The role of GPT as an adaptive technology in climate change journalism

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ABSTRACT

Recent advancements in Large Language Models (LLMs), such as GPT-4o, have enabled automated content generation and adaptation, including summaries of news articles. To date, LLM use in a journalism context has been understudied, but can potentially address challenges of selective exposure and polarization by adapting content to end users. This study used a one-shot recommender platform to test whether LLM-generated news summaries were evaluated more positively than 'standard' 50-word news article previews. Moreover, using climate change news from the Washington Post, we also compared the influence of different 'emotional reframing' strategies to rewrite texts and their impact on the environmental behavioral intentions of end users. We used a 2 (between: Summary vs. 50-word previews) x 3 (within: fear, fear-hope or neutral reframing) research design. Participants (N = 300) were first asked to read news articles in our interface and to choose a preferred news article, while later performing an in-depth evaluation task on the usability (e.g., clarity) and trustworthiness of different framing strategies. Results showed that evaluations of summaries, while being positive, were not significantly better than those of previews. We did, however, observe that a fear-hope reframing strategy of a news article, when paired with a GPT-generated summary, led to higher pro-environmental intentions compared to neutral framing. We discuss the potential benefits of this technology.

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KEYWORDS

News Recommender Systems, Large Language Models, Fear-Hope Appeals, Emotional Framing, User Experience, Selective Exposure, Polarization, News Summaries

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1 INTRODUCTION

In today's digital era, online news plays a crucial role in information dissemination. Recent advancements in Large Language Models (LLMs) such as GPT have raised new opportunities for adaptation and personalization in news. For one, the creation of content can be expedited by the use of such models, although findings on creative writing have been mixed [50]. GPT tools can also be used to make changes to existing content. For example, these technologies enable the generation of news summaries and the reframing of content.

Such technologies could help address the challenges of digital news provision [9, 31, 52]. Various modern media platforms, such as Google News, have adopted personalized News recommender systems (NRSs) to suggest news articles to end users, based on their interests [3, 36, 51]. By catering to individual preferences, these systems can reinforce selective exposure due to a converging news offering. Moreover, in doing so, they often fail to promote constructive engagement with societal issues, such as environmental issues [4]. Specifically, GPT-generated summaries can reduce information overload while retaining key details [28]. This capacity for summarization and reframing might address polarization by facilitating the presentation of various viewpoints.

However, the use of GPT in the newsroom is a relatively new field of research. Research appears to involve qualitative evaluations of journalism about the use of GPT [6], or quantitative research into model-based optimization of models for use in the newsroom [28]. Most studies related to news summarization focus on computational

or model-based performance metrics [21, 28]. These studies tend to focus on metrics such as faithfulness, coherence, and relevance to examine the quality of a news summary [80]. Human evaluation of GPT-based summaries has been limited to studies conducted in controlled laboratory settings [80]. To date, little research has explored the application of GPT in real-world news platforms, the ethical implications of GPT-generated summaries or its influence on shaping user engagement and attitudes, particularly through emotional reframing strategies [35, 37]. News consumption behaviors are also influenced by psychological factors such as risk and self-efficacy. Users may disengage from certain news articles if they perceive them as threatening. Emotional reframing offers a potential strategy to reduce avoidance behavior by reinforcing a sense of self-efficacy. In this study, we explore whether GPT-generated reframed summaries help mitigate polarization, selective exposure, and promote pro-environmental behavior. Our approach is technology-focused, highlighting personalization through summarization and reframing while attempting to implement these methods responsibly.

1.1 Research Focus and Objective

This study investigates the application of GPT-generated summaries as a primary innovation in online news, particularly in terms of their potential ability to enhance users' trust and clarity while reading news articles. In addition, it examines how emotional reframing, particularly through fear-hope appeals, can complement these summaries to address challenges, such as selective exposure and polarization. We focus on two key aspects: (1) the role of GPT-generated summaries in shaping user preferences and enhancing their news consumption experience, and (2) the influence of fear-hope emotional appeals in complementing these summaries to address selective exposure and polarization. By addressing these dimensions, our research aims to provide actionable insights into how online news can leverage AI advancements to foster more balanced and prosocial interactions with news content.

Although personalized NRSs offer significant benefits to consumers and stakeholders, they also risk reinforcing biases by encouraging individuals to overlook stories that challenge their existing attitudes or are deemed irrelevant. This dynamic can exacerbate social conflicts and polarization [3, 18, 76]. It is imperative to explore how LLM technology can be applied to NRSs to provide better news consumption experience and also mitigate polarization issues [60]. Our research explores the integration of LLMs into NRSs to enhance user experiences and counteract polarization.

Selective exposure, a phenomenon where individuals tend to seek out and consume news that aligns with their pre-existing beliefs or attitudes, can contribute to polarization by reinforcing existing viewpoints and limiting exposure to diverse perspectives [23, 38, 71]. People being exposed to news that matches their beliefs, selective exposure can also significantly reinforce and intensify polarization among individuals. As a result, their existing attitudes can be further strengthened [13, 27]. Studies [68, 75] have indicated that recommender systems typically base their suggestions on users' past behaviors, which can result in limited diversity.

