Misinformation and Emotions in Nigeria: The Case of COVID-19 Fake News

Pre-Analysis Plan*

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1 Overview

The popularity of social media means that news and information travel quickly through large networks of individuals. Problematically, some of the information circulating online is patently false. One study found that during the 2016 US presidential election, 1 in 4 US citizens visited fake news websites (Guess et al., 2018). Other scholars find that false rumors reach more people than true rumors on Twitter (Vosoughi et al., 2018). While misinformation is not a new phenomenon (Lazer et al., 2018), the ubiquity of social media platforms makes it easier for these kinds of falsities to quickly spread far and wide.

This research explores an under-explored mechanism of belief in political misinformation—emotional responses. The aim of this project is to test the role of distinctive emotions in belief in fake news stories. We ask whether emotions are associated with greater belief in online fake news. We are particularly interested in the influence of anger and fear since the former generally makes people rely on heuristics and intuitive strategies (Lerner and Tiedens, 2006), while the latter induces deliberative thinking (Tiedens and Linton, 2001; Miller, 2011; Valentino et al., 2008). We will test whether fake news headlines evoke emotions, such as anger and anxiety, among respondents in Nigeria and examine whether emotional response negatively predicts analytic engagement (and therefore truth discernment) when evaluating the truth of given headlines. Thus, one of the main goals of this study is to extend the dual process framework of misinformation by testing whether

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emotions, which are by definition intuitive processes, play a role in the formation of belief in online political (mis)information (Evans and Stanovich, 2013; Kahneman, 2011).

Given the current COVID-19 pandemic, we focus on belief in and sharing of information about Coronavirus. Understanding how citizens interact with information during health crises is critical because false information about potential cures and remedies during epidemics can be deadly. For example, during the 2014 Ebola epidemic people died reportedly because they followed the advice of rumors that drinking salt water could prevent the disease.[1] Exploring the mechanisms that drive belief in and spread of misinformation are particularly critical during global pandemics when overall anxiety is high and uncertainty is abundant.[2]

1.1 Context: Nigeria

To date, research focused on the process and impact of fake news has largely been limited to the study of news headlines in the US and other western democracies. In many developing contexts, however, news spread on social media more often takes the form of photos with text. This research will help to broaden the scope of fake news research both by examining the emotional and cognitive mechanisms that help to predict belief in and spread of fake news in a competitive democracy where partisan identities are less entrenched, as well as test these mechanisms in the presence of a different type of stimuli that is image-centered.

Fake news is prevalent across the globe and Nigeria is no exception. At one point the president of Nigeria, Muhammadu Buhari, was forced to publicly discredit a rumor that he had died and been cloned. Amid the current Coronavirus outbreak, misinformation about prevention, cures, and home remedies for staving off the virus are abundant on social media sites in Nigeria, as do claims about the government's response. Thus, the government is now forced to not only fight the pandemic and coordinate emergency response, but must also deal with misinformation that threatens citizens' well-being. This study contributes to the literature on misinformation through an exploration of emotional mechanisms and presenting evidence from a developing country context.

2 Research Design

This study assesses whether there is any correlation between emotions evoked by particular headlines or stories and belief in the veracity of that information. In addition to assessing belief, we analyze additional intended behaviors of clicking for more information and sharing the information.

[1] `https://www.who.int/mediacentre/news/ebola/15-august-2014/en/`

[2] Recognizing that information about health crises may be particularly emotional and therefore different from general misinformation circulating online, we plan to conduct this study again after the crisis with political and every day news content. (See Section 4 for more details.)

The following sections describe the headlines used as stimuli, how we measure emotional response, and our three outcome measures.

