

Emotional Fluctuations: A Timeliness Analysis of News Headlines and Audience Interaction in Xinhua News Agency's Reporting on the Russia-Ukraine Conflict

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ABSTRACT

This study aims to explore the impact of news headline design features, such as word count, emotional tone, the use of content words, and temporal words, on audience interaction behaviors during the coverage of the Russia-Ukraine conflict by Xinhua News Agency's WeChat official account, with a special focus on interaction patterns under the specific mechanisms of social media and their effects on long-term audience engagement. The research employs a Vector Autoregression (VAR) model to investigate the dynamic relationship between news headline design elements (e.g., word count, emotional tone, the use of content words, and temporal words) and audience interaction. The results reveal the dual-edged sword effect of information-dense headlines, the timeliness of emotional expression, the double-edged sword effect of official color vocabulary, and the moderate importance of using temporal vocabulary. This aids news media in optimizing headline design to attract more audience and promote interaction, while also highlighting the potential negative impacts of overusing emotional tone and official content words.

Keywords: News headline design, Audience interaction behaviours, Vector Autoregression (VAR), Emotional tone.

1. INTRODUCTION

The pursuit of objective reporting in news aims to convey factual information to the public without bias. However, with the rise of new media, news dissemination has begun to emphasize how to influence audiences through emotional engagement, not only transmitting information but also attempting to evoke emotional responses from the audience. This shift touches on core epistemological issues: namely, how knowledge is constructed and how facts and emotions interact in the construction of knowledge. In traditional epistemology, knowledge is seen as a product based on facts and logic, emphasizing the importance of rationality and objectivity. However, the emotionalization of news communication requires us to re-examine the role of emotions in understanding the world, forming beliefs, and constructing knowledge, thus considering emotions

as an indispensable part of the cognitive process. Therefore, the emotional turn in news communication not only challenges traditional notions of the objectivity of knowledge but also prompts the academic community to reassess the role of news in the knowledge construction process, reflecting on how to balance factual reporting with emotional expression in a rapidly evolving media environment, manage public emotions responsibly, and ensure that the public can form comprehensive knowledge and understanding based on both reason and emotion in a complex information flow.

The emotional turn in the study of news communication effects has become a hot topic in the academic community, especially the extensive use of emotional tone vocabulary and emotive mobilization phrases in the headlines of mainstream media's converged media news. However, no scholars have yet studied the long-term effects of affective mobilization theory in converged media

communication. This article observes the relationship between the news headlines of the Xinhua News Agency's official account on the Russia-Ukraine conflict and audience behavior over time, revealing the short-term and long-term impacts of emotional tone in communication and the interaction between emotional tone and its factors (word count, temporal words, content words) on long-term audience engagement and cumulative effects.

2. LITERATURE REVIEW

Glgorić et al. in conducting large-scale online field experiments (A/B testing), delved into the linguistic features of successful news headlines, finding that specific language styles, such as the use of negative language, significantly increase the attractiveness and reading rate of news headlines [1]. Appelman explored the impact of the use of acronyms and abbreviations in news headlines on audience perception through experimental methods, noting that unfamiliar acronyms lower audience ratings of the content and increase frustration, emphasizing the importance of using clear and understandable language in news headlines [2]. Piotrkowicz et al. studied the impact of news values and language styles on the popularity of news headlines on social media, finding differences in these features' impacts across different social media platforms and news organizations, further confirming the key role of news headlines in attracting social media audiences [3]. Kuiken et al. investigated the impact of "clickbait" features on the click-through rate of news headlines in a digital environment, verifying the effectiveness of these features in increasing audience engagement [4]. Wang Siyu based on foregrounding theory, comprehensively analyzed the functions and highlighting methods of WeChat official account news headlines, pointing out that enhancing the attractiveness of news headlines through language deviation and innovation is an effective strategy [5]. Bai Tonglaga and Fang Biyi respectively started from the development of new media platforms and the design strategies of news headlines in a converged media environment, further emphasizing the importance of news headlines in attracting audiences and improving communication efficiency [6][7].