In this study, we focus on emotional reframing as an intervention strategy, leveraging its impact on selective exposure, users' attitudes, decision-making processes [10, 48, 53], and its potential to mitigate polarization. Specifically, this study focuses on the combined use of fear and hope to shape readers' attitudes. Fear appeals have been widely utilized and are often regarded as effective strategies for influencing attitudes and behaviors, such as motivating individuals to quit smoking [44]. However, fear alone may not be sufficient to drive sustainable attitude or behavioral change.

Hope, in contrast, is a forward-looking emotion that acts as a critical motivator to achieve future goals [77]. It often emerges in response to unsatisfactory life circumstances or perceived threats, inspired by a concern for the future and a desire for positive change [40]. Together, fear and hope can function as complementary emotional orientations that influence not only individual attitudes but also broader societal perspectives and actions [34].

1.2 Research Gap

The integration of ChatGPT into journalism presents new opportunities, but also raises challenges. This study addresses three key gaps: (1) Permissibility and Ethics of GPT in Journalism: While GPT-generated summaries and reframed content can improve accessibility, little is known about their ethical implications, including how users perceive fairness, transparency, and trust in AI-generated news on real-world platforms. (2) Selective Exposure and Emotional Framing: The impact of GPT-generated summaries combined with emotional framing, such as fear-hope appeals, on selective exposure and user attitudes is unexplored. Emotional reframing could offer a novel way to mitigate polarization, but its effects remain largely unexamined. (3) Integration of attitudes in NRSs: Current NRSs focus on user preferences, neglecting attitudes, which have a deeper and more enduring influence on behavior. There is a lack of research on how GPT-generated content can balance preferences and attitudes to reduce polarization and foster more diverse news consumption, especially the extent to which these manipulations influence users' intentions to act pro-environmentally. We formulate the following research questions:

- **RQ1:** How do GPT-generated summaries and emotional framing (fear, fear-hope, neutral) influence users' selection of news articles in a news recommender system?
- **RQ2:** To what extent do GPT-generated summaries, particularly those framed with fear-hope appeals, influence users' pro-environmental behavioral intentions after news exposure?
- **RQ3:** How do users perceive GPT-generated summaries in terms of understanding, clarity, permissibility and trust?

2 RELATED WORK

2.1 Selective Exposure and Polarization in NRSs

Selective exposure refers to the tendency of individuals to prioritize information that aligns with their pre-existing beliefs or attitudes, avoiding opposing viewpoints. This behavior contributes to polarization in news consumption [78]. NRSs are designed to provide tailored news content, but they may inadvertently exacerbate polarization by prioritizing content that aligns with users' beliefs, fostering echo chambers, and reinforcing existing biases [1, 18, 66].

Research suggests that selective exposure contributes to confirmation bias, as individuals seek or interpret information that aligns with their existing beliefs [42]. Although NRSs are widely

used to provide customized news stories, they can exacerbate selective exposure by recommending content similar to users' past preferences [3, 18, 38]. News consumption generally follows two patterns: Some users explore various sources but still favor a specific viewpoint, while others stick to outlets that align with their beliefs, rarely seeking out opposing perspectives [24].

Polarization, particularly on issues like climate change, is fueled by this lack of exposure to differing viewpoints. It fosters division and an "us versus them" mentality, weakening democratic principles and potentially escalate societal violence [5, 20, 70]. This polarization is apparent across the political spectrum, and shapes the narrative and public discourse around key societal issues [39]. Furthermore, echo chambers, created by NRSs can further polarization by reinforcing existing views and limiting exposure to diverse perspectives [14, 18, 76]. Research supports these observations, with studies showing that modern NRSs typically recommend more polarized news stories to users with a preference for such content [43, 59]. Tackling these challenges calls for interventions that promote diverse perspectives and mitigate the dissemination of polarizing media. Emotional reframing and innovative applications of LLMs, such as GPT-generated summaries, offer promising solutions to counter selective exposure and polarization.

2.2 Using the Extended Parallel Processing Model for Reframing

2.2.1 Framing. Framing is the strategic selection and emphasis of specific aspects of perceived reality to shape how an issue is defined, interpreted, and judged. By directing attention to key information, it enhances its prominence, increasing the likelihood that audiences will notice, process, and remember it [19]. In the context of NRSs, framing is crucial in shaping how users perceive the news they encounter, and emotional framing has emerged as an approach in shaping attitudes and behaviors [37, 45, 61].

Frames are integral to political debates, journalistic practices, and discourse within social movements, offering alternative ways to interpret and define political and social issues [15]. Journalists employ frames to interpret events and address contentious topics. These frames distill complex discussions and policy debates into manageable components, attributing responsibility for issues and suggesting potential courses of action [73].

