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Understanding the Role of Language Style of Government Response in E-participation: Evidence from a Citizen Inquiry Forum in China

Completed Research

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Abstract

In response to the “Internet + Public Service” reformation, Chinese government organizations increasingly use e-participation platforms to interact with citizens, making how government respond to citizens' inquiry increasingly critical in citizen participation. This study is one of the few attempts to study the effect of language style of government response on citizen participation. Based on the language expectancy theory, we hypothesize that government response using appropriate formal and emotional language will change citizen e-participation behavior. Using text data from 11,194 users in a Chinese citizen inquiry forum, we found that emotional language has the positive impact on citizens' continuous participation significantly. And both emotional language and formal language can promote citizens' participation quality. Moreover, we identified the complementary effects of two languages on e-participation. This study has implications for both researchers and practitioners.

Keywords

Language style, government response, e-participation.

Introduction

The development of information and communication technology (ICT) has changed the communication process in the public sphere in China. Social media and other Web 2.0 tools provide new electronic channels in Chinese local government portals, promoting greater participation and collaboration between government and citizens(Gintova 2019). How to motivate these e-participation platform users continuously participate and maintain active value contribution become an ongoing challenge(Ansell and Miura 2020).

As public expression and government response are gradually moving from offline to online, Chinese governments are increasingly required to be responsive to citizens(Sjoberg et al. 2017). The strategies chosen by government's response must consider not only what is communicated, but how it is communicated(Stone and Can 2020). Previous research on platform interaction emphasized the role of language style in user perception and behavior (Lee and Theokary 2021). In addition, emerging research in field of public administration has focused on language style in e-petitions(Hagen et al. 2016) and municipal twitter feeds(Stone and Can 2020). Collectively, these previous researches demonstrate that effective language style of online government response is, indeed, central to user perception and participation behavior.

Government response needs to not only follow certain guidelines but also give the public a certain emotional value(Piotrowski and Rosenbloom 2002). Therefore, we focus our research on formal language and emotional language commonly used in government responses. Formal language refers to official and rigid

language expressions, meets citizens' expectations for a fair and equitable solution to problems. For example, "Relevant departments will investigate and punish in accordance with the 'Environmental Protection Law' ". Emotional language contains lively and human expressions, giving citizens emotional value. For example, "Thank you for your concern and support for various undertakings in your hometown".

Based on the language expectancy theory(Burgoon et al. 2002), we claim that when the language style of the government's response meets the public value expectations, it can promote continuous citizen participation and contribute more public value. We test our hypotheses in a sample of 11194 users in Yizheng inquiry forum in China. We find formal language and emotional language have different performances in citizens' continuous participation and participation quality. In addition, we found the complementary effect between the two language styles. Our research is a useful attempt to solve e-participation problems using user-generated data. We supplemented the e-participation literature with a perspective on how governments communicate, and extend the application of language expectation theory in the context of e-government. This study will also provide insights to government and platform managers on improving public willingness to participate and public value contribution.

Theoretical Background

Electronic participation (e-participation) can be broadly defined as the use of information technologies to facilitate citizen participation or to gain their support(Choi and Song 2020). Scholars have conducted extensive discussions on the factors influencing e-participation. The discussion of existing factors can mainly divide into internal factors and external factors. Intrinsic factors come from the user's motivation to participate, includes civic skills(Vicente and Novo 2014), experience(Holgersson and Karlsson 2014), habits(Vicente and Novo 2014), etc. External factors mainly include website design, government form(Zheng and Schachter 2017), etc. However, these literature implicitly assumes that various government's communication strategies have a uniform impact on a target public(Choi and Song 2020). There is almost no literature discussing the impact of government responses on public participation. In addition, although previous researches have investigated citizens' initial motivation to participate in crowd-sourcing platforms, how to ensure their continued participation and participation quality has largely been ignored so far.

At present, scholars have begun to pay attention the role of language style in e-participation. Stone and Can (2020) examine the language style of Twitter feeds. The research finding shows using a present-tense, informal, and cognitively complex style with more feminine, health-related, and third-party references can be more attractive to the public participation. Hagen et al. (2016) examine language styles associated with the popularity of e-petition platforms, founding the negative effects of extremity and repetition language styles. These studies provide references for us to study the language style of government response.

The words we use include both content words and style words(Toma and D'Angelo 2015). Content words (adjectives, nouns and verbs) convey much of the meaning, whereas the use of style words (language style) contributes to how something is said(Parhankangas and Renko 2017). Language Expectancy Theory (LET) assumes that language is a rules-based system. People develop expected norms regarding whether or not certain language is considered appropriate to be used in a given social context(Burgoon et al. 2002). Language Expectation Theory expresses that language choices carry social meanings, including the desire to negotiate relationships and control the impressions formed by others(Bazarova et al. 2013). Compared with language content, language style can be adjusted freely, so it is more meaningful for managing impressions and relationship adjustment(Pennebaker et al. 2003).

