic distribution across Spanish regions. The time interval between the two survey waves was chosen to capture short-term media effects, consistent with prior studies (Gil de Zúñiga et al., 2025). The attrition rate between the two waves was 55.8%, a figure consistent with similar longitudinal studies addressing short-term media effects within the field of communication (see Valenzuela et al., 2024). Descriptive statistics for Wave 1 variables were calculated using the merged data set encompassing both waves. For the exploratory factor analysis, the data from Wave 1 ( $n = 1,299$ ) were used exclusively to maximize the sample size. Zero-order correlations are presented in the online supplemental material<sup>1</sup> in Table 1. Overall, we used 10-point Likert scales to provide greater variability in responses, which allowed us to capture more nuanced differences across participants and strengthen the sensitivity of the study.

<sup>1</sup> Online Supplemental Materials can be accessed at [https://osf.io/t5dk9/overview?view\\_only=646a284067b74994b4f09eb7ff3dc53f](https://osf.io/t5dk9/overview?view_only=646a284067b74994b4f09eb7ff3dc53f)

### **Measurements**

#### *Social Media News Use*

This measurement aimed to capture a broad assessment of social media news use, rather than focusing on the specific nuances of individual platforms. Accordingly, the intended aim of the proposed items was to account for the commonalities among both emerging and consolidated social media platforms. Based on a similar measurement of the construct (Goyanes et al., 2024), this measure captures the frequency (10-point Likert scale, 1 = never, 10 = all the time) with which participants used social media in the past month for specific news purposes: "to stay informed about current events and public affairs," "to get news about current events from mainstream media," and "to get news from online news sites." These responses were averaged to create an index of social media news use ( $W^1$ :  $M = 6.01$ ;  $SD = 2.89$ ; Cronbach's  $\alpha = .95$ ).

#### *Cognitive Elaboration of Fake News*

This construct assesses respondents' level of agreement using a 10-point Likert scale (1 = never, 10 = all the time). The following items, adapted from a similar measurement of the construct by Cheng and Luo (2021), are included: "I have thought about the possible consequences caused by fake news on social media," "I often think about the problem of fake news on social media," and "I often recall the fake news I have encountered on social media and reflect on issues related to the topic." Responses were averaged to create an index of cognitive elaboration of fake news ( $W^1$ :  $M = 6.29$ ;  $SD = 2.39$ ; Cronbach's  $\alpha = .91$ ;  $W^2$ :  $M = 6.19$ ;  $SD = 2.35$ ; Cronbach's  $\alpha = .92$ ).

#### *Self-Perceived Fake News Exposure*

Underpinning this construct is the idea that, while individuals may not always recognize the fake news they encounter on social media, they can still perceive how often they believe they are exposed to it. It further assumes that people can reflect on this exposure over time, evaluating its frequency with reasonable accuracy. Some may accept fake news without question, while others critically assess it using tools such as fact-checking organizations, reputable media outlets, or post labels. Building on prior measurements (Ardévol-Abreu, 2022), this construct evaluates the perceived frequency of exposure to fake news through the following items: "How often, if at all, do you think you see": "fabricated information that mimics news media content and could mislead readers," "articles that originate from satirical websites, but were transformed by others and put in a misleading context," and "stories containing deliberately misleading elements making the reader believe it is correct" (10-point Likert scale, 1 = never, 10 = all the time). Responses were averaged to create an index of self-perceived fake news exposure ( $W^1$ :  $M = 5.78$ ;  $SD = 2.31$ ; Cronbach's  $\alpha = .95$ ). For our research objectives and considering the subjective nature of fake news identification (Schulz et al., 2020), perceived exposure could be a more meaningful predictor of individuals' cognitive and emotional responses to fake news.