2.2.2 Emotional Framing. Research shows that emotional factors in news production, such as political candidates' portrayals, influence public perception. A key aspect of media influence is how it shapes readers' understanding of events through emotional framing [11]. This spontaneous, non-inferential process filters and prioritizes information, simplifying complexity into personally meaningful content. By emphasizing specific emotions, emotional framing gives information distinct cognitive significance [45, 57].

For example, Sanford et al. [61] found that framing with negative emotion may be more effective than positive emotion in engaging individuals who are likely to care about environmental issues. Moreover, research by Greenaway and Fielding [29] links positive framing messages with a more optimistic attitude towards water recycling issues. Emotional framing shapes public perception and opinion by influencing emotional states and decision-making. Thus, it is worth exploring how framing influences opinion formation based on emotion [30].

2.2.3 Fear appeals and self-efficacy. The Extended Parallel Process Model (EPPM) offers a theoretical framework to explore how emotionally reframed GPT-generated summaries can address the challenges of selective exposure and polarization in online news. Central to EPPM is the notion that perceived threat serves as a key motivator for message processing, with higher levels of threat eliciting fear that captures attention and enhances the engagement with the message [79]. By integrating EPPM principles, GPT-generated summaries can be tailored to include emotional appeals that balance emotional appeals and efficacy, encouraging users to move beyond biases and engage with pro-environmental behaviors in a constructive fashion. The EPPM posits that a threat conveyed in a message leads to a threat evaluation, which in turn generates fear. Fear appeals, as persuasive strategies, aim to influence attitudes and behaviors by emphasizing potential threats or adverse consequences. Research has demonstrated their effectiveness in driving attitude changes [32, 44, 58]. Further research has shown that fear appeals successfully influence attitudes, intentions, and behaviors across nearly all examined conditions. Notably, even in cases when moderating factors showed no significant impact on their effectiveness, fear appeals consistently outperformed comparison treatments [72]. In fear appeal experiments, individuals are typically exposed to messages that highlight the harmful outcomes of specific behaviors. These messages often include clear recommendations on how to mitigate the threat by adopting particular attitudes and actions. The purpose of fear-inducing stimuli is to discourage behaviors that may result in adverse consequences [58].

According to the EPPM, people respond to fear appeals in one of three ways: 1) non-responses, 2) danger control responses, and 3) fear control responses. These responses are determined by the individual's threat and self-efficacy appraisals—the belief in one's ability to perform a specific behavior. Upon encountering a message, individuals first assess the severity of the threat and their susceptibility to it. If the threat is not perceived as severe or personal, fear is not aroused and further engagement with the message is unlikely. However, if the threat is perceived as high, they will experience fear and feel motivated to reduce it through one of two processes, guided by their efficacy appraisal. When individuals believe they have the ability to address the threat, they engage in danger control, i.e. constructive actions aligned with the message's recommendations. Alternatively, if they perceive low efficacy, they engage in fear control, i.e., avoidance strategies to diminish fear without addressing the threat itself [46].

This framework has been extensively applied in designing effective fear-based messages. For example, Shah et al. [63] confirmed the models effectiveness in motivating pro-environmental behaviors in the climate change context. Similarly, Gebrehiwot and van der Veen [26] found that effective communication using EPPM principles encouraged farmers to adopt sustainable agricultural practices. Further research has demonstrated that fear-appeals successfully influence attitudes, intentions, and behaviors across nearly all examined conditions. Even when moderators showed no relationship to their effectiveness, fear appeals still outperformed comparison

treatments [72]. For instance, research on promoting tetanus vaccinations shows that high-fear messages tend to be more persuasive than low-fear ones, particularly when clear, actionable solutions are provided [41]. Building on these insights, our study uniquely applies the EPPM framework in the context of personalized NRSs. By reframing GPT-generated news summaries to integrate fear with efficacy, we aim to investigate whether such emotional reframing can mitigate selective exposure and polarization while encouraging pro-environmental behavior. Previous research has validated the framework in controlled environments, this study extends the framework by evaluating its capability to real-world contexts within online news domains.

2.2.4 Hope appeal. Hope can motivate people to take action to improve an undesirable situation. Self-efficacy fosters hope and plays a key role in initiating problem-focused coping action [40, 77]. Hope as a combination of pathways, (identifying a way to solve a problem) and agency thinking (confidence in one's ability to create change), drive individuals to take action, boosting morale, and reinforcing commitment [7, 40].

Messages focusing on hope could be an effective approach to foster positive responses to the challenges posed by climate change [33]. Hope appeal in climate change plays an important role in predicting pro-environmental behavior, aligning with prior research showing that hope often precedes active participation in climate solutions [69]. It is a combination of identifying a way to solve a problem and agency confidence in one's ability to create change, which together drive individuals to take action [64, 69].