Existing research collectively reveals the importance of language features, clarity, news value, and adaptation to social media styles in news headlines in the current media environment. To

successfully attract and retain audiences in the digital and converged media age, news organizations need to adopt more strategic and innovative approaches to designing news headlines. This involves not only the choice and expression of language but also real-time testing and optimization of the effectiveness of news headlines across different platforms, as well as a deep understanding of audience preferences and behaviors. However, these studies have focused more on language and content strategies, with less exploration of specific discourse strategies (such as word count, emotional tone, content words, temporal words) affecting the attractiveness of news headlines. Additionally, past research has focused solely on the attractiveness of titles, overlooking the diversity of audience interaction and its cumulative changes over time.

Therefore, this study poses the following research questions: During the coverage of the Russia-Ukraine conflict by Xinhua News Agency's WeChat official account, how do the design features of news headlines (including length, emotional tone, use of content words, and temporal words) affect audience interaction behavior, especially in terms of interaction patterns under specific social media mechanisms, cultural background differences, emotional expression variations, and language feature details? Furthermore, how do these changes in interaction behavior reflect on the audience's long-term engagement and cumulative effect?

3. RESEARCH HYPOTHESES AND METHODS

3.1 Research Hypotheses

Affective theory emphasizes that specific events can trigger emotional responses, thereby influencing an individual's behavioral decisions and attitudes. In the field of news communication, news headlines serve the primary task of attracting audience attention, and their design features, especially the length and emotional tone of the headlines, constitute "emotional events" that can evoke audience emotional responses. First, the length of a headline is closely related to the amount of information it conveys; longer headlines can provide more information, presenting the audience with rich background and details. This can not only stimulate the audience's curiosity but also enhance their attraction and willingness to engage. According to affective theory, the increase in information through the stimulation of emotional

responses promotes positive interaction between the audience and the news content. Second, the application of positive emotional tones in news headlines can immediately trigger positive emotions in the audience, prompting them to take positive actions. For example, news headlines containing positive emotions such as hope, joy, or praise not only can increase the audience's interest in the news content but may also increase their behavior in sharing and discussing the news, as people tend to share content that induces a positive emotional experience. By appropriately increasing the amount of information and using positive emotional tones in news headlines, news organizations can more effectively attract the audience, stimulate their participation and interaction, thereby significantly enhancing the dissemination effect of news content. This provides important theoretical support for news headline design, guiding how to better capture the audience's attention and emotions to promote widespread dissemination and deep engagement with news content.

Hypothesis H0: Longer headlines and those with a positive emotional tone are more likely to attract readers.

Cognitive dissonance theory elucidates that individuals experience psychological discomfort when confronted with inconsistencies or conflicts among their beliefs, knowledge, or actions, and are motivated to take active measures to mitigate or eliminate this discomfort. When nouns in headlines carry explicit information that conflicts with the audience's pre-existing beliefs or expectations, such as references to specific countries, leaders, or events potentially being interpreted as having an official stance or bias, especially when these stances are incongruent with the audience's personal beliefs or emotional inclinations, it can be particularly impactful. On one hand, the perception of nouns in headlines suggesting an official stance or bias contrary to personal beliefs may trigger cognitive dissonance, leading to psychological discomfort. According to cognitive dissonance theory, the audience may alleviate this discomfort through ignoring, denying, or disparaging these pieces of information, a psychological strategy that may weaken their engagement and interactivity with the news content, thus negatively affecting news interaction. On the other hand, cognitive dissonance may also trigger a reactance, where the audience resists those views or information that seem to be imposed, in an effort to maintain consistency in self-cognition and the integrity of

self-concept. This reactance could further diminish the audience's trust and interest in content containing specific nouns. Therefore, the hypothesis based on cognitive dissonance theory regarding the impact of noun usage in news headlines highlights the need for careful consideration of potential cognitive dissonance and reactance effects, especially in reports involving sensitive and complex international issues. By carefully selecting nouns and avoiding expressions that may trigger audience cognitive dissonance, positive engagement can be stimulated, reducing negative reactions, thereby effectively enhancing the dissemination impact of news content.

Hypothesis H1: the use of nouns due to perceived official bias negatively impacts audience interaction.

