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Online Political Engagement, Cognitive Skills, and Engagement with Misinformation:

Evidence from Sub-Saharan Africa and the United States

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Abstract

Purpose – Informational use of social media facilitates political engagement. Yet, we are now

witnessing the perils of frequent political engagement in misinformation propagation. This study

examines the association between online political engagement, perceived exposure to

misinformation, individuals' cognitive characteristics, and misinformation sharing.

Design/methodology/approach – Online surveys were conducted in Kenya, Nigeria, and South

Africa (Study 1) and the United States (Study 2).

Findings – Study 1 finds that online political engagement is positively associated with perceived

exposure to and sharing of misinformation. Mediation analyses suggest that the relationship

between online political engagement and misinformation sharing is mediated by perceived

exposure to misinformation. Further, the likelihood of sharing misinformation is found to

increase at higher levels of online political engagement, but those with low need for cognition

are more vulnerable to such sharing. Study 2 explores cognitive ability in place of need for

cognition. The results follow similar patterns as Study 1 - online political engagement is linked

to misinformation sharing via higher perceived exposure to misinformation. We also find that the

tendency to share misinformation increases with frequent exposure to misinformation but those with lower cognitive ability are more prone to such sharing.

Originality / value – In both contexts, our data show that perceived exposure to misinformation mediates the relationship between online political engagement and misinformation sharing and those with low need for cognition and cognitive ability are more vulnerable. Overall, the findings offer insight into the mechanisms of political engagement and sharing misinformation.

Keywords: misinformation behaviors, political engagement, need for cognition, cognitive ability, social media

Social media has redefined the way citizens engage in politics. Millions consume political and public affairs news (Shearer and Matsa, 2018), learn about politics and participate in political activities (Silver and Johnson 2018) on social media platforms. Substantial empirical evidence points to the democratic benefits of social media use for the citizenry (Lilleker and Koc-Michalska, 2017; Gil de Zúñiga *et al.*, 2012; Su and Xiao, 2021; Vaccari and Valeriani, 2016). However, studies have shown that social media platforms such as Facebook, Twitter, YouTube, and Instagram are petri dishes of misinformation (Iosifidis and Nicoli, 2020; Vargo *et al.*, 2018), and recent studies suggest that users who are politically engaged are likely to share misinformation (Valenzuela *et al.*, 2019). This finding contrasts the normative expectation of social media as a facilitator of democratic engagement that would help to mobilize a responsible citizenry.

At the same time, there's evidence to suggest that the prevalence of misinformation might be most acute in several Sub-Saharan African nations, where both perceived exposure to and sharing of misinformation has been shown to be quite high (Newman *et al.*, 2020; Wasserman and Madrid-Morales, 2019). In Africa and elsewhere, exposure to incorrect and misleading information often happens on social media platforms and messaging chat apps such as WhatsApp (Chadwick, Vaccari and Hall, 2022; Silver, 2019; Tandoc *et al.*, 2020). In Kenya and South Africa, for example, more than half of social media and mobile messaging app users (55% and 69% respectively) say they frequently or occasionally see articles on those platforms that seem obviously false or untrue (Silver, 2019).

Given this context, we explore the relationship between online political engagement and perceived exposure to and sharing of misinformation in Sub-Saharan Africa and the United States. Building on existing work on political engagement and misinformation behaviours

(Austin, Borah and Domgaard, 2021; Chang, Haider and Ferrara, 2021; Ohme *et al*,, 2021; Valenzuela *et al.*, 2019), this study explores how online political engagement translates into misinformation sharing through greater exposure to misinformation. In addition, we examine the role of two cognitive factors – need for cognition (NFC) and cognitive ability – as moderators in the relationship between political engagement and misinformation behaviors. NFC is a cognitive factor that captures enjoyment for critical thinking and is often considered a necessary antecedent to mindful processing of news and information and has been linked to political engagement, making it an important factor to explore in this context (Ashley *et al.*, 2017). Similarly, cognitive ability refers to individuals' general intelligence and has been found to be an important factor in misinformation engagement (Ahmed, 2021). Individuals with higher cognitive ability are better at information processing (Vernon, 1983) and are less likely to believe and share false content on social media (Ahmed, 2021; Pennycook and Rand, 2019a). Thus, we believe that both enhanced critical thinking (measured by NFC) and the real ability to process information and analytical thinking in cognitive ability can be critical factors in exposure to and engagement with misinformation.

We examine these issues by comparing the results of two survey studies, one in Kenya, Nigeria, South Africa (Study 1), and one in the United States (Study 2). In doing so, we address two important shortcomings of existing work: (a) the limited amount of research exploring misinformation sharing behavior and political engagement in the Global South; and (b) the lack of comparative studies between countries in the Global North and the Global South (Madrid-Morales and Wasserman, 2022). Most work has focused on countries in Europe and North America (Allcott and Gentzkow, 2017; Grinberg *et al.*, 2019; Guess *et al.*, 2019) limiting the empirical and theoretical scope of existing research. In African contexts, misinformation is not a

new phenomenon and is often linked to colonial and post-colonial experiences as well as histories of oppression and expression that rely on alternative media and communication (Dwyer and Moloney, 2019; Nyabola, 2018; Wasserman, 2020). By exploring misinformation behaviors and political engagement in Sub-Saharan Africa and comparing these data to the United States, we offer more robust evidence for understanding these relationships, with the goal of advancing current knowledge and contributing to theorizing on political phenomena from the Global South.

We use survey data collected from online panels to answer four overarching questions: (1) What factors explain misinformation exposure and sharing? (2) What role does political engagement play in misinformation sharing? (3) Do cognitive factors inhibit the spread of misinformation? (4) Are there differences in these relationships between the United States and countries in Suh-Saharan Africa? Ultimately, we aim to determine whether perceived exposure to misinformation mediates the relationship between online political engagement and sharing misinformation. The study's findings extend current scholarship by comparing insights from Sub-Saharan Africa and the United States and offer a nuanced understanding of how cognitive factors impact the relationship between online political engagement and misinformation sharing.