2.2.5 Fear-Hope appeal. Moreover, fear appeals are most effective when paired with efficacy statements that counter fear, which inspires hope providing actionable solutions [2]. Combining fear and hope is particularly effective in driving behavioral change. Fear grabs attention by highlighting the negative consequences of inaction but can trigger avoidance [37]. In contrast, hope provides solutions and encourages a positive outlook toward achieving desired outcomes [40, 77]. Together, fear underscores the urgency of the problem, while hope offers a clear path forward and empowers individuals to take control [34]. Importantly, research shows that combining fear with hope is more effective at motivating behavior change than using fear alone at any level [65]. By strategically pairing fear to capture attention with hope to inspire action, messages may achieve more impactful and behavioral change.

2.3 The Role of Attitudes

Attitudes shape readers' behavior and cognition, reflecting favorable or unfavorable judgments toward specific aspects [16, 17, 25, 54]. Attitude is "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor [17]. Shaped by internal cognitive processes, attitudes can be positive or negative and significantly influence behavior [22, 55]. Research indicates that strong attitudes are persistent, resistant to change, and impact behavior and cognition. They guide actions, influence attention, shape information processing, and affect how individuals perceive and respond to persuasive [17, 25, 54].

For instance, digital news media has spread false information and divisive messages, such as during the 2016 US presidential election. People engage more with like-minded groups, limiting exposure to diverse views [47], which can fuel polarization as individuals trust news sources that align with their beliefs [81]. Attitudes may shape news consumption behavior, yet most recommender systems prioritize preferences over attitudes. While preferences reflect stable likes or dislikes, attitudes have a deeper impact on thoughts, emotions, and behaviors [62].

2.4 Contribution of Current Research

This research investigates the interplay between GPT-generated summaries and emotional reframing, particularly fear-hope appeals, within a personalized news context. Existing studies on NRSs have predominantly concentrated on improving content personalization to manage information overload [3, 36]. Additionally, research on emotional framing has highlighted its role in shaping user attitudes, engagement, and decision-making processes [10, 61, 65].

However, limited research has explored the integration of LLM-driven news summaries with emotional reframing techniques. Most existing work focuses on either the computational efficiency of news summaries [28, 80] or the effects of framing in isolation [29, 61]. In contrast, this study bridges these gaps by investigating how GPT-4 turbo-generated summaries, enhanced with fear-hope appeals, shape pro-environmental behavioral intentions and influence users' perceptions of news articles.

Our contributions to the field are as follows:

(1) Integration of Emotional Reframing in a context of personalization: This study bridges the gap between emotional reframing and personalized news context by examining how GPT-generated summaries, enhanced with fear-hope appeals. We contribute to the growing field of AI-driven journalism by demonstrating how emotional reframing can address challenges such as promoting pro-social behaviors reducing polarization.
(2) Behavioral Influence: Our findings demonstrate the role of fear-hope appeals in fostering pro-environmental behavioral intentions and constructive attitudes. This highlights the potential of emotional reframing in driving positive societal behaviors and shaping user perceptions through AI-enhanced NRSs, contributing to the development of responsible and user-centric AI.
(3) User Trust and Ethical Implications: We provide empirical evidence that GPT-generated summaries enhance user trust and clarity. These findings address critical ethical concerns in AI-generated journalism, such as fairness and transparency.

3 MATERIALS & METHODS

3.1 Data Collection

To achieve our research goals, we created a research platform utilizing opinion articles from Washingtonpost.com/opinions/ [74], a leading news website known for its editorial content. The study concentrated on three key topical areas: Environment, Weather, and Green Living. A total of 18 news articles were included in the dataset, with 6 articles randomly selected from each domain.

