

# Rating Reliability and Bias in News Articles: Does AI Assistance Help Everyone?

**Benjamin D. Horne**, Dorit Nevo, John O'Donovan, Jin-Hee Cho, and Sibel Adali

**Rensselaer Polytechnic Institute**  
UC Santa Barbara  
Virginia Tech

# Many algorithmic tools have been introduced to assess bias and reliability of news.

- According to Web of Science, since 2017, over 600 papers have been published on “fake news”, over 100 of them in Computer Science
- Much of this work has been framed as “Fake News Detection”
- In lab settings, many of these automatic methods have been shown to be highly accurate
- Who will use the tool?
- The vast majority of these studies use case is for news consumers
- There are even company startups focused on news quality tools for news consumers

# Little work exploring how effective these tools are at changing human perceptions of content

- Even if we have perfect automated tools, will it help consumers?
- Human interaction with misinformation is complex
  - Stories that are coherent may be easier to believe
  - Information shared by trusted friend seen as more credible
  - Information that is compatible with strongly-held beliefs seen as more credible
  - Often heuristics are used, stopping deep information processing

# This work begins filling this context-specific gap

Does algorithmic assistance improve **users' perceptions** of news **reliability**?

1. Randomly select political articles from known reliable and unreliable sources
2. Ensure articles are reliable or unreliable through expert rating (gives us a set of Unreliable articles and Reliable articles)
3. Recruit AmTurkers to rate how reliable they think each article is.

We do this over 3 conditions

# Condition 1: Text Only

Moms Across America Releases Powerful New Documentary Exposing Toxicity of GMOs and Glyphosate

Moms Across America has just released a powerful new video called Communities Rising that exposes the devastating toxicity of GMOs and glyphosate. Watch the video now at this YouTube link, or watch it below.

This film highlights everyday citizens across the world that are taking matters into their own hands, healing their families, raising awareness about organic food, and changing local pesticide policies, filmmaker Zen H. told Natural News. Im confident that were in the process of ending this chemical era and taking back our food supply.

GMOs and glyphosate are the leading toxins used in the mass poisoning of our children and our food soils. This mass poisoning is being underwritten and promoted by the deceptive media, prostituted science shills (who are routinely bribed to promote toxic poisons) and even Monsanto-funded smear groups that attack clean food activists. Thats why its so important that you not only watch this film but share it with others.

Every mom in America needs to see this documentary. Every consumer of food urgently needs to be informed of the systemic poisoning thats being conducted right now, across nearly the entire U.S. food supply.

Watch this important film below, share it with others, and visit MomsAcrossAmerica.com to join the movement. Read Glyphosate.news for more breaking news and science headlines on the toxicity of this deadly chemical thats being sprayed on food crops all across this nation. All our lives are at stake. We either stand up against this mass poisoning or we die of cancer, Alzheimers, depression, suicide and other serious diseases caused by a toxic food supply thats been POISONED on purpose.

Participants are asked:

**On a scale from 1 to 10, how reliable do you think the article is?**

1 - completely unreliable

10 - completely reliable

(a) Text Only Condition

# Condition 2: Text with AI prediction

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Our smart AI system says this article has a 8% chance of being reliable.  
Our smart AI system says this article has a 88% chance of being biased.

(b) AI Base Condition

Participants are asked:

**On a scale from 1 to 10, how reliable do you think the article is?**

1 - completely unreliable

10 - completely reliable

Note: no incorrect answers by the AI

# Condition 3: Text with AI prediction and feature explanation

## Moms Across America Releases Powerful New Documentary Exposing Toxicity of GMOs and Glyphosate

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Our smart AI system says this article has a 8% chance of being reliable. This is because of lack of quotes, function words in title, stop words in title, body text objectivity.

Our smart AI system says this article has a 88% chance of being biased. This is because of word count in title, body text subjectivity, negative emotion, negations.

(Examples are highlighted in the article.)

(c) AI Explanation Condition

Participants are asked:

On a scale from 1 to 10, how reliable do you think the article is?