### *Concerns About Fake News*

Based on previously validated measurements of the construct (Zhang & Cozma, 2022), this scale evaluates citizens' agreement using a 10-point Likert scale (1 = never, 10 = all the time). The following items were included: "Fake news is a really serious threat to Spain," "Others have been exposed to fake news and believed it," "Fake news can change people's attitudes," and "Social media are leading sources of fake news." Responses were averaged to create an index of fake news concerns ( $W^1$ :  $M = 7.97$ ;  $SD = 1.82$ ; Cronbach's  $\alpha = .87$ ;  $W^2$ :  $M = 7.76$ ;  $SD = 2.00$ ; Cronbach's  $\alpha = .90$ ). Descriptive statistics for this composite index excluded the final item because of its low factor loading, consistent with the analysis reported in the Results section (see online supplemental material, Table 2).

### **Control Variables**

All models included in this study accounted for several control variables to minimize potential confounding effects that could influence citizens' levels of cognitive elaboration of fake news and concerns about it (Gil de Zúñiga et al., 2025; Su et al., 2024). Specifically, the series of autoregressive regressions, moderation effects, and conditional process models incorporated several variables. Political ideology was measured using three items: "Generally speaking, where do you place yourself?" "Regarding economic issues, where would you place yourself?" and "Regarding social issues, where would you place yourself?" (1 = strongly left-wing, 10 = strongly right-wing;  $W^1$ :  $M = 4.75$ ;  $SD = 2.16$ ; Cronbach's  $\alpha = .94$ ). Self-perceived levels of fake news identification were assessed using Borah's (2022) misinformation efficacy scale, with items such as "Generally, I am able to discern fake information from real news," "Most of the time, when I see fake news, I am able to detect them easily," and "It is very unlikely that a piece of fake information can mislead me" (1 = completely disagree, 10 = completely agree;  $W^1$ :  $M = 6.14$ ;  $SD = 1.91$ ). Finally, demographic variables, such as age, gender, income, and education, were also included.

### **Analysis Strategy**

Various statistical techniques were employed to test the proposed hypotheses and address the research question. First, to assess whether the scales for (self-perceived) fake news exposure, fake news concerns, cognitive elaboration of fake news, and (self-perceived) fake news identification measure distinct yet correlated constructs, a principal axis factoring with Promax rotation was conducted (Tabachnick & Fidell, 2013). Subsequently, a series of autoregressive regression models (Adachi & Willoughby, 2015) were designed to test H1 to H3. A panel design in which the same individuals repeatedly take the survey over time provides stronger evidence of population changes and the underlying factors driving those changes compared with cross-sectional, one-time individual-level data. In these models, control variables from Wave 1 (and the autoregressive term) were introduced in blocks to isolate and evaluate their explanatory power in predicting fake news concerns and cognitive elaboration of fake news in Wave 2.

To test the moderation effect hypothesized in H4, the PROCESS macro (Hayes, 2018; Model 1) was used. Interaction effects were computed using bootstrapping with 5,000 samples and bias-corrected confidence intervals set at 95%. Finally, to examine the moderated mediation hypothesized in H5, the PROCESS macro (Model 7) was used (Hayes, 2017). This analysis included the same control variables used

in the direct autoregressive regressions and the autoregressive terms for cognitive elaboration of fake news and fake news concerns. Given the absence of a third wave in the panel survey, both the mediator and the dependent variable were examined at  $W^2$ , with their baseline levels introduced as covariates. In this model, we included the mediator at  $W^2$  instead of  $W^1$  to strengthen the temporal-order findings. This approach ensures that baseline levels of both the mediator and the dependent variables are accounted for. Additionally, from a theoretical perspective, it is more plausible that the effect of social media news use on cognitive elaboration unfolds over time, while the influence of cognitive elaboration on fake news concerns occurs concurrently. The index of moderated mediation was used to test the conditional process analysis using 5,000 bootstrap samples and confidence intervals set at 95%. See online supplemental material for robustness checks and additional analyses.

### Results

Principal axis factoring with Promax rotation (Tabachnick & Fidell, 2013) was conducted to examine the correlated, but distinct nature of the main constructs related to the measurement of fake news: (self-perceived) fake news exposure, fake news concerns, cognitive elaboration of fake news, and (self-perceived) fake news identification. The analysis identified four distinct factors collectively explaining 80.64% of the total variance, which aligned well with the proposed constructs (see Table 2 in the online supplemental material). However, for the construct of fake news concerns, the factor loading for the item "Social media are the main sources of fake news" was .363, falling below the recommended threshold of .40 (Stevens, 1992; Tabachnick & Fidell, 2013). Consequently, this item was excluded from the composite index, resulting in a final construct comprising the remaining three items.