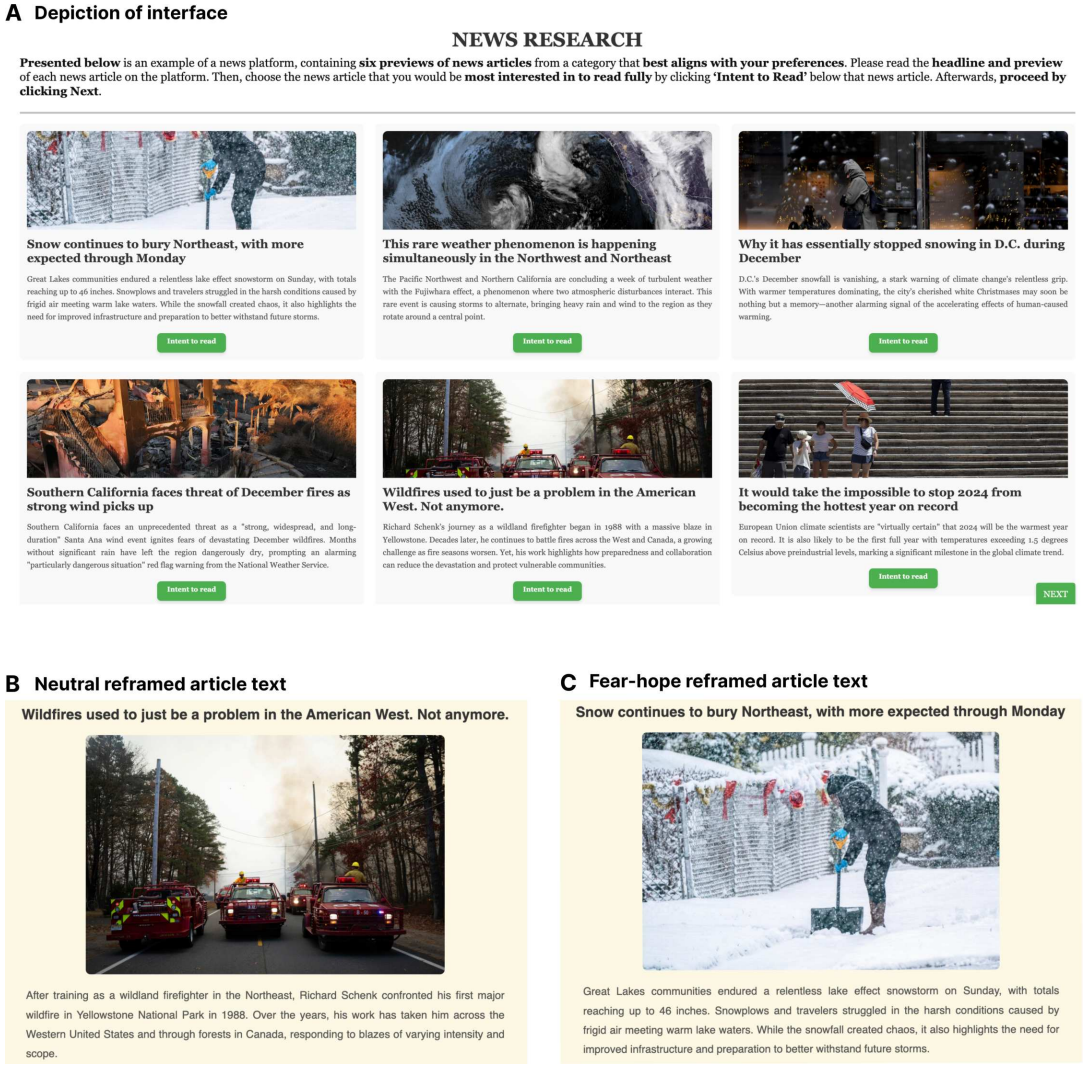

Figure 1: (A) Presents the overall interface where users select news from different news framings, while (B) depicts a neutrally reframed article for the perception of the news phase. (C) depicts a fear-hope reframed article for the perception of the news phase.

3.2 Participants

A total of 300 participants from the USA (48.33% male, 51% female, 0.67% prefer not to say) took part in our user study. All participants were recruited via the crowdsourcing platform Prolific. Our sample size is adequate to identify effects that are both theoretically significant and practically relevant [67]. In addition, for participant recruitment on Prolific, we implemented Quota Sampling to maintain a balanced distribution of pre-existing environmental attitudes, assessed on a 1 to 5 Likert scale, where 1 signifies "Not at all concerned" and 5 denotes "Very concerned" [56].

3.3 Materials

3.3.1 Model selection and Prompting. We chose OpenAI's ChatGPT-4o model (version gpt-4-turbo-2023) to generate three summaries, one with a neutral valence, one with a fearful valence, and one with a fear-hope valence. We used this model because of its advanced natural language processing capabilities, suitability to generate contextually relevant text, and cost-efficiency while maintaining high performance. The temperature parameter was 1.0 to maintain the creative text output. The parameter Top_P used in the experiment was the default parameter of 1.0. This parameter enhances the quality of the output by focusing on a broad range of probable next words while allowing variability and diversity in the output. We prompted ChatGPT-4o in an iterative process. First, (1) we provided the LLM with domain-specific terminology related to fear and hope appeals, supplemented by background literature expanding on these concepts. Then (2) we supplied the original article and instructed the model to emotionally reframe it in English. Through iterative

qualitative evaluation, this approach yielded effective results for this model under the given conditions.

This study focused on examining how users' intention to act pro-environmentally, perceptions of FATE (Fairness, Accountability, Transparency, and Ethics) were influenced across two distinct platform setups. The specific conditions analyzed were as follows:

(1) **Condition A**: A ChatGPT-generated summary designed to provide a comprehensive overview of the article.
(2) **Condition B**: The first 50 words of the news article, simulating a preview snippet.

Each setup featured a unique combination of text framed by the following emotional styles in two conditions:

(1) **Fear**: Emphasizing risks or negative outcomes.
(2) **Fear-Hope**: Balancing risks with potential solutions or optimistic outlooks.
(3) **Neutral**: Presenting factual content without emotional framing.

The frontend was developed using JavaScript, HTML, and CSS. The backend was built with Django, Python and SQLite. To evaluate the effects of these conditions, statistical analyses using Stata and R were employed, including an ANOVA, T-test and logistic regression to explore the relationships between emotional framing, selection of news articles and their perception of news. This comprehensive approach provided valuable insights into how emotional framing and summary techniques using LLMs influence users' behavior change.