1 - completely unreliable

10 - completely reliable

Features chosen by classifier

AI uses interpretable features

# There were 654 participants in total

	<b>Text Only</b>	<b>AI Base</b>	<b>AI Explanation</b>
<b>N</b>	217	211	226
<b>Median Age Group</b>	25-34	25-34	25-34
<b>Median Education Group</b>	4 year college	4 year college	4 year college
<b>Gender</b>	M: 100 F: 115 O: 2	M: 110 F: 100 O: 1	M: 100 F: 124 O: 2
<b>Political Leaning</b>	VL:28 L:66 M:77 C:40 VC:6	VL:30 L:57 M:85 C:28 VC:11	VL:25 L:73 M:83 C:34 VC:11



# AI Assistance improves human perceptions about the reliability of news articles

- Using two one-way ANOVA tests corresponding to each ground truth, we find improvement in perceptions using the tool
- **Dependent:** participant ratings, **Independent:** experimental condition

Article Type	F	Post hoc test (indicating what means are different)
Reliable Articles	<b>7.8129**</b>	text only & AI base, text only & AI explanation
Unreliable Articles	<b>18.1541**</b>	text only & AI explanation, AI base & AI explanation

# We analyze individual differences using 7 pre-study questions:

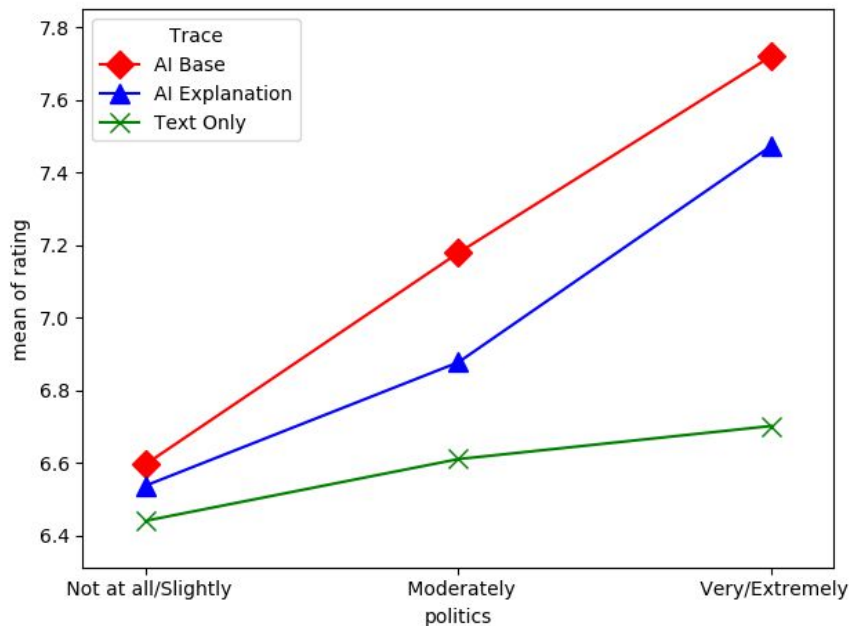
1. **How familiar are you with US politics?** “not at all” to “extremely”
2. **How often do you read news?** “never” to “multiple times a day”
3. **What is the primary way you get news?** “social media”, “news websites”, “TV”, “newspaper”
4. **When you use social media, how often do you share news?** “never” to “always”
5. **Do you trust news coming from mainstream media?** “don’t trust” to “do trust”
6. **Do you trust news coming from your social contacts?** “don’t trust” to “do trust”
7. **What is your political leaning?** “very liberal” to “very conservative”

# We use Two-way ANOVA for each individual difference measures

- **Dependent variable:** participant ratings
- **Independent variable 1:** experimental condition
- **Independent variable 2:** individual difference question
- Tells us if either or both IV have an impact
- Tell us if there is a significant interaction between the two IVs, if so we cannot clearly interpret the significance

We conduct a total of 28 two-way ANOVA tests (4 ground truths, 7 questions)