In a media-saturated environment, audiences face a deluge of information, with their attention and processing capabilities being limited. At such times, temporal nouns such as "urgent" or "immediate" can attract audience attention by creating a sense of urgency or timeliness, as people tend to prioritize information that appears urgent or important. However, the overuse of temporal nouns may lead to audience skepticism regarding their authenticity, especially when subsequent content fails to meet expectations or the conveyed urgency does not match the actual situation. Under these circumstances, audience trust in the media may gradually decline, as information repeatedly emphasizing urgency could be perceived as manipulative strategies or clickbait. In the long run, the misuse of temporal nouns may exacerbate audience distrust in media overall. Media saturation theory suggests that over time, audiences form stable attitudes and views towards information sources. If audiences continuously perceive inconsistencies or believe that information sources attract attention through insincere means, they may harbor long-term negative views towards these sources. Although the appropriate use of temporal nouns can enhance audience attention and participation in the short term, their overuse may damage media credibility and long-term audience trust. This highlights the need for news organizations to balance the short-term appeal of temporal nouns with potential long-term negative impacts, in order to maintain audience trust and media credibility.

Hypothesis H2: The effect of temporal nouns is complex, initially positive, but overuse may lead to distrust over time.

3.2 Research Methodology

3.2.1 Research Method

The Vector AutoRegression (VAR) model, with its multivariate analysis capability, treatment of time-series data, exploration of causal relationships, and functionality for forecasting future trends, offers an effective tool for analyzing the complex dynamic relationship between news headlines and audience interaction. It is capable of revealing the interactions between the characteristics of news headlines and audience engagements (such as likes, comments, shares, etc.), processing and analyzing the variations of these variables over time, identifying their potential causal relationships, and predicting the trends of audience interaction that specific news headlines may trigger. Thus, it provides a basis for news organizations to formulate more effective interaction strategies.

3.2.2 Variable Selection

Audiences are initially attracted by headlines, making them the first filter in the communication process. At the same time, carefully chosen vocabulary and sentence structures can shape the audience's cognitive framework and emotional response[8]. Titles that are emotionally engaging are more likely to be widely disseminated on social media[9]. These factors collectively underscore the central role of discourse strategies in news headlines within the realm of news dissemination. Considering the characteristics of news headlines about the Russia-Ukraine conflict reported by Xinhua News Agency's WeChat public account, the number of words in a headline, emotional color, quantity of substantive words, and number of temporal words are listed as core considerations.

Audience behaviors such as reading, following, and sharing are seen in many theories as direct reflections of trust and identification with the information. Since "following" behavior is more influenced by psychological mechanisms of content identification, this study focuses on analyzing reading and sharing behaviors.

In the digital communication environment, the phenomenon of information saturation faced by the Xinhua News Agency's public account means that its published content headlines must have significant appeal to optimize the information filtering process. When audiences browse the message list of the public account, the first thing they see is the title of each article. If the title is

sufficiently appealing or intriguing to them, they are more likely to click to read the article. The delivery reading rate is the ratio of the number of people who open to read to the total number of the public account's followers. A high delivery reading rate indicates a high proportion of followers is attracted and chooses to open the message, suggesting that the title has a high degree of appeal.

The effect of republishing focuses on the impact of content on new audiences after being shared. In WeChat's private domain, because people tend to trust shares from friends and family more, republishing not only enhances the coverage of Xinhua's content but also strengthens the audience's trust in its content. When a large number of audiences republish information or viewpoints from Xinhua, its influence on public opinion and social decision-making also increases, thereby establishing and consolidating its authority and influence. The number of readings after each share is the new number of readings directly caused by the audience's sharing behavior. This figure can directly measure the effect of audience sharing behavior on increasing content exposure. If the number of reads following each share is high, it implies that the content shared by the audience possesses a strong capacity for re-dissemination, meaning that the content is more likely to resonate among the audience, being accepted and propagated by a wider number of individuals.

3.3 Data Collection and Assignment

This study collected a total of 39 headlines of reports on the Russia-Ukraine conflict published by Xinhua News Agency's WeChat official account in February 2022 as the objects of analysis.

The emotional tone was assigned values between 0 and 1, with positive being marked as 1, negative as 0, and neutral as 0.5. For the count of substantive words, a lexicon specific to the Russia-Ukraine conflict was constructed, including names of relevant countries and leaders, and the number of substantive words in each headline was tallied. For words indicating urgency, terms such as "latest," "just now," and "overnight to this morning" were counted to quantify the expression of temporal urgency. Based on the quantification of these five features from the 39 news headlines, a discourse strategy data table was constructed.