3.4 Procedure

Participants were invited to participate in an online survey aimed at evaluating a news platform prototype. An overview of the procedure is depicted in Figure 2. At the start of the study, participants provided demographic information, and stated their preferred news topics. The platform allowed participants to choose from a set of topical categories, including *Environment*, *Weather* and *Green Living*.

Participants were then redirected to our news platform which either presented news articles with summaries or previews of the first 50 words of news articles. All participants would be presented six news article previews, which were subject to our three within-subject framing conditions: two articles were neutrally framed, two were fear-framed and two were subject to a fear-hope frame. News articles were presented in a random order. Please refer to the footnote to inspect the prompts of our study[1].

Participants were instructed to review the six previews and indicate their preference by selecting the article they found most interesting to read. After making their selection, the platform displayed two examples of news article previews that had been previously presented to users (see Figure 1). One article included an emotionally neutral summary or the first 50 words, while the other featured a reframed summary or the first 50 words with a fear-hope appeal. Under each news preview, participants were asked to respond to additional questions regarding intention to act pro-environmentally, understanding, permissibility and trust (see Figure 2).

[1]The prompts we used in ChatGPT-4 turbo to reframe news articles are here: https://anonymous.4open.science/r/UMAP2025-A72E/README.md

3.5 Measures

Participants completed a questionnaire designed to evaluate the following dimensions:

3.5.1 Intention to act pro-environmentally. This measured a user's likelihood of engaging in pro-environmental behavior after reading a news article preview. We averaged 4 items to form a construct ($\alpha = 0.91$) based on the questionnaire of Global Environmental Change, utilizing revised items from [8, 12]:

(1) I plan to take some actions to stop global warming.
(2) I personally do not intend to do much to stop global warming.
(3) I will make some efforts to mitigate the negative effects of global warming.
(4) I intend to take concrete steps to do something to mitigate the negative effects of global warming.

3.5.2 Trust of AI and Clearness. Another part of questionnaire is related to ethical implications, which contain the following items:

- **Understanding**: I understand the information provided to me.
- **Clarity**: The information provided is clear and easy to comprehend.
- **Permissibility**: It is appropriate to use AI to rewrite or summarize this news article.
- **Trust**: I trust AI to write a fair and balanced summary.

We found some of these items to correlate strongly with each other. Hence, we subjected them to a principal component factor analysis, which revealed two reliable factors with Eigenvalue > 1 and little cross-loadings: **(1) Clearness ($\alpha = 0.79$)**, which consisted of Understanding (loading: 0.92) and Clarity (loading: 0.89) and **(2) Trust in AI ($\alpha = 0.86$)**, which included Permissibility (loading: 0.93) and Trust (loading: 0.93).

3.6 Ethical Statement

This research adhered to the ethical guidelines of the University [Anonymous] and [Anonymous] regulations for scientific research. The study was judged to meet the ethical standards of [university] and therefore did not require a more extensive review, as it contained no misleading information, stressful tasks, or content that would likely provoke extreme emotions. All collected data were collected and processed anonymously to ensure participant confidentiality and privacy.

4 RESULTS

We examined changes in pro-environmental behavioral intentions before and after exposure to two presentation styles—GPT-generated summaries and first 50-word previews—framed with different emotional appeals (fear, fear-hope, and neutral) using ChatGPT-4 turbo. First, participants were asked to select a news articles from a list of 6 based on their previews. Thereafter, they had to evaluate two examples of news article previews, disclosing for each their intention to act pro-environmentally and their perception of the preview.

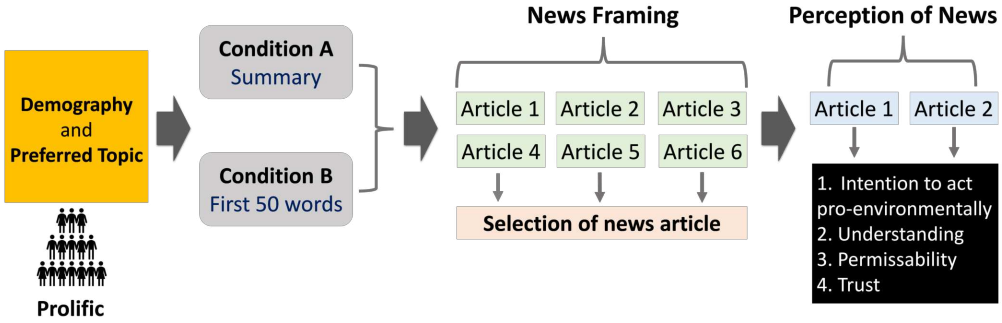

Figure 2: The procedure in this news research platform, from data collection via Prolific to users' selection of news articles and perception of news articles.

Table 1: Results of the conditional logistic regression analysis on news article selection. $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$.