# Rating Reliable Articles: political familiarity help participants judge when news is reliable.

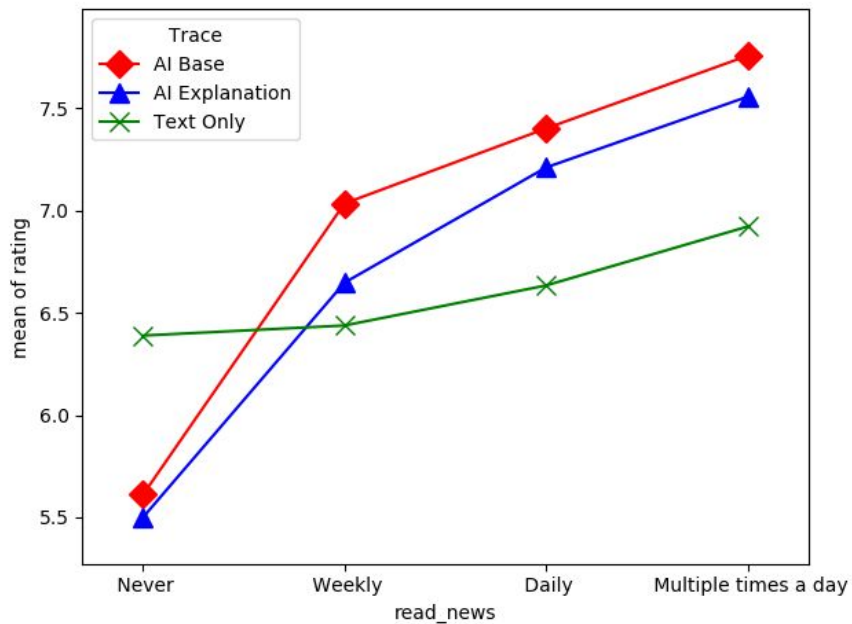


Article Type	Political Familiarity
Reliable	No significant interaction $F_{condition} = 7.66^{**}$ ; $F_{familiarity} = 15.14^{**}$
Unreliable	No significant interaction $F_{condition} = 31.6^{**}$



**Higher is Better**

# Rating Reliable Articles: Reading frequency help participants judge when news is reliable.



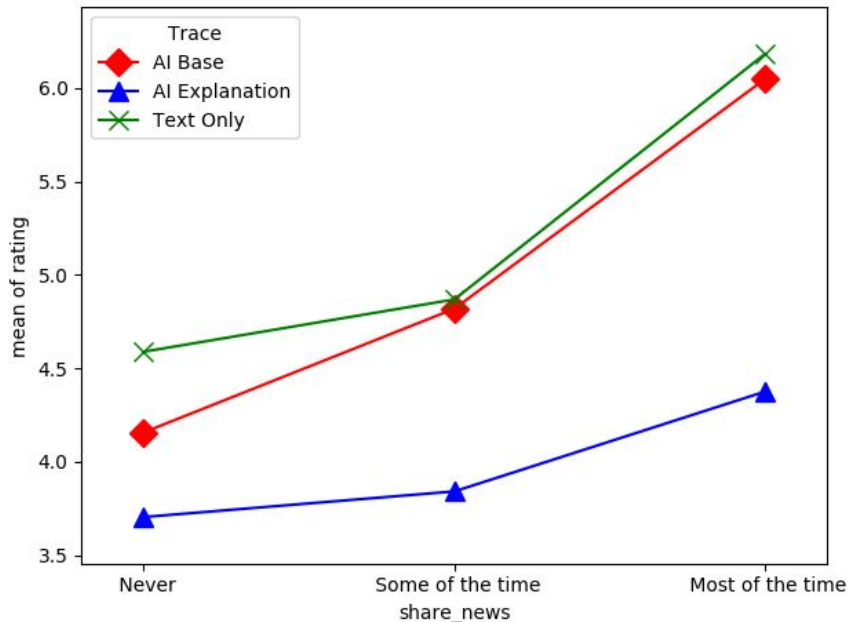
Article Type	Reading Frequency
Reliable	No significant interaction $F_{condition} = 6.69^{**}$ ; $F_{reading} = 15.87^{**}$
Unreliable	No significant interaction $F_{condition} = 32.12^{**}$