2.1 Stimuli

The stimuli for this study include a set of headlines collected from news and social media sites frequented by Nigerians. Importantly, all of these headlines and stories recently circulated online in Nigeria. Each respondent views 10 headlines total, five true and five false, the order of which is randomized.[3] We obtained the false headlines after they were checked and reported by AFP and AfricaCheck.org between March 20th and 27th, 2020. All stimuli are about the Coronavirus pandemic. Some headlines describe remedies or fake stories (as shown in Figure 1). Other stories describe statements (both true and false) reportedly said by political leaders (as in Figure 2). At the end of the survey, respondents are debriefed and informed which headlines are false and which are true.

Figure 1: Example of a *false* story that circulated in Nigeria: Africans are immune to Coronavirus



[3]Though most of these headlines are not politically charged, if we find differential reactions to the stimuli by partisanship, we will have a different sample of respondents to rate the headlines as whether they believe they largely support the PDP or APC (the two main parties in Nigeria), in order to then control for whether the headline is concordant or discordant with the respondent's political affiliation.

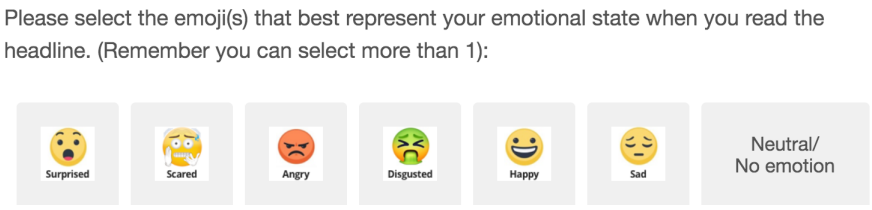
Figure 2: Example of a *true* story that circulated in Nigeria: Chairman of the Economic and Financial Crimes Commission said corruption caused Coronavirus



2.2 Emotion

We measure respondents' emotional state by asking them to select emojis, each of which is associated with a distinctive emotional response, to indicate how they feel after reading the headline. After selecting the emotions, they are asked to rate how strongly they feel it on a scale from 1 (not very strongly) to 7 (very strongly). Labels for each emoji are included below the image.

Figure 3: Question measuring emotional response



Ideally we would have an automatic or biological way to measure felt emotions immediately after respondents read the headline. Because we cannot do this in the context of the online survey, participants are randomly assigned to either give a response to the veracity (belief) question or the emotion measure first after seeing the headline. We do this because studies show that labeling emotions can act as emotion regulation (Torre and Lieberman, 2018), therefore reducing felt emotions. Asking about felt emotions after belief, however, is post-treatment with respect to this outcome measure. Randomization of the order of questions occurs at the participant level. If we observe no difference in ordering effects in terms of the relationship between felt emotions and belief then we will pool these two conditions to analyze the correlation between reported emotions and belief, clicking, and sharing.

2.3 Belief and behavior

We are interested in three main outcomes in this study. Our primary outcome measure is respondents' assessment of the veracity of the headline. We ask them to report their belief by answering the question: "Do you think this headline accurately describes an event that actually happened?" In addition to belief, our second and third outcomes of interest are whether or not respondents indicate that they would click to read the story and whether or not they would share the story, if these were possible.[4] After a respondent is asked these questions for all ten headlines, they are asked whether they have seen each headline prior to the study.

2.4 Hypotheses and Analysis

We have two main hypotheses (1-2) and two secondary hypotheses (3-4):

H1 Respondents will be more likely to believe false headlines that evoke an emotional response.

H2 Respondents will be more likely to report wanting to click to read and share false headlines that make them emotional.

H3 Cognitive reflection, as measured by the Cognitive Reflection Test (CRT), will negatively correlate with susceptibility to fake information.