	Coefficient (*S.E.*)	**z**
Fear	0.072 (0.14)	0.52
Fear X Summary	−0.29 (0.28)	−1.05
Fear-hope	−0.10 (0.15)	−0.70
Fear-hope X Summary	−0.37 (0.29)	−1.28

4.1 RQ1: Selection of news articles

We first analyzed the news article selection data, performing a conditional logistic regression. We predicted the likelihood that an article was selected based on its framing strategy (i.e., fear or fear-hope), as well as the interaction of those styles with the summary style. Table 1 presents the results, revealing no relation between the framing style used and the likelihood a news article was selected for further reading (all $p > 0.05$).

We also examined to what extent it mattered whether the news articles were either summarized or the first 50 words were presented. As this was constant per list, we only explored interaction effects with the framing styles. Table 1 reveals no significant interaction effects between the applied framing strategy and the summary style (all $p > 0.05$). Taken together, this suggested that the used writing style and format did not affect news article selection. Hence, fearful communication did not increase, nor reduce the attractiveness of individual news articles.

4.2 RQ2: Pro-environmental behavioral intentions

Our results demonstrate that GPT-generated summaries outperform first-50-word previews in promoting pro-environmental behavioral intentions, especially when coupled with fear-hope appeals. Participants exposed to fear-hope-framed summaries reported higher pro-environmental intentions compared to those who read first-50-word previews. These findings underscore the potential of emotional reframing as a tool for influencing users' behaviors in a pro-environmental direction. The success of fear-hope appeals, balancing urgency with optimism, provides important insights into how emotional framing can drive positive societal change (Figure 3).

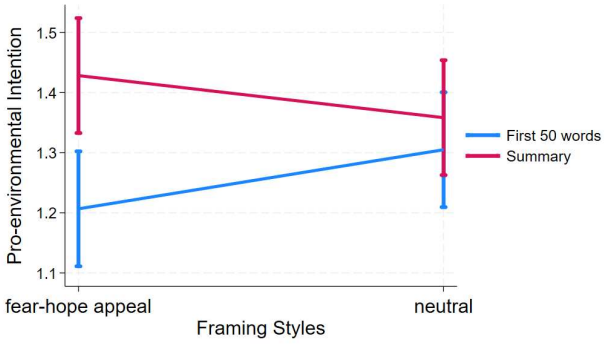

Figure 3: Mean Pro-environmental behavioral intentions across different presentation conditions. Error bars are 1 S.E.

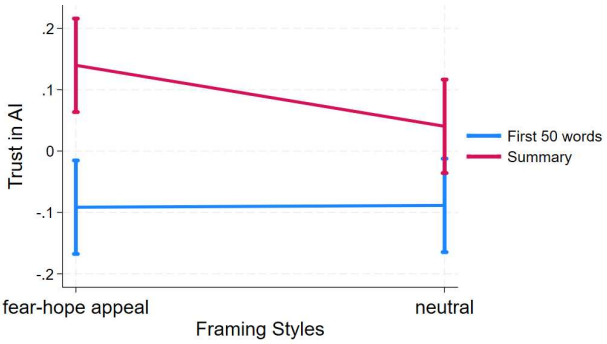

Figure 4: Mean Trust in AI across different presentation conditions. Error bars are 1 S.E.

This outcome aligns with prior research demonstrating the effectiveness of emotional reframing in motivating behavior change by balancing threat and efficacy [40, 65]. Notably, no significant differences were observed in the neutral framing condition between summaries and first 50-word previews. These findings emphasize the added value of summaries over previews in fostering actionable intentions, particularly when emotional appeals are incorporated.

4.3 RQ3: Ethical Implications

Our analysis of the ethical implications of using GPT-generated summaries in NRSs focused on user perceptions of Permissibility, Trust in AI, Understanding, and Clarity. The results are summarized as follows:

4.3.1 Trust in AI Factor: Permissibility-Trust. The ANOVA results indicated that participants rated GPT-generated summaries significantly higher in trustworthiness ($M = 0.09$) compared to first 50-word previews ($M = -0.09$): $F(1, 596) = 4.89$, $p = 0.0274$. Figure 4 shows this effect was amplified when fear-hope appeals were employed, but we observed no significant interaction effect between the presentation style and the framing strategy: $F(1, 596) = 0.39$, $p = 0.531$. Hence, we neither observed significant differences between the two presentation styles in the neutral framing condition. This suggested that the use of emotional framing strategies did not harm trust, while summaries were deemed to be more trustworthy.

4.3.2 Clearness: Understanding & Clarity. With regard to clearness, a two-way ANOVA did not observe significant differences across conditions. Although summaries ($M = 0.074$) outperformed first 50-word previews ($M = -0.074$) in terms of clarity and comprehension, the difference was not significant: $F(1, 596) = 3.33$, $p = 0.0685$. These findings suggested that the differences between summaries the 50-word previews, if any, were minor (Figure 5).

