The Emotional Loading of Fake News

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1 Introduction

Fake news tends to spread faster than real news, often due to its emotional appeal (Vosoughi *et al.*, 2018). Research shows that fake news posted on social media platforms like Twitter, Facebook, and Instagram convey negative emotions such as anger, disgust and fear (Farhoudinia *et al.*, 2024), while fake news headlines frequently use emotionally charged language to attract attention and increase engagement, making headline sentiment crucial in understanding misinformation spread (Alonso *et al.*, 2021; Bakir & McStay, 2018). This raises the question of whether anger, disgust and fear are also stronger expressed in unreliable news headlines than in reliable ones.

Do the headlines of unreliable news sites convey more negative emotions than those found on truthful news sites?

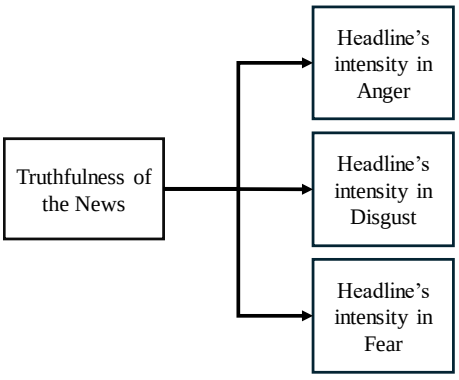

Figure 1. Directed Acyclic Graph representing the hypothesized causal links between the emotions of fear, anger, disgust and unreliable news

We anticipate that:

Prediction: At least one negative emotion is more present in unreliable news than in real news.

Indeed, studies have shown that fear, anger, and disgust are among the most frequently evoked emotions in the spread of fake news (Farhoudinia *et al.*, 2024), so based on these findings, we predict that one of those negative emotions is more present in unreliable news than in the reliable ones.

2 Data

To address our research question, we used two datasets previously employed in studies by Ahmed, Traore, and Saad, focusing on opinion spam detection and fake news classification (Ahmed *et al.*, 2018;

Ahmed *et al.*, 2017). These datasets contain over 20,000 news articles each — about half labeled as truthful (sourced from Reuters) and about half as unreliable (from sites flagged by PolitiFact and Wikipedia), mostly published between 2016 and 2017. Each row includes the title, full text, subject, publication date, and type (truthful or unreliable) of the article.

We prompted the Large Language Model (LLM) Phi-4 (*see* ***Appendix, Figure 6***) to annotate the emotional loading of 1000 randomly picked news headlines from these datasets, evenly split between unreliable news (500) and real news (500) (*see* ***Appendix, Figure 3***). To assess the emotional tone of each headline, Phi-4 generated scores for three key emotions: fear, disgust, and anger. Each emotion was rated on a continuous scale from 0 to 1, where 0 indicates the complete absence of the emotion and 1 represents a strong presence (*see* ***Figure 2 and Appendix, Figure 4***).

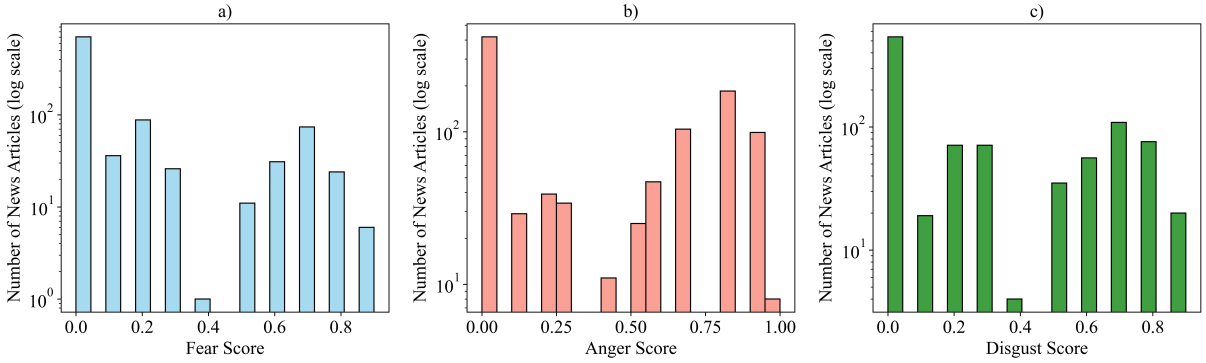

Figure 2. a) Distribution of the fear score (log scale), **b)** Distribution of the anger score (log scale), **c)** Distribution of the disgust score (log scale)

3 Methods

To test our hypothesis, we conducted a multiple logistic regression using the emotion scores to examine whether the intensities of anger, disgust, and fear are respectively associated with the veracity of a news headline. (*see* ***Figure 1***).

$$logit(P(Veracity\_news = 1)) = \beta_0 + \beta_1 Anger_i + \beta_2 Disgust_i + \beta_3 Fear_i$$

Where:

$Veracity\_news$	Binary indicator of whether the headline's news website is reliable (1) or unreliable (0)
$Anger_i$	Anger score of the headline i
$Disgust_i$	Disgust score of the headline i
$Fear_i$	Fear score of the headline i

4 Results

The regression results show that anger and disgust are both significant predictors. Indeed, anger has a significantly positive association with unreliable news ($\beta_1 = 1.4210$, $p < 0.001$, *see* ***Appendix, Figure 5***), indicating that headlines expressing anger are more likely to be unreliable. Disgust is also significantly positively associated with unreliable news ($\beta_2 = 0.6033$, $p < 0.001$, *see* ***Appendix, Figure 5***). In contrast, a headline expressing more fear seems to be associated with truthful news, but it is not significant ($\beta_3 = -0.1153$, $p = 0.196$, *see* ***Appendix, Figure 5***), suggesting that this emotion alone is not a reliable indicator in our model.