Data on delivered read rate, the number of new followers after reading, and the number of reads

brought by each share were collected from the backend of the Xinhua News Agency's WeChat official account. The delivered read rate represents the proportion of the audience who directly opened to read the news headline out of the total number of followers after the news push was sent. The number of new followers after reading refers to the number of people who chose to follow the official account after reading the report. The number of reads brought by each share indicates the additional number of reads resulting from the audience sharing the report. Based on the delivered read rate,

the number of new followers after reading, and the number of reads brought by each share for the 39 news headlines, an audience interaction data table was constructed.

4. VAR MODEL

To facilitate the analysis of the relationship between discourse strategies and audience interaction, each indicator variable is represented by letters, as shown in "Table 1".

Table 1. Variable naming

	Variable Name	Represented by Letters
	Number of Words in Headline	ZS
Discourse	Emotional Tone	SC
Strategies	Number of Substantive Words Related to the Topic	ZT
	Temporal Words	SJ
Audience	Number of Reads Brought by Each Share	RE
Interaction	Delivered Read Rate	DE

4.1 Unit Root Test

Given that the VAR model requires data to be stationary, we need to conduct a unit root test to

check the stationarity of all variables. The method used is the ADF test (Augmented Dickey-Fuller test). The results of the test are presented in "Table 2".

Table 2. ADF test

	ZS	SC	ZT	SJ	RE	DE
ADFStatistic	-7.7867	-6.7940	-6.5538	-5.2743	-3.5528	-4.6647
1%Critical Value	-3.6156	-3.6156	-3.6156	-3.6156	-3.6156	-3.6156
5%Critical Value	-2.9411	-2.9411	-2.9411	-2.9411	-2.9411	-2.9411
10%Critical Value	-2.6091	-2.6091	-2.6091	-2.6091	-2.6091	-2.6091
Significance	0.0000	0.0000	0.0000	0.0001	0.0117	0.0006

Based on the results of the ADF test, the significance levels of all variables' ADF tests are below 0.05, demonstrating that the p-values for each variable reject the hypothesis of the presence of a unit root, indicating that all six variables are stationary.

4.2 VAR Model Test

This study constructs a Vector AutoRegression (VAR) model using variables such as word count, emotional tone, number of substantive words related to the topic, temporal words, re-dissemination effect, and headline attractiveness, with the following formula. In ZS_t , SC_t , ZT_t , SJ_t ,

RE_t and DE_t , the subscript t represents the measurements of word count, emotional tone, number of substantive words related to the topic, temporal words, re-dissemination effect, and headline attractiveness variables at time t , respectively. ZS_{t-i} , SC_{t-i} , ZT_{t-i} , SJ_{t-i} , RE_{t-i} and DE_{t-i} , represent the i -th lag of the variables based on the time periods. The right side of the equation, a 6×6 order matrix, represents the parameters to be estimated in the model; u and ε respectively represent the fixed effects and the error terms of the VAR model.

$$\begin{bmatrix} ZS_t \\ SC_t \\ ZT_t \\ SJ_t \\ RE_t \\ DE_t \end{bmatrix} = \begin{bmatrix} u_{ZS} \\ u_{SC} \\ u_{ZT} \\ u_{SJ} \\ u_{RE} \\ u_{DE} \end{bmatrix} + \sum_{i=1}^t \begin{bmatrix} a_{11}^{t-i} & a_{12}^{t-i} & a_{13}^{t-i} & a_{14}^{t-i} & a_{15}^{t-i} & a_{16}^{t-i} \\ a_{21}^{t-i} & a_{22}^{t-i} & a_{23}^{t-i} & a_{24}^{t-i} & a_{25}^{t-i} & a_{26}^{t-i} \\ a_{31}^{t-i} & a_{32}^{t-i} & a_{33}^{t-i} & a_{34}^{t-i} & a_{35}^{t-i} & a_{36}^{t-i} \\ a_{41}^{t-i} & a_{42}^{t-i} & a_{43}^{t-i} & a_{44}^{t-i} & a_{45}^{t-i} & a_{46}^{t-i} \\ a_{51}^{t-i} & a_{52}^{t-i} & a_{53}^{t-i} & a_{54}^{t-i} & a_{55}^{t-i} & a_{56}^{t-i} \\ a_{61}^{t-i} & a_{62}^{t-i} & a_{63}^{t-i} & a_{64}^{t-i} & a_{65}^{t-i} & a_{66}^{t-i} \end{bmatrix} \begin{bmatrix} ZS_{t-i} \\ SC_{t-i} \\ ZT_{t-i} \\ SJ_{t-i} \\ RE_{t-i} \\ DE_{t-i} \end{bmatrix} + \begin{bmatrix} \varepsilon_{ZS} \\ \varepsilon_{SC} \\ \varepsilon_{ZT} \\ \varepsilon_{SJ} \\ \varepsilon_{RE} \\ \varepsilon_{DE} \end{bmatrix}$$

By calculating information criteria indices such as FPE (Final Prediction Error), AIC (Akaike Information Criterion), SC (Schwarz Criterion), and

HQ (Hannan-Quinn Criterion), the lag order of the model is determined. The calculation results are presented in "Table 3".