**Higher is Better**

- Reading frequency and political familiarity signal expertise in political news

# Rating unreliable articles: those who share news on social media perceive them as more reliable.

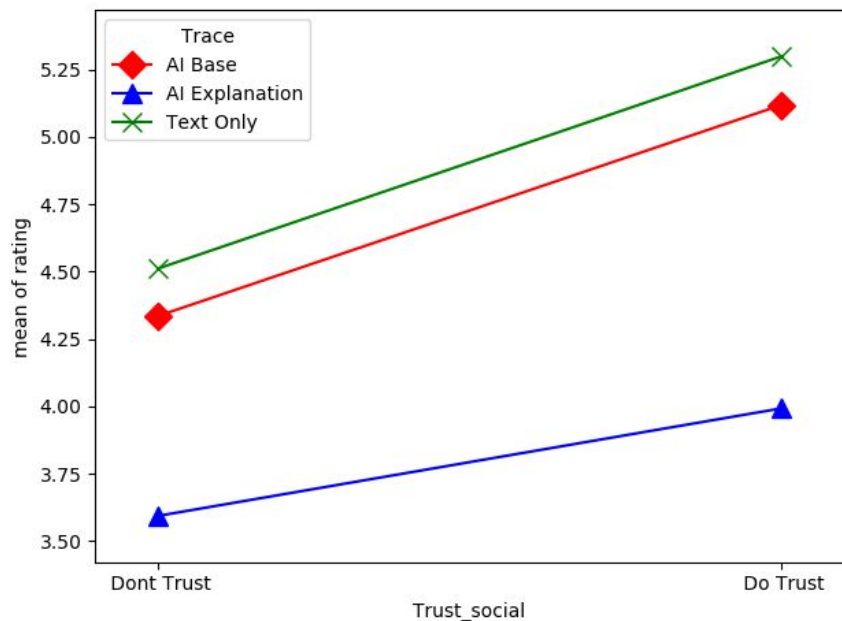


Article Type	Sharing Frequency
Reliable	No significant interaction $F_{condition} = 7.23^{**}$
Unreliable	No significant interaction $F_{condition} = 28.27^{**}$ $F_{sharing} = 20.97^{**}$



**Lower is Better**

# Rating unreliable articles: those who trust news from friends perceive unreliable as more reliable.



Article Type	Trust in Social Contacts
Reliable	No significant interaction $F_{condition} = 6.49^*$
Unreliable	No significant interaction $F_{condition} = 31.93^{**}$ $F_{socialtrust} = 13.06^{**}$



**Lower is Better**

- Repeated exposure to false news is correlated with believing and sharing false news in the future,
- Repeated exposure = used to the style of news?

# What about biased news?

Does algorithmic assistance improve **users' perceptions** of news **bias**?

Same study, but for the concept of bias, rather than reliability



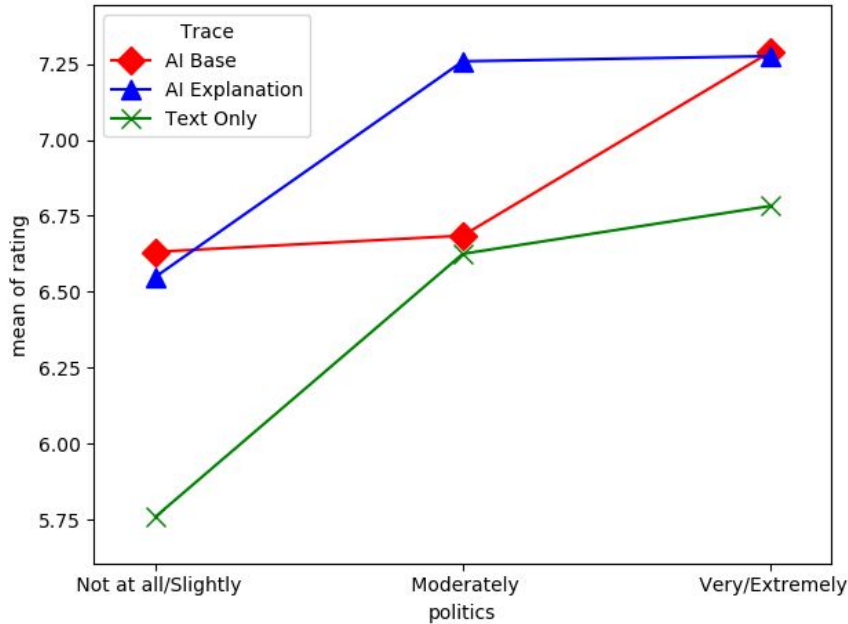
# AI Assistance can improve human perceptions of bias, but requires explanations