Social Media and Misinformation

Lately, misinformation has garnered attention due to its role and prominence related to recent U.S. elections and the ongoing Covid-19 pandemic (Allcott and Getnzkow, 2017; Gringberg *et al.*, 2019; Guess *et al.*, 2019). Elsewhere in the world, countries in Asia (Poonam and Bansal 2019), South America (Avelar, 2019; Dwoskin and Gowen, 2018), and Sub-Saharan Africa (Hitchen *et al.*, 2019; Wasserman and Madrid-Morales 2019), for example, are reporting the use and effects of misinformation on civil and political events. Research on this area, which has increased rapidly since 2016, has focused to a great extent on the role that social media

platforms and instant messaging apps have had in fuelling the growth of misinformation online

and offline (Tandoc, 2019). The relationship between social media and misinformation behaviors

has been identified at both global and national levels, with examples of the former including the

COVID-19 pandemic (Sommariva *et al.*, 2021), and the national elections in Kenya (Maweu,

2019) for the latter.

To understand the phenomenon of sharing misinformation on social media, a key

question remains: who shares it? The literature on media effects reports a consistent and positive

association between online exposure to information, and news sharing behavior in general,

regardless of its veracity (Hutchens *et al.*, 2015; Weeks and Holbert, 2013). Therefore, it is not

surprising that exposure to misinformation has been identified as a primary antecedent to sharing

it (Grinberg *et al.*, 2019; Halpern *et al.*, 2019). The preference-based logic argues that

individuals consider their political identities above truth and therefore would share

misinformation to push their political agenda (Van Bavel and Pereira, 2018), to mobilize the

audience or create chaos (Petersen *et al.*, 2018), or to push content that would be "interesting-if-

true" (Altay *et al.*, 2021). A social media user's age, political interest, political ideology, fear of

missing out, and social media fatigue can also predict their likelihood to share misinformation

(Guess *et al.*, 2019; Halpern *et al.*, 2019; Talwar *et al.*, 2019). Moreover, increased exposure

translating into sharing behaviour could also entail a lack of attention or critical thinking

(Pennycook and Rand, 2021).

While studies of the same magnitude haven't been done in Sub-Saharan Africa, survey

evidence presented by Wasserman and Madrid-Morales (2019) and Newman et al. (2020) and

cross-national focus group data (Madrid-Morales *et al.*, 2020), suggest that sharing of inaccurate

information is widespread, particularly among those who are heavy social media users. Thus, based on the above discussion, the following hypothesis is proposed:

H1: Perceived misinformation exposure will be positively associated with misinformation sharing.

Online Political Engagement and Misinformation

When media users perceive they are exposed to misinformation online, not all of them are equally likely to share that information with others. Research into misinformation engagement behaviours has revealed other forms of engagement such as providing corrections to information that users deem inaccurate (Bode and Vraga, 2021); commenting and discussing the content to seek further clarification (Xiao and Su, 2022). In some cases, rather than engagement, research has revealed the existence of avoidance behaviors, such as ignoring inaccurate information (Tandoc, Lim and Ling, 2019), in similar ways to those described in literature on selective avoidance and unfriending effects (John and Dvir-Gvirsman, 2015). Tandoc *et al.* (2019) have posited that ignoring or blocking misinformation is less likely among users who feel strongly about an issue. These users are more likely to engage in correcting and sharing behaviors. This resonates with findings in other areas of research in political knowledge such as work on "corrective action" (Rojas, 2010). A common characteristic of these studies is that those who are more likely to actively engage with information, whether accurate or not, are those with higher levels of political interest.

The dramatic increase in social media use across the globe in the last decade has led to an extensive body of research exploring how new communication practices might impact individuals' engagement with politics (Cho *et al.*, 2020; Bosch, 2017; Valenzuela *et al.*, 2016). A certain consensus has been reached around two ideas: social media platforms and messaging

apps are increasingly being used by those seeking political information; and, political engagement online and offline increases as people are more inclined towards searching political news on social media (Bosch, 2018; Gil de Zúñiga *et al*., 2012). These two findings have been shown to be fairly consistent across political systems and in countries with rather different stages of economic development. Writing about South Africa, Bosch (2019) reckons that "despite internet penetration issues related to the digital divide, social media is increasingly being used by citizens to engage in collective forms of networked action" (p. 68).

The same social media platforms that seem to have nurtured new forms of political engagement, have been under the spotlight more recently because of an upsurge in the amount of misinformation being circulated (Silver, 2019). Research in the context of the 2016 U.S. presidential election has shown that exposure to political disinformation among American voters was generally low. However, it was significantly higher amongst very conservative individuals, who tend to be exceedingly engaged in online information seeking (Allcott and Gentzkow, 2017; Guess *et al*., 2020).

During the 2016 U.S. election, conservative citizens were not only more likely to be exposed to inaccurate political information, they also appeared to be much more inclined towards sharing it with others on Facebook (Guess *et al*., 2019). In a political and socio-economic context (Chile) more proximate to the three Sub-Saharan African countries we study, Valenzuela et al. (2019) have shown that individuals with higher levels of online political engagement are more likely to spread news content, including misinformation. In the authors' view, there are three reasons to expect an association between online political engagement and sharing misinformation. First, individuals who are more politically engaged might be more likely to share information that aligns with their political views, regardless of veracity, because of biases

in how they process information, as research has shown (Leong *et al.*, 2020). These biases can come, for example, from processing information through one's own lived experience (Cramer and Toff, 2017), or from having narrowly defined political categories, as research in post-Brexit UK has revealed (Zmigrod, Rentfrow, and Robbins, 2018). Second, with more political participation comes the possibility that individuals cluster around "polarized networks" (Valenzuela *et al.*, 2019, p. 806) where inaccurate information gets shared at high rates via social media or closed-messaging apps (Kuru *et al.*, 2022). And third, politically engaged individuals might share misinformation simply because they see themselves as opinion-leaders, which leads them to sharing more information online than others. Evidence of this behavior can be found in Madrid-Morales *et al.*'s (2020) study of college students in six Sub-Saharan African countries. After showing focus group participants examples of online misinformation, participants noted that, not them, but their politically engaged friends would be likely to share those stories online. Building on these findings, in our second hypothesis, we test the association of online political engagement with both exposure to and sharing of misinformation:

> H2: Online political engagement will be positively associated with a) perceived exposure
> to misinformation and b) misinformation sharing.