Table 3. Information criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
1	-78.3355*	33.5158*	0.0000*	6.8763*	8.7427*	7.5206*
2	-44.1730	42.9472	0.0001	6.9813	10.4475	8.1778
3	-20.0262	22.0771	0.0002	7.6586	12.7246	9.4074
4	49.7631	39.8796	0.0001	5.727822*	12.3936	8.0288

Based on the aforementioned information criteria indices, it is observed that the information criteria AIC, SC, and HQ reach their minimum values at lag order 1. Therefore, the lag order of the VAR model in this study is determined to be $i=1$.

This means that a VAR(1) model is selected to estimate the coefficient matrix of the VAR model.

The estimation of the coefficient matrix of the VAR model is carried out, and the estimation results are shown in "Table 4".

Table 4. Estimation of coefficients in the VAR model

	ZS	SC	ZT	SJ	RE	DE
	0.3331	0.0150**	0.0948**	-0.0155	0.0874	0.0004
ZS _{t-1}	(1.4849)	(2.4602)	(2.6719)	(-0.6035)	(1.4410)	(0.9909)
	10.9839	0.2573	1.4286	0.2450	1.7234	0.0191
SC _{t-1}	(1.5164)	(1.3083)	(1.2470)	(0.2953)	(0.8800)	(1.5112)
	0.6676	-0.0194	-0.0346	0.0322	-0.3888	-0.0013
ZT _{t-1}	(0.4502)	(-0.4811)	(-0.1474)	(0.1898)	(-0.9699)	(-0.5004)
	-0.2152	0.0341	0.2477	0.1518	-0.1747	-0.0002
SJ _{t-1}	(-0.1201)	(0.7008)	(0.8739)	(0.7397)	(-0.3607)	(-0.0630)
	-0.3480	0.0024	-0.2621	0.1908	0.4444	0.0010
RE _{t-1}	(-0.3951)	(0.0991)	(-1.8814)	(1.8915)	(1.8666)	(0.6385)
	257.1472**	4.2947	45.0718**	-15.2512	37.9902	0.1606
DE _{t-1}	(2.1189)	(1.3034)	(2.3484)	(-1.0972)	(1.1579)	(0.7583)

The estimation results of the VAR model parameters show: First, from the estimation results in the first column of the table, it can be seen that the lagged term of headline attractiveness has a positive and significant effect on the number of words (257.1472**). Second, the estimation results in the second column of the table indicate that the

first lag of the word count variable has a positive and significant contribution to emotional tone (0.0150**). Third, the estimation results in the third column of the table reveal that headline attractiveness has a positive and significant impact on the number of substantive words related to the topic (45.0718**).

A unit circle test method is used to conduct an experiment on its stability. By analyzing whether the eigenvalues of each variable fall inside the unit circle, it is determined that the modulus of the eigenvalues is less than 1. As shown in "Figure 1", the eigenvalues of all variables are within the unit circle. Therefore, the model established is stable and reliable.

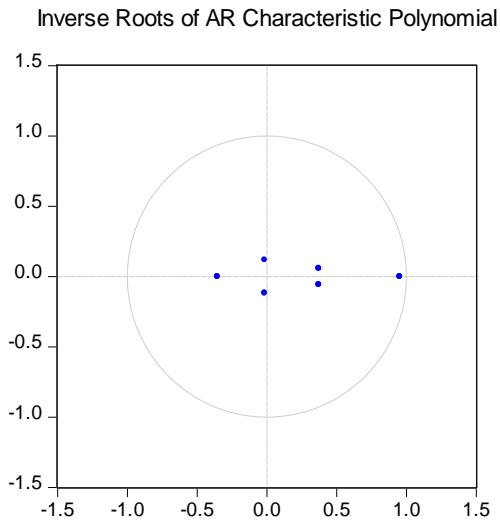


Figure 1 Unit circle test examination.