H4 Respondents who tend to regulate their emotions (both through cognitive reappraisal and expressive suppression as measures by the ERQ) will be less likely to believe in fake information.[5]

For the analysis, we will use mixed-effect models with random slopes and intercepts for respondents and headlines (see model 1), in order to account for the interdependence between observations because participants rate several headlines and all headlines are assessed by all participants.

$$belief = \beta_0 + \beta_1 true + \beta_2 emo + \beta_3 true * emo + u_0 + u_1 true + v_0 + v_1 emo + \epsilon \quad (1)$$

Where *emo* represents the emotion rating by respondents which varies within headlines and between respondents, and *true* is the veracity of the headline (true/false) which varies within respondent and between headlines. The β's estimate the fixed effects, parameters u_0 and u_1 estimate the by-respondent random effects, and v_0 and v_1 estimate the by-headline random effects (intercept

[4]Note, we do not allow respondents to *actually* click to read the article or share the story because we do not want respondents consuming more misinformation or spreading it.

[5]The Emotion Regulation Questionnaire (ERQ) is a 10-item scale designed to measure respondents' tendency to regulate their emotions (Gross and John, 2003).

and slope). Should the models not converge, we will exclude random slopes from the models (following Brauer and Curtin (2018)).

Although our dependent variables (belief, click, share) are dichotomous, we will use linear regression models for ease of interpretation but for robustness confirm that the results are consistent with logistic regression models. For each of the discrete emotions, we will run a model predicting perceived accuracy (binary) on a dummy for that selected emotion, a headline veracity dummy, and the interaction.[6] Furthermore, we will test whether or not the strength of emotions predict our three outcomes by running the same models replacing the emotion dummy with a variable that has value 0 if the emotion was not selected, and the value on the 1 to 7 scale selected in the followup intensity question if the emotion was selected. We will analyze each of our six distinct emotions separately, as well as run one model pooling all emotions to look at the correlation between emotion-inducing headlines and our outcomes of interest. We will follow up any significant interactions by using net coefficients to test simple effects. For robustness, we will also run all models including controls for gender, age, and education level, as well as specifically look at any differences between men and women with respect to felt emotions and belief.

2.5 Debrief and Ethics

At the end of the study all respondents are told that half the headlines they saw were true and half were false. They are shown the false headlines again with red "X's" through them and are also shown which headlines were true.[7] Importantly, all of the headlines used as stimuli circulated online media in Nigeria. We did not make up false stories. Rather, we asked respondents to assess headlines already present in the media and at the end informed them of the veracity of those stories. For these reasons, we anticipate that the study offers greater potential benefit than the minimal risk of harm to respondents if they absorb the misinformation presented in the study. At the end of the survey, we provide links to AfricaCheck.org and to the WHO's Coronavirus myth-busters page, as well as links for respondents join both organizations' WhatsApp groups.

3 Sample Recruitment Through Facebook

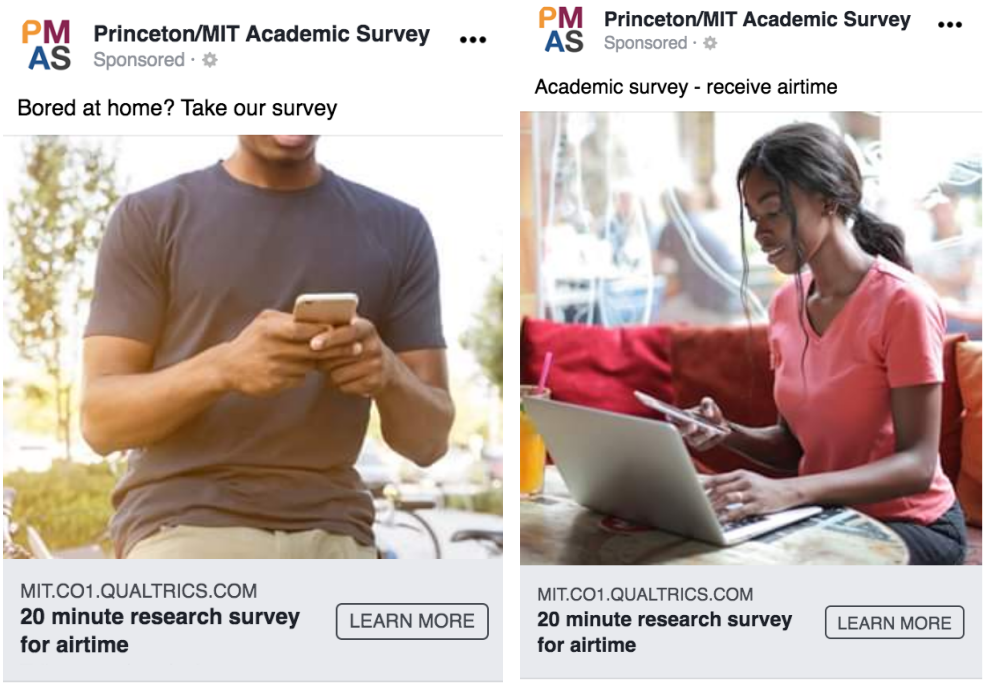
We aim to recruit around 1000 respondents through Facebook ads (as shown in Figure 4) targeted to users living in Nigeria who are 18 years and older. Facebook is becoming a tool for respondent recruitment in developing coutnries, given the ability to rapidly deploy surveys and the