While there would seem to be enough research that confirms the direct effect of online political engagement on exposure and sharing of misinformation, the possible mediating role of exposure to misinformation on the relationship between online political engagement and sharing of inaccurate information has not been as widely explored. Work by Halpern and colleagues (2019) would seem to support this. Using data from Chile, the authors test the mediating role of being exposed to misinformation in the relationship between multiple independent variables (e.g., news consumption on social media, frequency of use of social media, trust in traditional

media, conspiracy mentality, strength of political views, confidence in information shared by

contacts, and online political participation) and sharing misinformation. Of all the predictor

variables, only online political participation is found to have an indirect positive association with

sharing misinformation through exposure to it. We test this relationship with our third

hypothesis:

> H3: Online political engagement will have an indirect positive association with
>
> misinformation sharing through perceived exposure to misinformation.

Need for Cognition and Receptivity to Misinformation

A number of cognitive and personal factors are associated with sharing and believing

misinformation (Pennycook and Rand 2019a, 2019b; Roschke, 2018). For example, research

suggests that some individuals believe false information because of confirmation bias, which

proposes that people find information that supports their beliefs to be more credible or persuasive

than information that contradicts it (Lazer *et al*., 2018). Other research suggests a lack of

analytical thinking and not biased processing, which contributes to believing misinformation

(Pennycook and Rand 2019a, 2019b). Studies on thinking styles suggest that people who are

more likely to engage in effortful processing are less likely to perceive misinformation as

accurate (Schaewitz *et al*., 2020). In this research, Schaewitz *et al*. (2020) analyzed need for

cognition and faith in intuition to examine the relationship between these "thinking styles" or

cognitive predispositions and perceptions of false news stories.

Need for cognition seems like a particularly relevant cognitive factor as it directly

addresses a person's interest in thinking, which is a critical aspect of the kind of mindful

processing that may help people detect misinformation. NFC is a personality trait that describes

an individual's desire to think critically and to enjoy thinking (Furnham and Thorne, 2013;

Haugtvedt *et al*., 1992). Furham and Thorne (2013) define NFC as "a stable personality trait relating to the tendency to engage in and enjoy effortful cognitive activity" (p. 230). Individuals with higher NFC are more likely to engage in mindful processing while individuals with lower NFC are more likely to rely on heuristics or cues and to engage in peripheral processing, which could influence their perceptions of misinformation.

Research on news credibility has found that individuals' NFC predicts news credibility evaluations (Metzger *et al*. 2015). In other words, "NFC is a strong predictor for young people's general credibility concerns regarding online information and their ability to evaluate such information correctly" (Schaewitz *et al*., 2020: p. 10). Considering the relationship between NFC and mindful processing, we suggest that individuals with higher NFC will be less likely to be exposed to misinformation because they will put in more effort to find credible news and will be less likely to share it when they do encounter misinformation. We propose the following relationships between NFC and misinformation behaviors such that:

H4: Higher need for cognition will be negatively associated with (a) perceived exposure to misinformation and (b) misinformation sharing.

H5: Need for cognition will moderate the association between perceived exposure to misinformation and misinformation sharing, such that the association will be stronger among individuals with low need for cognition.

Valenzuela *et al.* (2019), however, suggest that politically engaged individuals are more likely to engage in biased information processing than the unengaged. However, this kind of biased processing could be mitigated by NFC if it promotes more mindful processing that counters political motivations (Ashley *et al*., 2017). Individuals with higher NFC may be less likely to engage in motivated reasoning and more likely to thoughtfully process and share

information (Miller *et al.*, 2016; Nir, 2011). In addition, higher NFC has been shown to be

associated with individuals' desire to engage with more complex political information and

politics more broadly, which again could contribute to less peripheral processing (Sohlberg,

2019). If this is the case, then we expect that NFC will moderate the relationship between

political engagement and misinformation behaviors:

> H6: Need for cognition will moderate the association between online political
>
> engagement and misinformation sharing, such that the association will be stronger among
>
> individuals with a low need for cognition.

Study 1

Method

Sample

The data used in this study was gathered via an online sample fielded between April and

May 2019 ($N = 901$). To recruit participants from Kenya, Nigeria, and South Africa, we

employed a public opinion research firm that maintains online panels in these countries. Our

sample comprises adults (18 years and above) who were paid financial incentives for their

participation. While this data collection strategy in Sub-Saharan Africa tends to overrepresent the

urban, young, and more educated sections of the population (Lau et al., 2018), this is also the

only segment of the population likely to be exposed to political news content online regularly.

We also examined the relationships with a weighted (using the latest available census data)

dataset. The findings followed the same patterns as presented here.

Measures

Perceived exposure to misinformation was measured by asking respondents how often

($1 = $ often to $4 = $ never) they come across news stories about politics and government online that

they think a) are not entirely accurate and b) are completely made up. The items were reversed so that higher values represent more frequent perceived exposure to misinformation. The items were averaged to create a scale of perceived exposure to misinformation (M = 3.33, SD = .57, α = .62).

Misinformation sharing was measured by asking respondents if they have ever shared a political news story online that a) they later found out was made up? (31.1% shared) and b) they thought at the time was made up? (23.9% shared). The two items were summed to create a scale of misinformation sharing (M = .55, SD = .75, α = .60) (see Apuke and Omar, 2021; Wasserman and Madrid-Morales, 2019).