4.3 Impulse Response Analysis

Impulse response analysis describes the changes that occur when the model is subject to a shock from one variable, reflecting the impact size and trend of that variable on the model. To further explore the impact relationship between discourse strategies and audience interaction over time, this study established impulse response functions for different variables to measure the impact of shocks from various elements of discourse strategies (as random disturbance terms) on audience interaction (delivered read rate, the number of reads after each share). The impulse response analysis results of audience interaction under the shock of discourse strategies are shown in "Figure 2" and "Figure 3". The horizontal axis represents the period ($T=0,1,\dots,10$ days), and the vertical axis represents the degree of impact on the variables; the blue solid line represents the estimated impulse response function curve, and the red dashed line represents the 95% confidence interval. For instance, in the illustrations above, "Response of RE to ZS" indicates the impact of the number of words in the headline (ZS) on the number of reads brought by each share (RE).

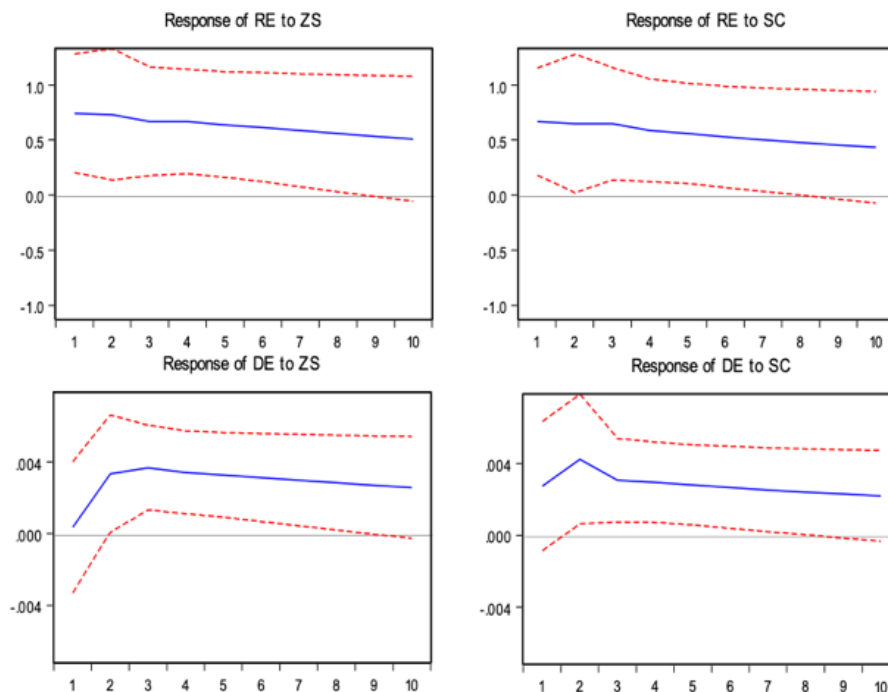


Figure 2 Impulse response analysis. (1)