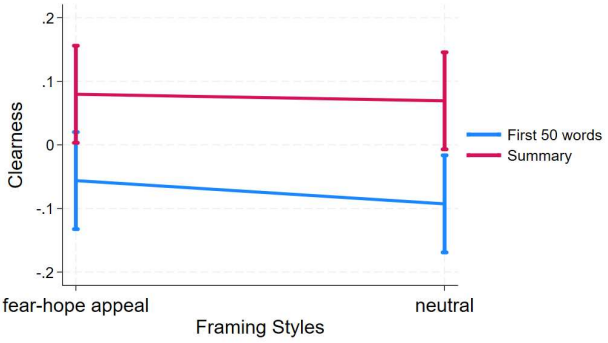

Figure 5: Mean Clearness in AI across different presentation conditions. Error bars are 1 S.E.

5 DISCUSSION

This study explored the role of GPT-generated summaries and emotional reframing techniques, particularly fear-hope appeals, in influencing user behavior within personalized news context. Our aim was to examine whether news summary, compared to first-50-word previews, has potential to mitigate selective exposure, enhance comprehension and trust in AI-generated journalism, and encourage pro-environmental behavior. With these objectives in mind, we structure the discussion around the key comparisons between GPT-generated summaries and first-50-word previews, while addressing each research question (RQ).

Regarding [RQ1], contrary to our expectations, emotional framing and presentation style had no significant effect on participants' article selection behavior. Instead, pre-existing preferences and topic relevance were more influential in determining choices. This finding highlights the role of selective exposure and confirmation bias, wherein users tend to prioritize content that aligns with their pre-existing beliefs, regardless of its framing or presentation style [3, 24]. While GPT-generated summaries and emotional framing could affect user pro-environmental intentions after exposure, they were less effective in influencing initial selection decisions. This distinction between passive content consumption and active decision-making suggests that ingrained biases remain a significant challenge for NRSs [38, 49]. Addressing these biases is critical for promoting diverse perspectives and constructive engagement in news consumption.

Regarding [RQ2], our results demonstrate that GPT-generated summaries are significantly more effective influence more than first-50-word previews in promoting pro-environmental behavioral intentions, particularly when paired with fear-hope emotional framing. Participants exposed to fear-hope-framed summaries reported higher intentions to act pro-environmentally compared to those exposed to previews. The effectiveness of fear-hope framing lies in its ability to balance urgency with optimism. Fear appeals highlight the severity of environmental threats, capturing attention, while hope appeals provide actionable solutions, fostering agency and encouraging users to take constructive action. This balance is critical in mitigating avoidance behaviors, often triggered by fear alone, and aligns with prior research on emotional framing strategies for behavior change [40, 65, 79]. These findings demonstrate the potential of fear-hope-framed summaries in encouraging readers' behavioral change [40, 65]. In contrast, neutral summaries had a weaker impact on driving behavioral change. This suggests that emotional reframing could be an effective tool for motivating pro-environmental actions.

In terms of [RQ3], participants rated GPT-generated summaries significantly higher in trust compared to first-50-word previews. Summaries framed with fear-hope appeals could amplify trust, likely due to their balanced emotional content and actionable insights. Moreover, GPT-generated summaries were rated higher in clarity and understanding. Summaries condense information into an accessible format, enabling users to better grasp complex topics, compared to previews. These findings underscore the potential of GPT-generated content to enhance fairness and transparency in AI journalism.

Overall, GPT-generated summaries outperform first-50-word previews in promoting pro-environmental intentions, boosting AI trust, and slightly affecting clearness. Emotional reframing, especially fear-hope appeals, showcases the potential to drive positive societal behaviors. However, selective exposure and confirmation bias highlight the need for strategies that encourage diverse perspectives.

6 CONCLUSIONS AND FUTURE WORK

This study underscores the potential of GPT-generated summaries in a personalized news context, particularly when combined with emotional reframing techniques, such as fear-hope appeals. These summaries demonstrated an ability to foster pro-environmental behavioral intentions and build trust in AI-driven journalism. By delivering actionable content, fear-hope-framed summaries could

effectively promote pro-social behaviors. However, the limited impact of emotional framing on article selection behavior highlights the role of pre-existing preferences and topic relevance in users' initial decisions. This finding reinforces the distinction between passive content consumption and active decision-making, and it underscores the persistent challenges posed by selective exposure and confirmation bias. Addressing these challenges will require innovative interventions to promote exposure to diverse perspectives and mitigate the polarization effects commonly associated with personalized news context.

Our study is subject to limitations. First, the absence of a real-world news platform limits the validity of our findings. Additionally, our dataset was limited to The Washington Post, which may not capture broader media biases or diverse news consumption behaviors. Furthermore, we did not examine the long-term effects of emotional reframing. Lastly, in the current study design, a specific set of articles was assigned to each framing style. Future studies should assign news articles to conditions more randomly.

Future research could explore affective framing in real-world news platforms, examining its influence on user behavior beyond controlled settings. Expanding datasets to include diverse news sources would enhance the generalizability of our findings. Additionally, cross-cultural studies could provide insights into how different societies respond to emotional framing. Investigating the long-term effects of emotional reframing, including various emotional combinations, would be valuable for designing more responsible AI-driven journalism.

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