As e-government is often seen as an effective means to create public value for citizens(Harrison et al. 2012; Karunasena and Deng 2012), government response needs to be aligned with public values to meet citizen expectations. Piotrowski & Rosenbloom(2002) divide public value into mission-based public value and nonmission-based public value. Among them, the mission-based public value refers to accomplish the mission based on specific regulations; nonmission-based public values are mainly considered the value that the public expects apart from prescribed tasks, such as the emotional value expressed by the government. Specific to the government's response language, we summarize them as formal language and emotional language commonly used in government responses. Next, we will examine the role of the formal

language and emotional language of government responses and their interaction how to affect citizens' follow-up participation behavior.

Hypotheses Development

Perceived responsiveness is the belief of citizens that if they communicate their opinions, complaints and requests, the government will respond to them, it is closely related to citizens' online political participation (Arshad and Khurram 2020). According to the language expectation theory, formal language is characterized as competent and qualified, it will make citizens believe government will take substantial actions to help them. Research also shows that reasonably explaining through formal language such as certain policy can make government response more effective (Esaiaasson et al. 2017). Therefore, when the government response contains more formal language, the higher the public perception of external political efficacy, according to the civic voluntarism theory (Verba et al. 1995), citizens are more likely and more willing to continuously participate in political activities, and improve the participation quality. Accordingly, following hypotheses are proposed in this study:

Hypothesis 1a: Formal language of government response is positively associated with citizens' continuous participation.

Hypothesis 1b: Formal language of government response is positively associated with citizens' participation quality.

Language plays an important role in emotion perception, and positive language helps to form positive emotions, thereby affecting people's perception and behavior (Lindquist and Gendron 2013). According to the broaden-and-build theory, positive emotions will bring people a broader attention and affect the thought-behavior component (Fredrickson 2001). This kind of attention expansion and behavioral component change can promote people to participate in existing environment and related activities. Therefore, users who receive positive language responses from the government are more inclined to form a positive emotion and participate in political inquiries. In addition, emotional language can also inspire satisfaction and trust in interpersonal communication, thereby improving the quality of communication. Considering that trust and satisfaction are considered to be important factors affecting public participation in e-government (Lee and Schachter 2019), we have reason to believe that the positive emotional language of government responses can increase public trust and satisfaction, thereby promoting continued citizen participation and improving the participation quality.

Hypothesis 2a: Emotional language of government response is positively associated with citizens' continuous participation.

Hypothesis 2b: Emotional language of government response is positively associated with citizens' participation quality.

The language style of the government's response is usually a mixture of formal language and emotional language style. Therefore, we need to study the interaction between the two. Several studies have found a moderating role for emotional language. An experiment showed that in order to highlight the authority of the information source, the persuader should add emotional information to the persuasive information (Zhang et al. 2016). More tangent to the current research, study confirms that emotional language in government posts can play a significant moderating role in promoting public engagement (Chen et al. 2020). Based on the complementary between mission-based public value and nonmission-based public value (Piotrowski and Rosenbloom 2002), we hypothesize that this complementary also exists between emotional language and formal language in government responses.

Hypothesis 3a: The formal language and emotional language of the government's response have a complementary effect on the citizens' continuous participation.

Hypothesis 3b: The formal language and emotional language of the government's response have a complementary effect on citizens' participation quality.

Empirical Methodology and Analysis

Data Collection

The data for this research were taken from China Yizheng Government Forum (<https://bbs.yizheng.gov.cn>). The forum has a dedicated government response section. In this section, citizens post to the government on an issue, and the corresponding government department will respond to them. This section provides unique sample data for our research. First, the forum's government response rate is close to 100 percent, we can get government's reply after each post by a citizen. Second, this section does not allow other citizens to participate in the message except the poster, and there is no friendship between users. Thus, we can observe the relationship between pure civic behavior and government response. We developed a Python program to collect a panel data-set of all users' behavior who have posted from 2010 to 2020 in the forum's political section. We finally collected 11,194 users' information, including their posts and government responses.

Variable Measures

Dependent Variables

Continuous participation. In order to characterize the subsequent participation behavior of citizens, we turn the problem into studying the impact of language style on the probability of citizens continuing to participate in the next moment. We collected the time from citizens' first receipt of government response to their next post, and we defined the observation period as one year. We used the method of survival analysis to study how language style of government response is associated with the "hazard" (in this case, a positive hazard in the form of next participation).