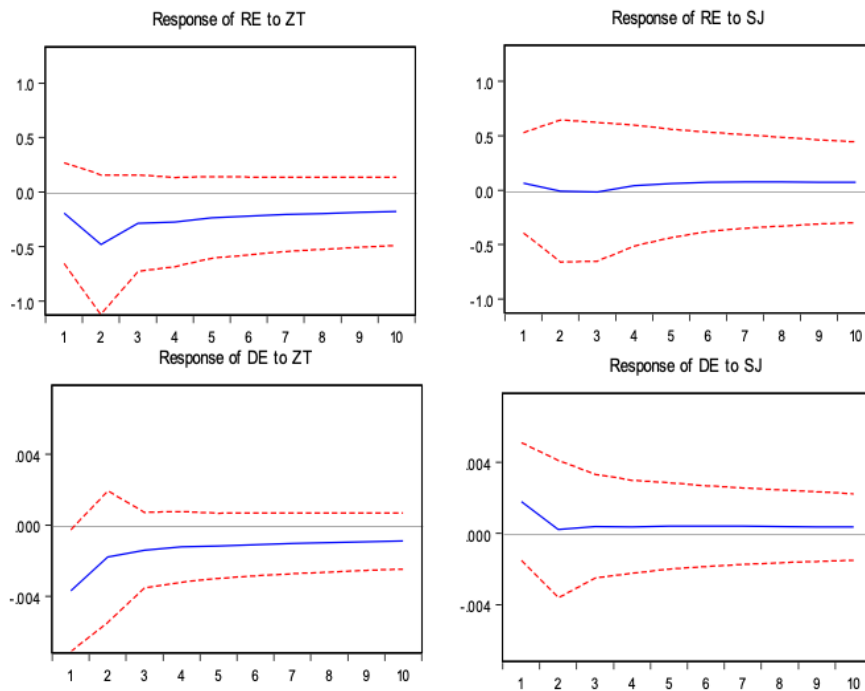


Figure 3 Impulse response analysis.(2)

Through the impulse response function, it was found that the number of words in the headline has a sustained positive impact on audience interaction; audiences are attracted by the abundance of information in the title. Emotional tone can effectively attract audience attention and stimulate sharing intentions initially, but its attractiveness for reading rates gradually weakens over time. The number of substantive words—such as names of countries and leaders—has a negative impact on interaction, potentially causing audiences to perceive the report as having an official bias, leading to reactance. This negative effect is evident initially, but it does not affect another segment of the audience's interest in the content, prompting them to continue reading. Finally, while temporal words have a slight positive effect on the audience initially, their impact is neutral in the long term. However, overuse may lead to distrust of the media by the audience.

4.4 Variance Decomposition

The model underwent variance decomposition, translating the forecast error variance of all variables in the system into the impact contributions of all endogenous variables within the system, with the lag period set to 10 cycles. Through forecast error variance analysis, it was found that the number of words and emotional tone

mutually influence each other, both affecting audience interaction effects. Although the number of substantive words (such as country names and leader names) is important in headlines, its association with the number of reads brought by sharing is not significant, implying that the quality and targeting of content may be more important than mere information volume. The use of temporal words in headlines varies over time, influenced by other factors such as the number of reads; sharing behavior is closely related to the content's reading rate. Therefore, to increase content dissemination, various factors influencing sharing, such as the number of words and emotional tone, need to be considered.

5. DISCUSSION

The analysis of the impact of news headline design elements—including word count, emotional tone, the use of substantive words, and temporal vocabulary—on stimulating audience interaction reveals that the number of words in a headline plays a continuous positive role in promoting audience interaction, particularly those information-dense headlines are more capable of capturing audience attention. This finding echoes previous research, emphasizing the importance of effectively conveying key information in an era of information overload. Information processing theory provides a

theoretical framework for understanding why the word count and information density of headlines can continuously attract audience attention. Against the backdrop of information proliferation in the digital age, headlines that can efficiently convey key information are more likely to capture audience interest. This finding highlights the high sensitivity of the audience to the quantity and quality of information when receiving and processing information.

Emotional tone plays a significant role in promoting initial sharing intentions among the audience, but its positive impact on reading rates gradually weakens over time. This suggests that emotion-driven interactions are transient and may require more strategies for long-term engagement with the audience. Emotion-driven theory further elucidates how emotional tone significantly impacts the initial sharing willingness of the audience. By instantaneously triggering emotional responses in the audience, emotionally charged content encourages sharing, showcasing the powerful role of emotions in driving human behavioral decisions. However, as time progresses, the influence of this emotion-triggered engagement fades, revealing the temporal nature of emotion-driven interactions and emphasizing the need for more diversified strategies to maintain long-term audience attention.

The use of substantive words, especially those with official connotations such as names of countries and leaders, initially had a negative impact on audience interaction, due to the natural resistance of the audience to content with an official bias. Yet, this negative impact was not sufficient to deter a portion of the audience from further exploring the content, indicating that news organizations need to weigh the pros and cons when using such vocabulary. Cognitive dissonance theory helps us understand why the initial use of substantive words with official connotations (such as names of countries and leaders) negatively impacts audience interaction. These words conflict with the audience's expectations for news independence and objectivity, eliciting adverse reactions. Nonetheless, this negative impact did not entirely inhibit the audience's further exploration of content, indicating that the audience employs complex cognitive strategies to regulate internal cognitive dissonance when processing information. Faced with information that might cause cognitive imbalance, the audience opts to engage in further processing to achieve internal cognitive equilibrium rather than simply avoiding it.