**Table 1. Autoregressive Model Predicting Fake News Concerns in  $W^2$ .**

Predictors	Autoregressive Fake news concerns ( $W^1-W^2$ )
<i>Block 1: Autoregressive term <math>W^1</math></i>	
	<i>b</i>
Fake news concerns	.553*** (.042)
$\Delta R^2$	31%
<i>Block 2: Demographics <math>W^1</math></i>	
Age	.006 (.005)
Gender	.253 (.144)
Ethnic	-.661 (.422)
Education	.018 (.029)
Income	.082 (.045)
$\Delta R^2$	1.3%
<i>Block 3: Ideology and fake news identification <math>W^1</math></i>	
Political ideology	-.005 (.033)
Fake news identification	-.005 (.038)
$\Delta R^2$	0.1%
<i>Block 4: Mediator <math>W^1</math></i>	
Cognitive elaboration of fake news	.105** (.034)
$\Delta R^2$	1.3%
<i>Block 5: Variable of interest <math>W^1</math></i>	
Social media news use	.009 (.026)
$\Delta R^2$	0%
Total $R^2$	33.6%
Adjs. $R^2$	32.4%
Residual std. error	1.647

Note. The sample size is 570. Unstandardized beta coefficients and standard errors between brackets.

\*\*  $p < .01$ . \*\*\*  $p < .001$ .

The first hypothesis examined whether social media news use ( $W^1$ ) is associated with fake news concerns ( $W^2$ ). Results from the autoregressive model, as reported in Table 1, revealed a nonsignificant relationship between respondents' level of social media news use and subsequent fake news concerns. This analysis controlled for the autoregressive term and all covariates, including the mediator (cognitive elaboration of fake news,  $W^1$ ). Furthermore, the independent variable accounted for 0% of the variance in predicting fake news concerns, underscoring its lack of explanatory power.

**Table 2. Autoregressive Model Predicting Cognitive Elaboration of Fake News  $W^2$ .**

Predictors	Autoregressive Cognitive elaboration of fake news ( $W^1-W^2$ )
<i>Block 1: Autoregressive term <math>W^1</math></i>	
Cognitive elaboration of fake news	<i>b</i> .541*** (.037)
$\Delta R^2$	34%
<i>Block 2: Demographics <math>W^1</math></i>	
Age	-.003 (.006)
Gender	-.042 (.168)
Ethnic	-.220 (.490)
Education	.029 (.034)
Income	.023 (.052)
$\Delta R^2$	0.3%
<i>Block 3: Ideology and fake news identification <math>W^1</math></i>	
Political ideology	.013 (.038)
Fake news identification	.023 (.044)
$\Delta R^2$	0.1%
<i>Block 4: Variable of interest <math>W^1</math></i>	
Social media news use	.066* (.030)
$\Delta R^2$	0.6%
Total $R^2$	35%
Adjs. $R^2$	33.9%
Residual std. error	1.914

Note. The sample size is 570. Unstandardized beta coefficients and standard errors between brackets.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

To test H2, we conducted an autoregressive regression analysis with cognitive elaboration ( $W^2$ ) as the dependent variable and social media news use ( $W^1$ ) as the independent variable. Results reported in Table 2 revealed a statistically significant and positive temporal association between social media news use and cognitive elaboration of fake news ( $b = .066$ ,  $p < .05$ ,  $\Delta R^2 = 0.6\%$ ). This finding indicates that respondents who consume more news on social media are more likely to cognitively elaborate on fake news encountered there. The temporal association remained significant after controlling for baseline levels of cognitive elaboration of fake news ( $W^1$ ) and all covariates. Accordingly, H2 was empirically supported by the data. Beyond the autoregressive term ( $b = .541$ ,  $p < .001$ ,  $\Delta R^2 = 34\%$ ), none of the covariates included in the model were statistically significant predictors of cognitive elaboration of fake news ( $W^2$ ). The total variance explained by this model was 35%.