Participation quality. Citizens' posts in forums are divided into two types: consultation type and suggestion type. The two types represent different levels of citizen participation (Reddick et al. 2017). In consultation-based participation, government only answer the questions raised by citizens, and does not involve the formulation and revision of public policies. In suggestion-based participation, citizen participation begin to play a role in public policy and contains more public values. We use weighted feature lexical to classify consultation-based and suggestion-based participation to measure the quality of civic participation. We consider consultation-based participation as lower quality of participation and suggestion-based as higher quality.

Independent Variables

Emotional language style. We use the style vocabulary that comes with LIWC (Linguistic Inquiry and Word Count) to measure the emotional language of government responses. There are more than 80 language dimensions in the LIWC software, from basic types of vocabulary (such as pronouns, articles, verbs, etc.) and psychological vocabulary (such as positive emotions, negative emotions, anxiety, sadness, etc.) For the measurement of the emotional language, this study selected the word Friend, Positive-emotion, and Love from the pre-defined language categories in the LIWC software.

Formal language style. The formal language dictionary of this research is obtained by mining high-frequency vocabulary in government work reports. The sample of this research is from the online policy deliberation forums of Yizheng City, China. To echo the sample of this research, this research collected government work reports of Yizheng City, China during the ten-year period from 2011 to 2020. We use word segmentation and word frequency statistics to extract high-frequency vocabulary related to government affairs as a rule-based information dictionary.

Control Variables

Studies have shown that the public's perception of the government's responsiveness is significantly related to the public's online political participation (Arshad and Khurram 2020). Therefore, we control the variables related to the government's response capacity, namely, the government's response time and the length of the government's response text. In addition, we have also controlled the time factors related to public posting, including the time from public registration to the release of the policy post, the time before the public release of the policy post, and whether the public release of the policy post is a working day. We also

use the post type as control variables. Finally, we control the topics of public posts and the government departments that reply to the posts.

Data Analysis and Results

The Impact of Language Style on Citizens’ Continuous Participation

As mentioned earlier, we transformed the research question to investigate the effect of language style of government response on the likelihood of citizens’ next participation. We use the methods of survival analysis to study the continued participation behavior of citizens. We take the first government response received by citizens after registration as the starting event, and the next participation of citizens as the ending event. The survival time is from the time when the public receives the government’s response to the next time they participate in the political inquiry.

We used Cox regression for multivariate survival analysis. Considering that the risk of government response effects on citizens’ behavior may vary over time, we use the Schoenfeld residual method to test whether the covariates meet the proportional hazards assumption. The results show that emotional language does not meet the proportional hazards assumption, so it is necessary to carry out Cox regression analysis with time-dependent covariates on the model. We set the time function to be $g(t)$, and established the model as follows:

$$H_i(t) = \exp \left\{ \beta_0 + \beta_1 \text{Formallanguage}_i + \beta_2 \text{Emotionallanguage}_i + \beta_2' \text{Emotionallanguage}_i * g_i(t) + \beta_3 \text{Formallanguage}_i * \text{Emotionallanguage}_i + \beta_4 \text{controls}_i \right\}$$

Cox regression analysis gives the fitted results for the coefficients of each covariate in the model (see Table 1). The results show that emotional language positively associated with the hazard rate. That is, citizens who received more emotional language in government response will participate in the next political inquiry sooner (coefficient=0.889, $p < 0.01$) (supporting $H2a$). Moreover, the results also show that this relationship weakens with time (coefficient=-.004, $p < 0.01$). Formal language has an opposite effect on hazard rate (coefficient=-.2565, $p < 0.01$), hypothesis $H1a$ not be supported. We can also see from the regression results that there is an interaction between emotional language and formal language. We will further group and draw survival curves to study the interaction.

	β	SE	Wald	df	Exp(β)	95% CI for Exp(β)	
						Lower	upper
Formal	-2.565***	.518	24.516	1	.077	.028	.212
Emotion	.889***	.148	35.838	1	2.432	1.818	3.254
T*Emotion	-.004***	.001	7.162	1	.996	.993	.999
Interact	3.776***	.699	29.189	1	43.650	11.093	171.761
Postage	.000***	.000	22.039	1	1.000	1.000	1.000
Registeredtime	.000**	.000	5.106	1	1.000	1.000	1.000
Wordcount	.000	.000	.954	1	1.000	1.000	1.001
Time	-.006	.007	.797	1	.994	.981	1.007
Workingday	.019	.044	.186	1	1.019	.934	1.112

N (total users) = 11194, N (Continuous participation) = 3211
 Overall Model Estimation: $\chi^2 = 879.718$. df = 11, p = 0.00, -2 Log likelihood = 57245.562
 *Significant at the 0.1 level; **Significant at the 0.05 level; ***Significant at the 0.01 level

Table 1. Cox Regression Model for Continuous Participation

We further divided emotional language and formal language into two groups: high (i.e., one standard deviation above the mean) and low (i.e., one standard deviation below the mean) to further study the interaction between the two. We plotted survival curves in groups, as shown in figure 1. We can see that formal language has a significant complementary effect on emotional language. This is manifested in the fact that emotional language has a more positive effect on citizen continuous participation when formal language in government responses increases. Therefore, hypothesis 3a is confirmed.