[6] We will also include a dummy for headline concordance if we find that partisanship correlates with belief in particular headlines.

[7] Even though there is some evidence that repeating false information, even to correct misinformation, can strengthen belief in falsities, we were required by TSE-IAST IRB to tell respondents which headlines were true and false.

cost effectiveness of reaching respondents across the globe (Pham et al., 2019). We plan to initially target ads to the entire country, but if we find that our click-through-rate is low and survey uptake slow, we will shift to targeting the ads specifically to Facebook users in cities with the largest number of users on Facebook in Nigeria (Lagos, Kano, Ibadan, Benin, and Abuja). We will create two ads for each location, one targeting men and the other targeting women to try and achieve balance on gender.

Figure 4: Ad to recruit Facebook users in Nigeria to the survey



4 Follow Up Studies

4.1 Testing emotion regulation interventions

Do emotion regulation and emotion suppression techniques reduce belief in online misinformation?

This research design mirrors our other study conducted on MTurk with US-based respondents. Similar to the study we conducted in the US, if we similarly find in Nigeria that particular emotions are correlated with belief in fake headlines we will conduct a follow-up study, with a separate sample, designed to test interventions that promote emotion *suppression* or emotion *reappraisal*. We will also compare how emotion regulation techniques compare to standard interventions, such as encouragement to evaluate the source and question the motive, with respect to improving discernment the veracity of online information.

In this second study, the same set of stimuli described above will be presented but respondents will not be asked about their emotional response. Instead, respondents will be randomized to receive reminders before reading the headlines, focusing on reappraisal or suppression, or to a control condition without any prompt. The text of the emotion reappraisal and suppression treatments used for our US-based study are below:

- **Reappraisal:** As you view and read the headlines, please try to adopt a detached and unemotional attitude. Please try to think about what you are reading objectively. Read all of the headlines carefully, but please try to think about what you are seeing in such a way that you feel less emotion.
- **Suppression:** As you view and read the headlines, if you have any feelings, please try your best not to let those feelings show. Read all of the headlines carefully, but try to behave so that someone watching you would not know that you are feeling anything at all.

Outcome measures are the same questions about belief in the headline, clicking, and sharing.

4.2 Emotions and political misinformation

We begin our exploration into the relationship between emotions and misinformation in Nigeria using headlines about coronavirus and COVID-19 given its prevalence and time sensitivity. We also plan to repeat this study using stimuli drawn from information circulating the news and social media in Nigeria about everyday issues and politics.

It could be the case that information about Coronavirus and COVID-19 make respondents particularly emotional, but as many studies in the U.S. have found, information about politics can also evoke strong emotions, such as fear and anxiety, among respondents. Hence, we want to explore the correspondence between emotions and respondents' ability to discern real from fake news, generally, as well as test the efficacy of interventions designed to reduce the spread of online misinformation both in the context of the current pandemic and more broadly in the usual media environment.

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