The final direct association (H3) was tested using the same regression model as the first hypothesis (see Table 1). For this analysis, cognitive elaboration of fake news was introduced in a separate block of the autoregressive model to examine its temporal impact on fake news concerns ( $W^2$ ) while controlling for all covariates and baseline levels of the dependent variable. Results revealed a statistically significant and positive temporal association between cognitive elaboration of fake news and fake news concerns ( $b = .105$ ,  $p < .001$ ,  $\Delta R^2 = 1.3\%$ ). This suggests that respondents who cognitively elaborate on fake news encountered

on social media are more likely to develop concerns about its impact in Spain over time. Accordingly, H3 was empirically supported by the data. Beyond the autoregressive term ( $b = .553, p < .001, \Delta R^2 = 31\%$ ), none of the covariates were statistically significant predictors of fake news concerns. The total variance explained by this model was 33.6%.

**Table 3. Autoregressive Moderating Effect of Self-Perceived Fake News Exposure in  $W^1$  Over the Association Between Social Media News Use in  $W^1$  and Cognitive Elaboration of Fake News in  $W^2$ .**

Cognitive Elaboration of Fake News $W^2$				
<i>Block 1: All prior blocks of table 3</i>	Coeff.	SE	LLCI	ULCI
$\Delta R^2$	35%			
<i>Block 2: Moderation</i>				
Social media news use $W^1 \times$ Self-perceived fake news exposure $W^1$	.035**	.011	.013	.058
$\Delta R^2$	1%			
Total $R^2$	36%			

Note. Estimates are unstandardized coefficients. Interaction effects based on bootstrapping to 5,000 samples with biased corrected confidence intervals set at 95%. The effects account for the same control variables found in Table 1.

\*\*  $p < .01$ .

To test H4, we conducted a moderation analysis, controlling for all covariates included in Table 3. The results, reported in Table 3, revealed a statistically significant and positive moderation effect ( $b = .035, p < .01, \Delta R^2 = 1\%$ ) of self-perceived fake news exposure levels ( $W^1$ ) on the temporal association between social media news use ( $W^1$ ) and cognitive elaboration of fake news ( $W^2$ ). Table 4 presents the conditional effects of this association at different values of self-perceived fake news exposure ( $-1$  SD, mean levels, and  $+1$  SD).

**Table 4. Autoregressive Conditional Effect at Values of Self-Perceived Fake News Exposure.**

Self-perceived fake news exposure in $W^1$	Effect	SE	LLCI	ULCI
$-1$ SD ( $-2.317$ )	-.021	.038	-.097	.054
Mean (0.00)	.061	.031	-.000	.122
$+1$ SD ( $-2.317$ )	.143**	.043	.058	.229

Note. The moderator variable (self-perceived fake news exposure) is the mean and  $\pm$  SD from the mean. Self-perceived fake news exposure and social media news use were mean-centered before analysis.

\*\*  $p < .01$ .

As shown in Table 4, the temporal association between social media news use and cognitive elaboration of fake news strengthens at higher levels of self-perceived fake news exposure. Notably, this association was statistically significant only at the highest levels of the moderator ( $+1$  SD,  $b = .143, p < .01, 95\% CI = .058, .229$ ). Accordingly, H4 was empirically supported by data.

The final hypothesis (H5) proposed a moderated mediation model in which social media news use ( $W^1$ ) positively influenced cognitive elaboration of fake news ( $W^2$ ), which in turn increased citizens' fake news concerns ( $W^2$ ). However, this indirect effect was hypothesized to occur only at high levels of self-

perceived fake news exposure ( $W^1$ ). To test this conditional indirect effect, Model 7 of the PROCESS macro was employed.

Results from the autoregressive moderated mediation analysis predicting fake news concerns ( $W^2$ ), as reported in Table 5, indicated a statistically significant and positive index of moderated mediation (Index = .009,  $SE = .004$ , 95%  $CI = [.0007, .0183]$ ). Specifically, at high levels of self-perceived fake news exposure (+1 SD), the conditional indirect effect was significant ( $b = .041$ ,  $SE = .015$ , 95%  $CI = [.011, .073]$ ), providing empirical support for the final hypothesis.