- Using four one-way ANOVA tests corresponding to each ground truth, we find improvement in perceptions using the tool
- **Dependent:** participant ratings, **Independent:** experimental condition

	F	Post hoc test (indicating what means are different)
Biased Articles	<b>4.1947*</b>	<b>text only &amp; AI explanation</b>
Unbiased Articles	2.9945	No significant differences

- Feature-based AI assistance is helpful in pointing out bias, but not necessarily the lack of bias in a news article.

# Rating Biased Articles: political familiarity helps perceptions of bias in news articles.

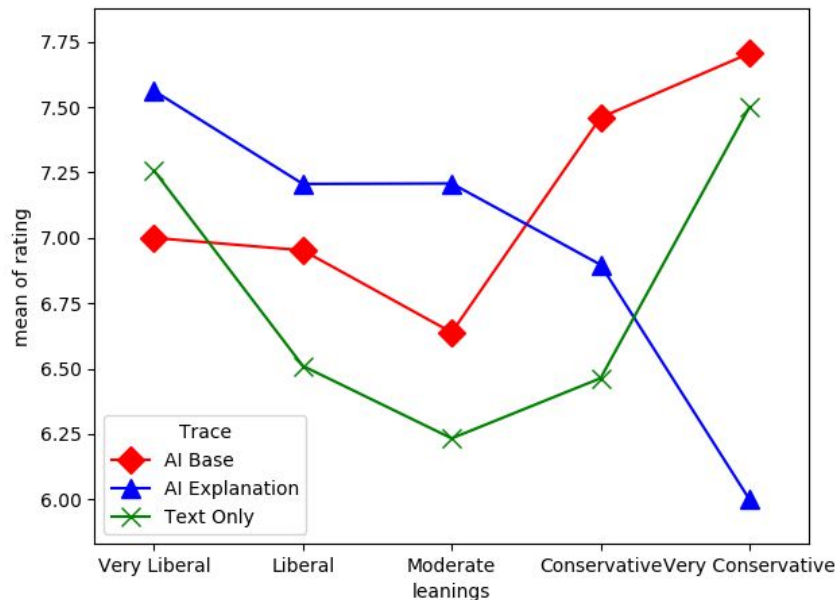


Article Type	Political Familiarity
Unbiased	No significant interaction $F_{condition} = 4.61^{**}$
Biased	No significant interaction $F_{condition} = 9.12^{**}; F_{familiarity} = 10.65^{**}$

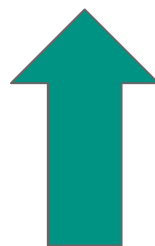


**Higher is Better**

# Rating Biased Articles: political leaning does not impact ratings of biased articles



Article Type	Political Leaning
Unbiased	No significant interaction
Biased	No significant interaction $F_{condition} = 12.55^{**}$



**Higher is Better**

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**Writing Style**

It uses a lot of opinion statements, and not a lot of evidence  
Written in a convoluted style  
The informal, accusatory, aggressive tone of the writing.  
This is a made-up news article, because it doesn't follow Associated Press style for capitalization.  
The headline is totally unprofessional.  
The story has a lot of grammatical errors  
A lot of negative emotions, Some language seems sensational  
It doesn't have emotional flash points or inflammatory language.  
Seems to be coherent and in order

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**AI Advice**

I based it on the AI system since I know nothing about this.  
The AI system rating lead me to think that this is unreliable article.  
It provides updates to previously reported news, stating facts and the smart AI system gave a 95% chance  
I'm going with the AI on this one  
Strong AI rating.