5 Conclusion

Our findings support the hypothesis that emotionally charged language plays a key role in distinguishing fake news from real news. Specifically, we found that anger and disgust, two emotions frequently

associated with sensationalist content, are significantly more present in unreliable news headlines, validating our prediction. These results are consistent with previous research showing that fake news often relies on heightened emotional appeal to increase engagement and spread, particularly through anger and disgust (Farhoudinia *et al.*, 2024, Alonso *et al.*, 2021.)

In contrast, fear, while commonly cited in the literature as a driver of misinformation (Bakir & McStay, 2018), did not emerge as a significant predictor in our model when controlling for the other two emotions. This suggests that not all negative emotions contribute equally to the spread of fake news, and that anger and disgust may serve as more reliable emotional markers of unreliability in headlines.

Future research could expand on this work by incorporating a wider range of emotions, analyzing a more diverse or larger dataset, or exploring emotional framing in multiple languages and media environments. Our results also suggest promising applications for automated fake news detection tools that integrate emotional profiling.

References

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A Appendix

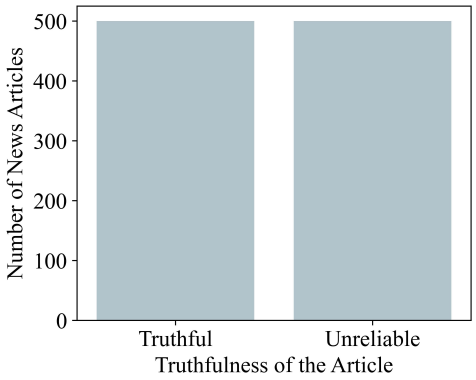

Figure 3. Distribution of the truthfulness of the articles

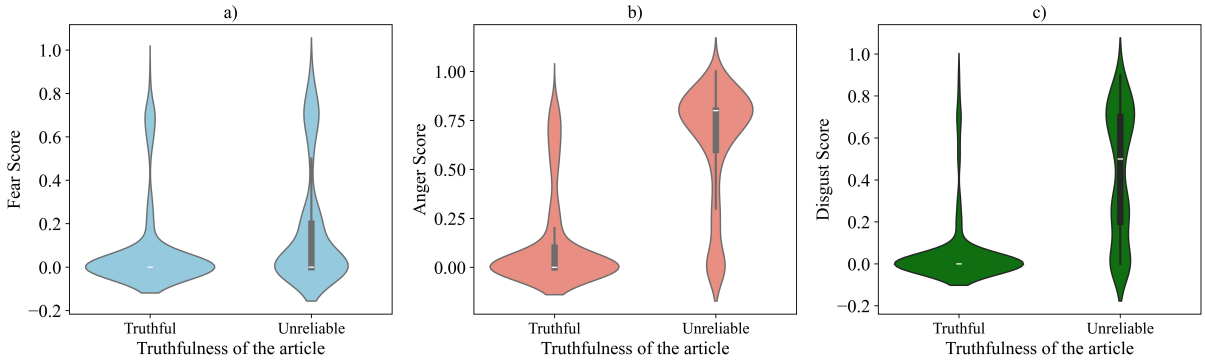

Figure 4. a) Violin plot of the fear score according to the truthfulness of the news, **b)** Violin plot of the anger score according to the truthfulness of the news, **c)** Violin plot of the disgust score according to the truthfulness of the news

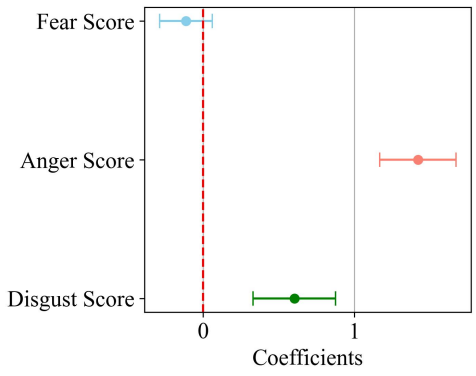

Figure 5. Forest plot showing the results of the multivariate logistic regression

"Evaluate the emotional tone of the following news headline based on how it is phrased and presented, not on its factual content or political implications: `title_to_annotate`
Estimate how strongly each of the following emotions is expressed through the wording and framing only (not the events described):
- Fear
- Disgust
- Anger
Give a score between 0 (not expressed at all) and 1 (very strongly expressed). Use 0 when there is no sign of that emotion.
First, briefly explain your reasoning in one sentence.
Then, on a new line, provide only the scores in this format:
Fear: X
Disgust: X
Anger: X"

Figure 6. Prompt used for evaluating the emotional tone in the news headlines