The use of temporal vocabulary initially has a slight positive impact on the audience, but over the long term, this effect tends towards neutrality and may even lead to audience distrust of the media when overused. This suggests that news organizations should consider the long-term effects when using temporal vocabulary. Media richness theory explains how temporal vocabulary can have a slight positive effect on the audience initially, while the long-term effects show neutrality, and in some cases, excessive use may weaken audience trust in the media. This emphasizes the need for caution when using time-sensitive information and avoiding over-reliance on a particular type of information element to prevent damaging the overall trust in the media.

The findings resonate with existing viewpoints, highlighting the importance of conveying key information in an era of information overload. While news headline design elements such as word count, emotional tone, the use of substantive words, and temporal vocabulary each play their unique roles and have their influences in promoting audience interaction, the effects of these elements are not immutable. Particularly, the use of emotional tone and substantive words may initially attract the audience, but over the long term, their positive impact may diminish or even turn negative, especially when overused, potentially leading to audience distrust in the media. This indicates that in designing news headlines to capture audience attention, careful consideration must be given to the long-term impacts of each element and how to balance these elements to maintain ongoing audience engagement and trust. Furthermore, this also emphasizes the need for news organizations to find a balance between seeking immediate interaction and long-term trust, adopting a more diverse and cautious content strategy.

6. CONCLUSION

This paper analyzed the impact of news headline design elements (including word count, emotional tone, the use of substantive words, and temporal vocabulary) on promoting audience interaction through a Vector Autoregression (VAR) model. The findings reveal that headlines with a large amount of information can continuously attract the audience, emotional tone can effectively promote audience willingness to share initially, but its impact diminishes over time. The use of substantive words may initially cause audience aversion due to their official connotations, but it is

not enough to prevent further audience exploration. Temporal vocabulary has a slight positive effect on the audience initially, but its long-term effect tends towards neutrality, and excessive use may lead to distrust. These insights provide theoretical guidance for news organizations in designing compelling headlines, emphasizing the importance of conveying key information and considering the interaction of multi-dimensional factors.

This study also has certain limitations. First, the relatively small sample size may limit the generalizability and extrapolation of our findings. Second, due to the limited time span of data collection, we were unable to fully explore the impacts of long-term trends and cyclical changes. Lastly, while the VAR model can reveal the dynamic relationships between variables, it may not fully capture all potential causal relationships and complex interactions. Future research could overcome these limitations by expanding the sample size, extending the study period, employing more diverse data sources and methodologies, and incorporating more advanced statistical models.

REFERENCES

- [1] K. Gligorić, G. Lifchits, R. West, et al., Linguistic effects on news headline success: Evidence from thousands of online field experiments, in: *Plos one*, 2023, 18(3): e0281682.DOI: <https://doi.org/10.1371/journal.pone.0281682>
- [2] A. Appelman, Written in Code: Exploring the Negative Effects of Acronyms in News Headlines, in: *Journalism Practice*, 2022, 16(7):1495-1511.DOI: <https://doi.org/10.1080/17512786.2021.1962757>
- [3] A. Piotrkowicz, V. Dimitrova, J. Otterbacher, et al., The impact of news values and linguistic style on the popularity of headlines on Twitter and Facebook, in: *Proceedings of the International AAAI Conference on Web and social media*, 2017, 11(1): 767-774.
- [4] J. Kuiken, A. Schuth, M. Spitters, et al., Effective headlines of newspaper articles in a digital environment, in: *Digital Journalism*, 2017,5(10):1300-1314.DOI: <https://doi.org/10.1080/21670811.2017.127978>
- [5] Siyu Wang, Research on the Highlighting Methods of News Headline Functions from the Perspective of Foregrounding in WeChat Official Accounts, Henan University, 2023.
- [6] Tongla Ba, Research on the WeChat Public Platform of "Xing'an Mongolian News", Inner Mongolia University, 2023.
- [7] Biyi Fang, How to Make News Headlines More Attractive in the Era of Converged Media, *Journalism and Culture Construction*, 2022, (18): 98-100.
- [8] Shengqing Liao, Jinhan Shu, The Impact of Headline Valence on News Sharing on New Media Platforms, in: *Modern Communication (Journal of Communication University of China)*, 2023, Vol. 45, No. 03.
- [9] Guangjun Ma, The Boundary, Certainty, and Communicability of Public Opinion Warfare in the Age of Social Media, in: *Journal of Intelligence*, 2023, Vol. 42, No. 08.