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**Journalistic Features**

Didn't really have cites to back this up  
Includes a non sequitur  
Because it uses unnamed sources to make its statement  
It addressed both sides of the question without seeming to take sides.

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**Trust**

Can never be 100% sure if news is real or fake these days  
The FBI can't be trusted.

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**Other Heuristics**

Clearly biased article written by an angry feminist  
It seems logical that these events happened.

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Participants are asked:

**Why did you rate the article this way?**

# In Conclusion

- This study explored the effectiveness of AI assistance in news credibility perceptions
- We found that AI assistance with feature-based explanations significantly improved perceptions of reliability and bias
- However, these improvements differ between different types of news consumers
- Some participants tended to do well on their own, (reading news frequently or political familiarity)
- Participants who used social media heavily showed negative results, perceiving unreliable articles as more reliable.

# There is still a lot to do

- May be more effective if they are tailored to individual differences
  - We focused on only one type of explanation (feature-based)
  - Other types include: example-based (See Lai and Tan 2019)
- More work is needed to understand:
  - Repeated interactions with the advice giver overtime
  - Tools effectiveness in a passive environment
  - What happens when tools make mistakes
- From a tool development perspective:
  - News is messy, and likely not a binary spectrum
  - Content predictions may not be robust enough

**Thanks to my Co-authors Dorit, John,  
Jin-Hee, and Sibel**

**I am on the job market!**

**Twitter: @benjamindhorne**

# Choosing News Articles



# We use a two-step approach to create our news article dataset

1. We selected news sources that fall into three categories:
  - a. Mainstream (typically assumed to be reliable and unbiased)
  - b. Unreliable
  - c. Biased.
2. Experts rate randomly selected political articles from these sources. Rating is done with criteria developed from Zhang et al. 2018

# Articles with multiple criteria marked by all experts were kept and labeled

## **Unreliable article criteria**

1. Does the article have a misleading title (clickbait or makes claims not supported by the article)?
2. Does the article have no supporting evidence (missing quotes from witnesses, experts, or other reputable sources)?
3. Does the article have logical fallacies (claims are not supported by the evidence presented in the article)?
4. Does the article use overly emotional tone?
5. Is the article factually incorrect (claims made that can be shown as false or misrepresented)?
6. Does the article reference other unreliable sources (other sources that are known to produce false information)?

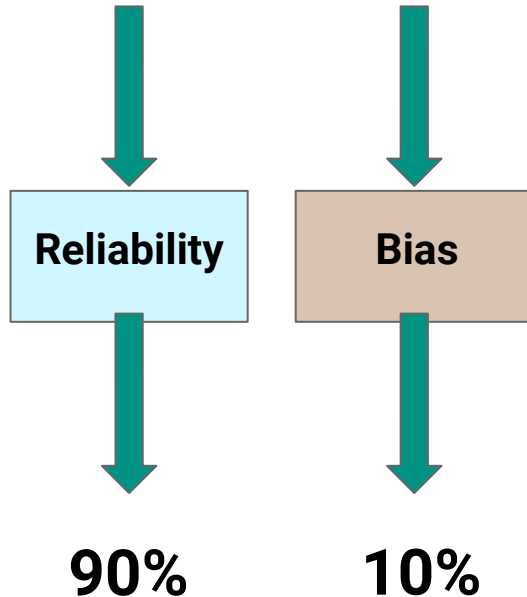
## **Biased article criteria**

1. Does the article use overly emotional tone?
2. Does the article create a “call to action” (telling consumers what to think or to do)?
3. Does the article have framing bias (only reporting one side of the story)?
4. Does the article use subjective statements or opinion?
5. Is the title of the article one-sided (a headline that favors one side over another)?

# AI Assistant

# We use previously developed content-based classifiers with interpretable features

## News Article



- On average, the classifier reported an **86%** chance of being reliable for articles we labeled as **reliable** and **17%** for articles we labeled as unreliable
- On average, the classifier reported **86%** chance of being **biased** for biased articles and **26%** for unbiased articles
- No incorrect or uncertain probabilities are given (around 50%)