Online political engagement was measured by asking the respondents how frequently (1= never to 5 = all the time) they engaged in the following five activities a) post or share content about politics on a social media site like Facebook or Twitter, b) post or share content about politics on a messaging site like WhatsApp, c) express your political views on a social media site like Facebook or Twitter, d) express your political views on a messaging site like WhatsApp and e) follow a political candidate or group on a social media site. The responses were averaged into an index of online political engagement (M = 2.60, SD = 1.07, α = .89).

Need for cognition (NFC) was measured by asking the respondents to indicate how much do they agree (1 = strongly disagree to 7= strongly agree) with the following statements a) I prefer to do something that challenges my thinking abilities rather than something that requires little thought and b) I prefer complex problems to simple problems. The two items were summed to create an index for NFC (M = 5.67, SD = 1.11).

In all models, we also included demographics and motivational controls that have been found to influence either online political engagement or misinformation behaviors.

Demographics included a) age (M = 29.62, SD = 9.95), b) gender (57% males), c) education

measured on a 10-point scale (M = 7.92, SD = 1.33). Motivational controls included mainstream

media trust (*M* = 2.87, *SD* = .60, α = .69) and political efficacy (*M* = 5.06, *SD* = 1.23, α = .81).

Scale details are included in Appendix A1.

Results

We conducted regression models to test our assumptions. The results are included in

Table 1 (misinformation exposure: Model 1 and misinformation sharing: Model 2). First, we

observe that perceived exposure to misinformation was positively related to misinformation

sharing (*b* = .164, SE = .042, *p* < .001; Model 2, Block 1). That is, those who are feel they are

exposed to misinformation are more likely to share them. Thus, H1 is supported.

Next, we examined if online political engagement was positively associated with

perceived exposure to misinformation (H2a) and sharing (H2b). The results (Model 1, Block 1)

supported the hypothesis, suggesting that online political engagement is positively related to

perceived exposure to misinformation (*b* = .074, SE = .020, *p* < .001). Similarly, the results

(Model 2, Block 1) suggest that online political engagement is positively associated with sharing

misinformation (*b* = .227, SE = .025, *p* < .001). Thus, both H2a and H2b are supported. Simply

put, respondents with higher online political engagement were more likely to be exposed to and

share misinformation.

[Table 1]

To test H3 (perceived exposure to misinformation will mediate the relationship between

online political engagement and misinformation sharing behavior), a bootstrapped mediation

model (Model 4) using the SPSS PROCESS macro was employed (Hayes, 2017). An illustration

of the results is presented in Figure 1. The mediation results report (Table 2) that the indirect

effect of online political engagement through perceived exposure to misinformation was statistically significant (b = .012, SE = .004, bootstrapping CI = .004 to .021). Therefore, H3 is supported.

[Figure 1]

[Table 2]

The fourth hypothesis examined the relationship between NFC and perceived exposure to misinformation (H4a) and sharing (H4b). Contrary to our prediction, we did not find evidence for H4a, as higher NFC was positively associated with perceived exposure to misinformation (b = .040, SE = .017, p < .001, see Table 1; Model 1, Block 1). However, the results supported H4b, such that, those with higher NFC were less likely to share misinformation (b = -.048, SE = .022, p < .05, Model 2, Block 1).

[Figure 2a and 2b here]

Moving beyond the direct association, the final two hypotheses tested the moderating role of NFC. The interaction results presented in Table 1 (Model 2, Block 2) failed to find support for H5 (b = .012, SE = .035, p = .727). However, the results support H6 such that the interaction between online political engagement and misinformation sharing was found to statistically significant (b = -.042, SE = .020, p < .05). Figure 2a shows the nature of the interaction and Figure 2b shows the Johnson-Neyman plot. Slope analysis indicates a robust negative effect on misinformation sharing with an increase in NFC. These effects are found to be most substantial for those with low NFC (b = .28, SE = .03, p < .001). Simply put, with the likelihood of sharing misinformation increases with an increase in online political engagement but those with low NFC are most vulnerable to such sharing. Figure 2b reveals that these effects are significant for all NFC levels observed in the data.

The results of Study 1 suggest that other than the direct effects of online political engagement on perceived exposure to misinformation and sharing, exposure also mediates the relationship between engagement and sharing. Thereby partly explaining a critical question, why are politically engaged citizens more likely to share misinformation? These findings dampen the optimism that online political engagement would always result in democratic benefits to society. However, we also find that, in the three Sub-Saharan African countries we observed, individuals with a higher NFC are less likely to share misinformation, suggesting that building critical thinking capacity and enjoyment could mitigate misinformation sharing tendencies.

The findings in Study 1 support, and expand, those in Valenzuela *et al.* (2019) and Halpern *et al.* (2019). Taken together, they provide empirical evidence of the connection between online political engagement, exposure to and sharing of misinformation in emerging democracies. Without similar research in advanced democracies, it is difficult to assess whether this association is one we should only expect to see in countries where democratic values are still being shaped, or whether this is a case of communication phenomena that, although first identified in countries from the Global South, could also be applied to the Global North. In Study 2, we test this proposition by exploring the same relationships from Study 1, replacing NFC with a measure of cogniative abillity, using survey data from the United States.

Study 2

At a first step, Study 2 aims to examine if the relationships observed in study 1 are replicated within the U.S. context. Thus, H1-3 are re-proposed.

Study 2 also proposes to focus on cognitive ability instead of need for cognition. Some researchers have found NFC to be positively associated with general cognitive ability (Day *et al.*, 2007; Martin *et al.*, 1993), but other studies have found no association between the two

constructs (Bors *et al.*, 2006). Moreover, Pennycook and Rand (2019a) argue that NFC may be

"susceptible to systematic distortion" (p. 187) because some individuals may not be reflective

enough to realize that they are unreflective (see Pennycook *et al.*, 2017). Therefore, in Study 2,

we focus on cognitive ability instead of NFC. H4-6 are tested with cognitive ability.