**Table 5. Autoregressive Moderated Mediation Model Predicting Fake News Concerns in  $W^2$ .**

Social media news use $W^1 \rightarrow$ Cognitive elaboration of fake news $W^2 \rightarrow$ Fake news concerns $W^2$				
	Effect/Index	SE	LLCI	ULCI
-1SD of self-perceived fake news exposure in $W^1$	-.002	.013	-.028	.025
Mean levels of self-perceived fake news exposure in $W^1$	.019	.010	-.000	.040
+1SD of self-perceived fake news exposure in $W^1$	.041	.015	.011	.073
Index of moderated mediation	.009	.004	.0007	.0183

*Note.* Estimates are unstandardized coefficients. Conditional indirect effects based on bootstrapping to 5,000 samples with biased corrected confidence intervals set at 95%. The effects account for the same control variables found in Table 1. The moderator variable (self-perceived fake news exposure) is the mean and +/- SD from the mean. Self-perceived fake news exposure and social media news use were mean-centered before analysis.

## Discussion and Conclusion

As fake news spreads on social media, there have been growing concerns about its prevalence and consequences (Barthel et al., 2016; Jungherr & Rauchfleisch, 2022; Mitchell et al., 2019). However, what cognitive and perceptual factors might shape these concerns over time remains unclear. Understanding how public concerns about their information environment evolve is crucial, as it has far-reaching implications for how they access, understand, and engage with news (Chang, 2021; Tandoc et al., 2020; Wagner & Boczkowski, 2019). Against this backdrop, the current study explored when and how news consumption on social media influences concerns about fake news in Spain, accounting for the role of cognitive elaboration and perceived exposure to fake news. Our findings bear several meaningful insights worth underscoring.

First, contrary to our expectations, we did not find support for a direct association between social media news use and concerns about fake news over time. This finding may sound counterintuitive because social media are often considered primary vehicles for fake news (Allcott & Gentzkow, 2017). Our findings suggest that mere exposure to a potentially misleading information environment or consuming news in such an environment does not necessarily translate into increased apprehension.

Instead, our results highlight the need for an alternative explanation—cognitive elaboration—that links social media news use to concerns about fake news (Chang, 2021; Tandoc et al., 2020). To be specific,

our findings suggest that individuals who consume news on social media more often are more likely to reflect on the false news they encounter. We also found that those who elaborate more on such false content are more likely to express concern about its societal impact. These findings provide valuable insights into research on the role of cognitive elaboration, such as the cognitive mediation model (e.g., Eveland, 2001), by replacing news elaboration and its effects tested in these studies with fake news and attitudes toward it.

While previous studies have found a positive association between news exposure on social media and individuals' cognitive elaboration of the news they encounter (e.g., Su et al., 2024), our results suggest that consuming news on social media may also trigger cognitive elaboration of misleading news. This is significant because, as cognitive mediation model scholarship suggests (Eveland, 2001; Gil de Zúñiga et al., 2021; Su et al., 2024), individuals interpret and reflect on the importance of their encounters (even with fake news) through their social media consumption. In doing so, they activate concerns about the potential societal impact of fake news. Given that social media have become a primary news source worldwide (Pew Research Center, 2024) and that individuals can learn even from news they encounter incidentally when they cognitively elaborate on it (Gil de Zúñiga et al., 2021; Wieland & Kleinen-von Königslöw, 2020), the role of cognitive elaboration of fake news in shaping concerns about it is an important contribution to our current understanding of individuals' perceptions of the impact of fake news in society. It is also worth noting that we measured cognitive elaboration specifically in the context of fake news, unlike most of the earlier work examining cognitive elaboration in general, which extended its operationalization.