To operationalize cognitive ability, we use the Wordsum test. The vocabulary test has

been frequently used to assess cognitive ability since it shares a high variance with general

intelligence (Brandt and Crawford, 2016; Ganzach *et al.*, 2019). More recently, the test has also

been used to evaluate online users' cognitive ability and misinformation engagement behavior

(Ahmed, 2021; Lee *et al.*, 2020; Murphy *et al.*, 2019).

<center>Method</center>

Sample

This study uses survey data ($N = 1,244$) gathered in the United States from an online

panel administered by Qualtrics in February 2020. The sample closely mirrored the population

parameters focusing on age and gender. Similar stratified online quota samples are commonly

used to generalize the conclusions to the national population (Min, 2021; Nelson *et al.*, 2021).

Measures

We focus on the same variables of interest as Study 1 including *perceived misinformation*

exposure ($M = 3.30$, $SD = .95$, $\alpha =.80$), *misinformation sharing* ($M = .99$, $SD = 1.38$, $0 =$ never to

$2 =$ more than once, $\alpha =.86$) and *online political engagement* ($M = 2.61$, $SD = 1.92$, $\alpha = .96$; see

Ahmed & Gil-Lopez, 2022).

However, instead of NFC, we include *cognitive ability* which was measured using a 10-

item Wordsum vocabulary test ($M = 5.59$, $SD = 2.62$, $\alpha = .77$). The Wordsum test is a subset of

the Wechsler Adult Intelligence Scale where participants are presented with a target word and

asked to choose the closest matching word from a list of five random words. The measure has

been frequently used in current literature to measure respondents' cognitive ability (Ahmed,

2021; Lee *et al.*, 2020; Murphy *et al.*, 2019).

Similar to the analytical strategy adopted in Study 1, we included several control

variables including age (M = 46.51, SD = 17.15), gender (49.9 % males) and education (M =

5.70, SD = 1.23), mainstream media trust (M = 3.11, SD = 1.12, α = .91) and political efficacy

(M = 5.06, SD = 1.23, α = .80). Details are included in Appendix B1.

For an easier comparison across Study 1 and 2, we use the same set of control variables.

However, we also ran regression models for Study 2 with additional controls including race,

income, and political interest. Since the results were consistent with what is reported here, the

more comparable models are presented.

<div align="center">Results</div>

Following the same analytical strategy as Study 1, we employed a regression model to

test the Study 2 hypotheses. The results are summarized in Table 3. Consistent with Study 1, it

was found that perceived exposure to misinformation was positively associated with

misinformation sharing (b =.244, SE = .036, p < .001); therefore, H1 was supported (Model 2,

Block 1). Online political participation (Model 1 and 2) was also found to be positively related to

both perceived exposure to misinformation (b =.185, SE =.019, p < .001) and misinformation

sharing (b =.345, SE =.024, p < .001). Thus, respondents with higher levels of online

participation were more likely to perceive they are exposed to misinformation and sharing it.

H2a and H2b were supported.

<div align="center">[Table 3]</div>

To test H3, a bootstrapped mediation model was employed. An illustration of the results

is detailed in Table 4 and presented in Figure 3. The mediation results suggest that the indirect

effect of online political engagement through perceived exposure to misinformation was

statistically significant (b =.045, SE =.009, bootstrapping CI =.030 to.063). Therefore, H3 is

supported.

[Figure 3]

[Table 4]

Next, we did not find support for H4a as the relationship between cognitive ability and

perceived exposure to misinformation was statistically not significant (Table 3, Model 1).

However, cognitive ability was negatively associated with misinformation sharing (b = -.083, SE

= .014, $p < .001$, Model 2, Block 1). Thus, those with higher cognitive ability were less likely to

share misinformation (H4b supported). This is similar to Study 1 where individuals with higher

NFC were also less likely to share misinformation.

The final set of analyses examined the moderation effects of cognitive ability. The results

are presented under Model 2 (Block 2) in Table 3. The interaction between cognitive ability and

perceived exposure to misinformation was found to be statistically significant (b = -.032, SE =

.014, $p < .001$), thereby supporting H5. Figure 4a shows the relationships between perceived

exposure to misinformation and sharing for different levels of cognitive ability. The slope test

indicates that while the tendency to share misinformation increases with an increase in exposure

to misinformation, those with lower cognitive ability are more prone to such sharing (b = .32, SE

= .05, $p < .001$). Figure 4b provides greater detail and indicates that the effect of perceived

exposure to misinformation is significantly negative for individuals with cognitive ability lower

than 9.35 (*cognitive ability range* = 1 to 10) that includes 98.39% of the sample.

The interaction between cognitive ability and online political engagement was

statistically not significant therefore H6 is not supported.

[Figure 4a and 4b here]

Discussion

This research examined the relationship between perceived exposure to misinformation, online political engagement, cognitive factors, and misinformation sharing in three Sub-Saharan African countries and the United States. Our findings reveal consistent patterns across Study 1 and Study 2 suggesting that the underlying mechanisms for these behaviors persist across contexts. Our findings are also in line with previous research in Chile (Valenzuela *et al.*, 2019), which found that citizens who are most engaged with politics online are more likely to share misinformation. Perceived misinformation exposure appears to mediate this relationship, in that politically engaged individuals are most likely to be exposed to misinformation and, in turn, more likely to share it.

These consistent findings are concerning from a normative perspective if we consider the potentially anti-democratic effect of social media: online political engagement is found to be positively associated with both perceived exposure to misinformation and sharing. From a theoretical perspective, however, our findings, coupled those from with Valenzula *et al.* (2019), suggest that greater political engagement is linked to misinformation behaviors, an important finding that has now been supported in multiple contexts. Previous research has shown that there is a positive relationship between political engagement and news consumption on social media (e,g., Saldaña, McGregor and Gil de Zúñiga, 2015). With extensive exposure to news and information, the likelihood of perceived exposure to misinformation increases, particularly given that research has demonstrated that it is through social media that most people perceive they are exposed to misinformation (Silver, 2019; Wasserman and Madrid-Morales, 2019). Besides, the

inability to discern misinformation from accurate news and information, increases tendencies to share such false content. This is not surprising given that previous research has found a positive association between online exposure to news and sharing (Weeks and Holbert, 2013).

While online political engagement increases the likelihood of misinformation sharing, we also find that NFC can partially safeguard the adverse effects of online political engagement. This area warrants further research as NFC has been linked to the mindful processing necessary to discern low- and high-quality news and information and to political engagement (Ashley *et al.*, 2017). Suppose NFC contributes to both of these behaviors. In that case, it is essential to further explore these mechanisms and consider possible interventions that could improve information processing and the kind of positive political engagement that has been the focus of most studies. In our study, we see political engagement associated with "dark" participation, but perhaps, developing critical thinking and related cognitive skills could be a way to intervene in this process. The results of Study 2 suggest that individuals with higher cognitive ability are less likely to share misinformation, suggesting that increased education and support for thinking, could help address the spread of misinformation.

Measuring "thinking" in these two ways – as need for cognition and as cognitive ability – is both a strength and limitation of this research. Considering different ways of understanding "thinking" is important as we grapple with how to prevent audiences from believing and sharing misinformation. However, because we measure in these two ways, we cannot compare the Sub-Saharan African countries to the United States directly. Future research should continue to explore "thinking" using a variety of measures and concepts.

Finally, it is important to make a note about the three Sub-Saharan countries under study here. In all our models, we considered the possible effect of cultural, political, and socio-

economic contexts by including country dummy variables as controls. While Kenya, Nigeria, and South Africa are among the freest democracies in Sub-Saharan Africa, and all enjoy substantial press freedom levels, it would be naïve to consider them as a single unit. For example, while politicians in both Kenya and South Africa have entertained the idea of introducing new regulations to address issues with misinformation, no such laws have been passed. That is not the case in Nigeria, where tougher libel and social media laws were passed and affected public opinion (Okoro and Emmanuel, 2019). Despite this and other important contextual differences, we saw no significant effect of the country in the relationships we explored. In other words, while we acknowledge that each of the three countries in the study has a unique democratic trajectory and has faced issues related to misinformation at different intensities and in different forms, our data would seem to suggest that these have not significantly led to different outcomes. Citizens with higher levels of political engagement in all three countries are more likely to be exposed to misinformation, and this seems to lead to higher rates of sharing. Equally, those with a higher need for cognition and were less likely to share misinformation. Similar patterns are observed in the United States, where cognitive ability was found to shield against misinformation sharing.

In addition, the data used in both studies are cross-sectional in nature. As such, causal claims cannot be made. Based on existing literature, we expected and found support for the relationship between online political engagement, misinformation exposure, and sharing. Since online political engagement and misinformation sharing are positively associated, it is likely that misinformation sharing can drive further political engagement. The directionality of the relationships are difficult to assess given the nature of the data used here. Therefore, future studies can employ multiwave surveys to come to more definitive conclusions.

Finally, our measure of online political engagement focuses on social media. While social media platforms are critical to online political engagement (Gil de Zúñiga *et al*., 2012; Saldaña *et al.*, 2015), it is likely that online political engagement can happen outside of social media platforms as well. Therefore, future investigations should analyze the relationship between online political engagement and misinformation sharing on and outside social media platforms.

To conclude, this study extends the current understanding of how higher political engagement transforms into misinformation sharing through perceived exposure to misinformation. We also find that a higher need for cognition and cognitive ability can safeguard against sharing misinformation, suggesting underlying mechanisms related to "thinking" that warrant continued exploration and offer some optimism as researchers and educators continue to grapple with how to address the spread of online misinformation.

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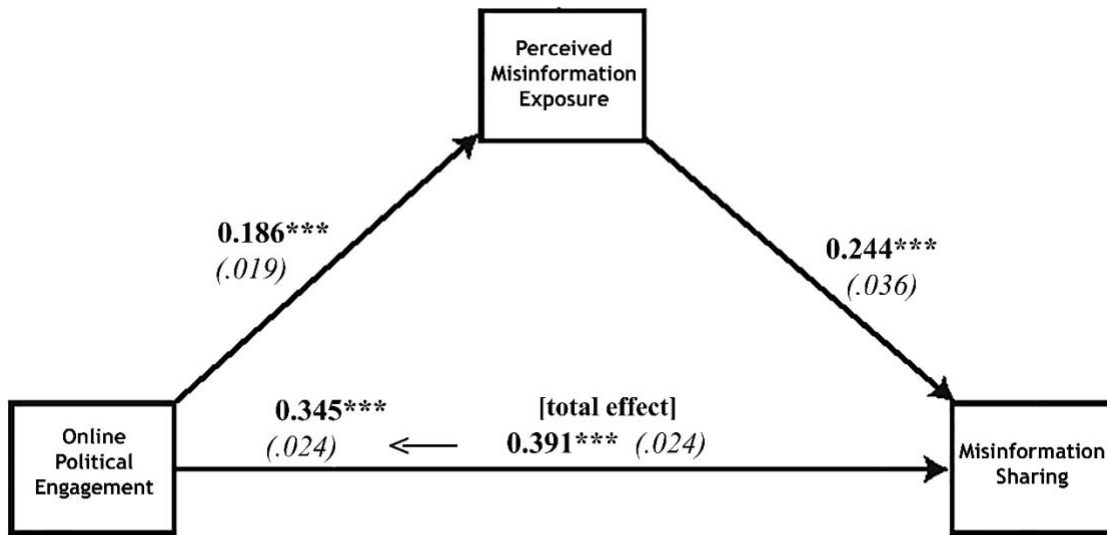*115*(19), E4532–E4540. doi: 10.1073/pnas.1708960115