Another important finding is that perceived fake news exposure plays a moderating role, amplifying the cognitive elaboration process and its subsequent impact on concerns about fake news. Our findings reveal that the positive association between social media news consumption and cognitive elaboration is contingent on individuals' perceptions of their exposure to fake news. Specifically, those who use social media for news exhibit a stronger tendency to engage in cognitive elaboration about fake news when they believe they are frequently exposed to fake news. This finding suggests that individuals' cognitive elaboration with fake news could be shaped not only by their actual media consumption but also by their perceived information environment. It highlights the central role of perceptions in the study of fake news (Jones-Jang et al., 2021; Schulz et al., 2020) and in broader understandings of news users' experiences (Swart et al., 2022).

Our results also confirm that the indirect effect of social media news use on fake news concerns through cognitive elaboration is contingent on perceived fake news exposure: The mediation effect is stronger among individuals who perceive themselves as highly exposed to fake news. Taken together, this study unpacks the mechanisms underlying fake news concerns (i.e., cognitive elaboration and perceived exposure). The incremental approach—beginning with direct associations and progressing toward an overarching moderated mediation model—provides a nuanced understanding of the mechanism and contingent factors shaping concerns about fake news.

Although we tested individual-level factors and outcomes, our findings have societal implications, as widespread concerns about fake news could undermine public trust in news media and other democratic values. Individuals who question the reliability of available information could become skeptical of journalistic content in general and may even avoid news altogether (Mitchell et al., 2019). Such fears also erode public

confidence in democratic processes (Bennett & Livingston, 2018) and even foster political cynicism (Jones-Jang et al., 2021). By examining when and how people raise concerns about their information environment, this study contributes to broader debates on the consequences of fake news.

This study aims to provide empirically robust evidence, yet it is not without limitations. First, at a broader methodological level, the study relies on self-reported measures, which, as is common in survey research, are inherently subject to bias. Consequently, the findings may not be as methodologically rigorous as those derived from more controlled experimental designs. In this regard, one of the variables most affected by this intrinsic limitation is self-perceived fake news exposure. As noted in the measurement section, this construct is designed to capture subjective assessments of exposure to fake news, relying on participants' ability to recall and estimate its frequency. Given the subjective nature of fake news identification (Schulz et al., 2020), perceived exposure—rather than actual exposure—could be a more meaningful predictor of individuals' cognitive and emotional responses to fake news.

As outlined in the methods section, the use of repeated measures across two waves limits our ability to examine a full mediating effect with the dependent variable at Wave 3. Consequently, we opted to assess this indirect effect by positioning the mediator in Wave 2 and the independent variable in Wave 2, thereby allowing us to establish a temporal order effect for the first path—from the independent variable to the mediator—while conducting a concurrent analysis of the relationship between the mediator and the dependent variable. Beyond the theoretical justification for this analytical approach, we contend that introducing the mediator in Wave 2 enhances the robustness of temporal-order effects, as it accounts for the baseline levels of both the mediator and the independent variable. However, future research could further enhance our study by incorporating a three-wave panel design to fully ascertain the temporal order of effects between the independent variable and the mediator, as well as between the mediator and the dependent variable. In addition, qualitative approaches, such as in-depth interviews or focus groups, could provide richer insights into how individuals develop perceptions of fake news exposure and concerns. Future work may also examine additional variables, such as trust in news, news literacy, and need for cognition, that could further illuminate the consequences of fake news concerns at both the individual and societal levels.

Another limitation of our study was the absence of a measure of general cognitive elaboration on news content. While we focused specifically on the elaboration of fake news, consistent with our dependent variable (concern about fake news), the lack of a more general measure prevented us from testing whether reflection on news in general could also influence concerns about fake news. Future research should therefore examine alternative models, including general cognitive elaboration, as they may also foster concerns about fake news. Similarly, although platforms vary in their affordances (Anter, 2025) and logics (Hase et al., 2023), which shape how information is presented and processed, we did not look at platform-level differences, as our primary interest was social media news use as a general practice. Future studies would benefit from how different platform affordances and logics may influence people's experience of news and perception of fake news exposure. Finally, although the attrition rate between the two waves aligns with similar panel studies, the Wave 2 sample cannot claim the same quota representativeness as Wave 1.

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