Figures
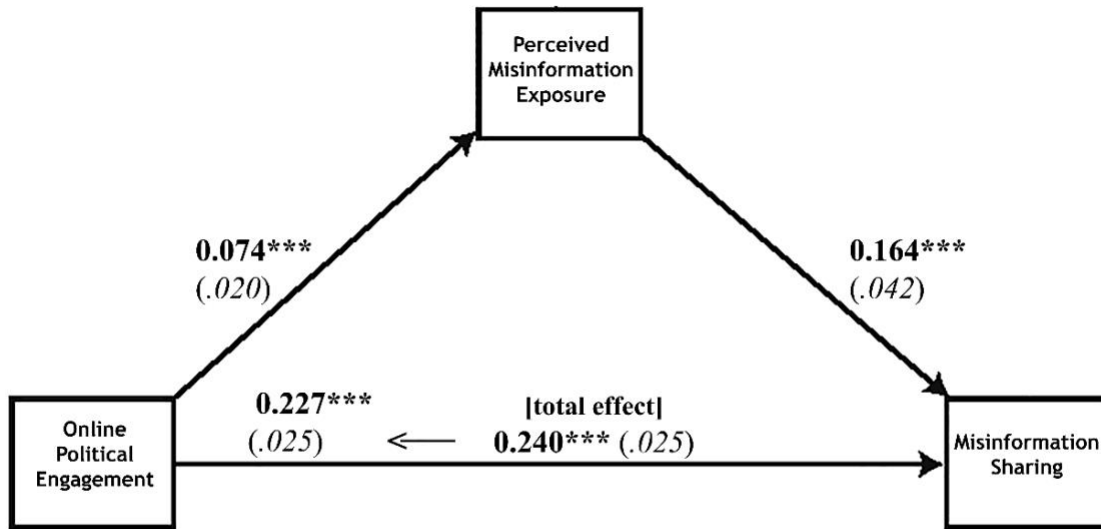
Note. Unstandardized regression coefficients are reported with standard errors in parentheses. Estimates are calculated using the PROCESS macro for SPSS (Model 4, Hayes 2017). Bootstrap resample = 5,000. Statistical controls include dummy variables for *Kenya and Nigeria (South Africa is the reference category), all unrelated experimental conditions, age, gender, education, mainstream media trust, political efficacy, and need for cognition.*

Figure 1. Mediation paths visualized for Sub-Saharan Africa
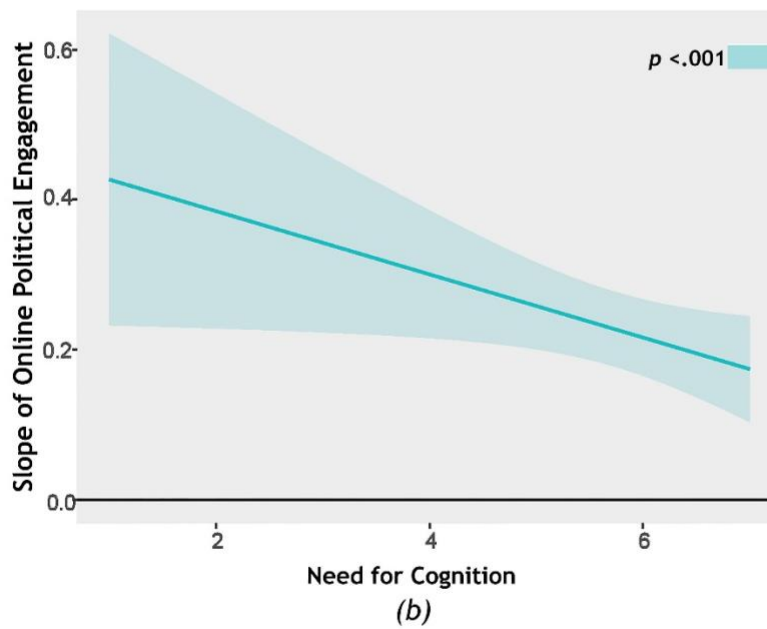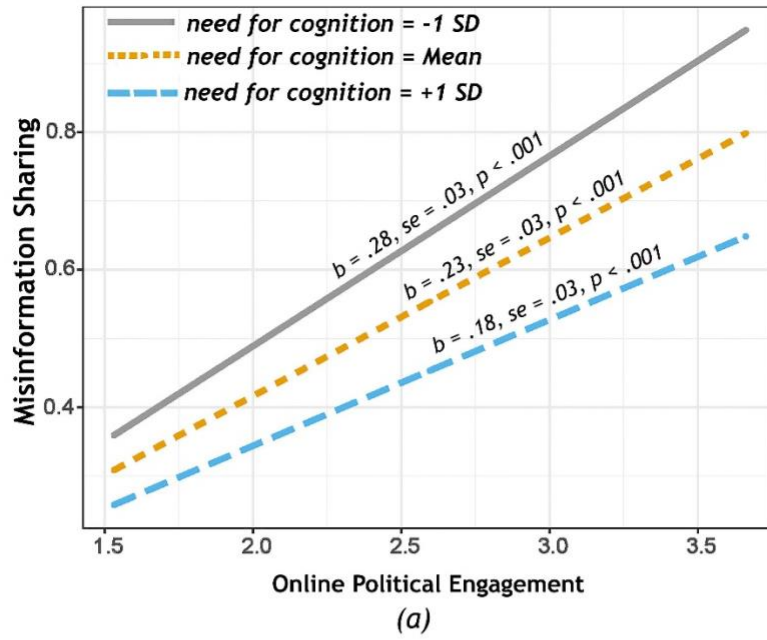
Note: Visualizations of the interaction effect of online political engagement and need for cognition on misinformation sharing. Plot (a) show the relationship between online political engagement and misinformation sharing for different levels of need for cognition. The simple slope test results are also included. The Johnson-Neyman plots (plot b) show the size and significance of the slope of online political engagement throughout all observed need for cognition levels in the data. Shaded regions on plot b indicate 95% confidence intervals. These plots are based on Table 1 (Model 2).

Figure 2. Visualizing two-way interaction between online political engagement and need for cognition

Note. Unstandardized regression coefficients are reported with standard errors in parentheses. Estimates are calculated using the PROCESS macro for SPSS (Model 4, Hayes 2017). Bootstrap resample = 5,000. Statistical controls include *age, gender, education, mainstream media trust, political efficacy* and *cognitive ability*.

Figure 3. Mediation paths visualized for the United States

(a)

(b)
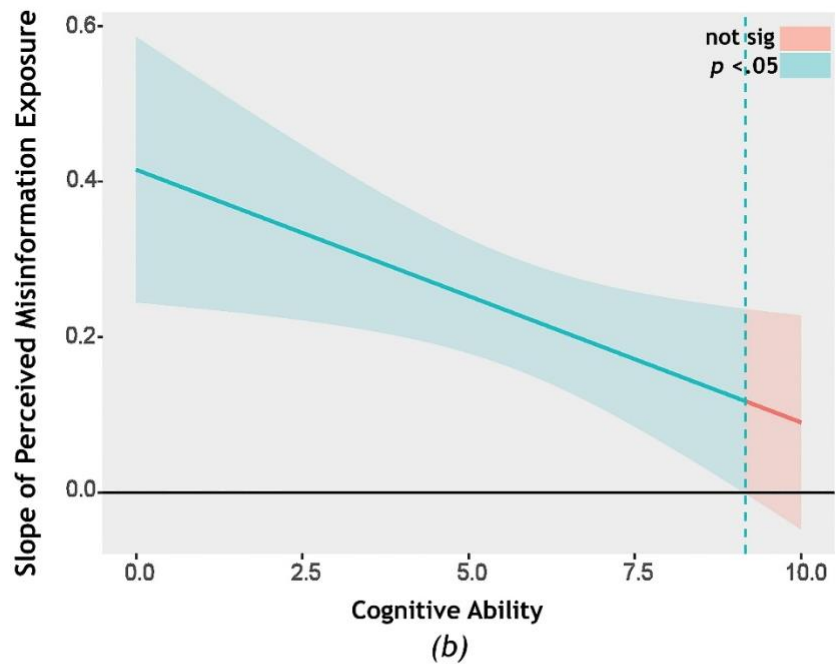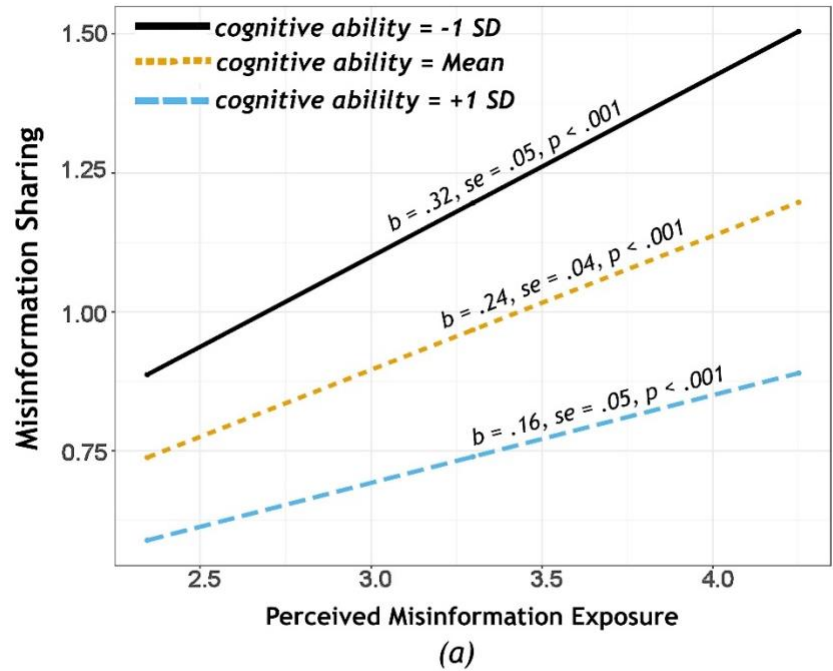
Note: Visualizations of the interaction effect of misinformation exposure and cognitive ability on misinformation sharing. Plot (a) show the relationship between misinformation exposure and sharing for different levels of cognitive ability. The simple slope test results are also included. The Johnson-Neyman plot (plot b) show the size and significance of the slope of misinformation exposure throughout all observed cognitive ability levels in the data. Shaded regions on plot b indicate 95% confidence intervals. These plots are based on Table 3 (Model 2).

Figure 4. Visualizing two-way interaction between perceived exposure to misinformation and cognitive ability

Appendix A1

Mainstream media trust was measured by asking how much respondents trust the information they get from a) national news organizations b) local news organizations and c) international news organizations (1= not at all to 4 = a lot). A scale was created by averaging the responses ($M = 2.87$, $SD = .60$, $\alpha = .69$). Political efficacy was measured via four statements on a 7-point scale (e.g., I feel that I have a pretty good understanding of the important political issues facing our country). The items were summed to create a scale of political efficacy ($M = 5.06$, $SD = 1.23$, $\alpha = .81$).

Appendix B1

Mainstream media trust was measured by asking how much the respondents trust the information

they get from a) national news organizations b) local news organizations and c) international

news organizations (1 = not at all to 5 = a lot). A scale was created by averaging the responses

(M = 3.11, SD = 1.12, α = .91). Political efficacy was measured via two statements on a 7-point

scale (e.g., I have a good understanding of the important political issues facing our country). The

items were summed to create a scale of political efficacy (M = 5.06, SD = 1.23, r = .81).