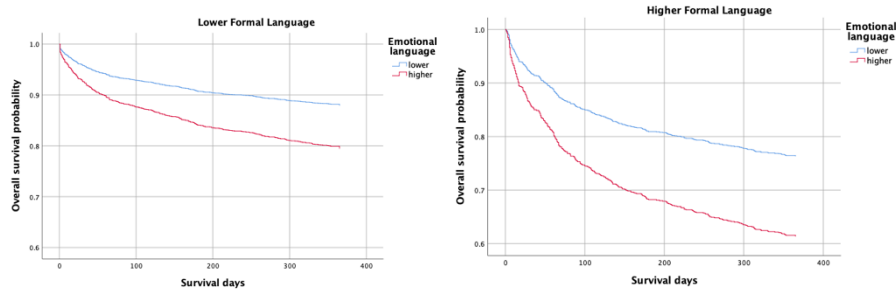


Figure 1. Survival Curves for Multivariate Analysis

The Impact of Language Style on Citizens’ Participation Quality

In this study, participation quality is a binary discrete variable. We use a panel logit model to estimate the impact of the language style of government responses on the quality of participation. Since the participation of citizens in the current period is affected by the government’s response in the previous period, we need to use data with a lag of one period to estimate the dependent variable. Formally, we estimated the following block equation:

$$U_{it}(Quality) = \beta_0 + \beta_1 Formallanguage_{i(t-1)} + \beta_2 Emotionallanguage_{i(t-1)} + \beta_3 Formallanguage_{i(t-1)} * Emotionallanguage_{i(t-1)} + \beta_4 controls_{i(t-1)} + \varepsilon_{it} = V_{i(t-1)} + \varepsilon_{it}$$

Thus, the conditional probability, Pr_{it} , that citizen i in period t chooses to improve the participation quality which means contributing public value is given by the usual expression

$$Pr_{it} = \frac{\exp(V_{it})}{1 + \exp(V_{it})}$$

Hausman test showed that a fixed-effect model (FEM) is more appropriate than a random-effect model (REM) ($p < 0.001$), so we controlled the individual and time fixed effects. We first ran the base model with control variables and then added the effect of language style. Formal language and emotional language are strongly and significantly associated with the likelihood of participation quality (coefficient=1.674, $p < 0.01$; coefficient=9.682, $p < 0.01$), supporting H1a and H2a. We calculated an average marginal effect of 0.205 for formal language, which means that when other variables are held constant, for every 0.1 increase in the level of marginal effect in the government response, the public is 2.05% more likely to contribute public value. The average marginal effect of emotional language is 0.989, which means for every 0.1 increase in the level of marginal effect in the government response, the public is 9.89% more likely to contribute public value. After adding the interaction term, we found that there is an interactive relationship between emotional language and formal language (coefficient=40.290, $p < 0.05$).

Variable	Base model	+Language style	+Interaction
Formal language		1.674*** (0.415)	1.674*** (0.415)
Emotional language		9.682*** (1.392)	9.682*** (1.392)
Interact			40.290** (16.293)
Workingday	0.005 (0.071)	-0.003 (0.072)	-0.009 (0.072)
Postage	0.040 (0.059)	0.063 (0.059)	0.066 (0.059)
Registeredtime	-0.037 (0.035)	-0.030 (0.036)	-0.029 (0.036)

Variable	Base model	+Language style	+Interaction
Wordcount	-0.021(0.040)	0.017(0.041)	0.015(0.041)
Time	-0.023 ^{**} (0.011)	-0.019 ^{**} (0.011)	-0.018 ^{**} (0.011)
Type	0.241 ^{***} (0.073)	0.144 ^{***} (0.075)	0.127 ^{***} (0.076)
Log Likelihood	-2671.165	-2644.528	-2641.437
Id	Yes	Yes	Yes
Depart	Yes	Yes	Yes
Freq	Yes	Yes	Yes
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$			

Table 2. Binary Logistic Regression Model for Participation Quality

As an interaction effect in logistic regression is a nonlinear marginal effect whose value depends on the values assumed by all model variables(Norton et al. 2004), we conducted additional analyses to explore the true interaction effect. Figure 2 plots the interaction term in percentage points against the predicted probability (and the incorrect marginal effect), in none of these deviant cases was the coefficient significantly different from zero. We can also see that the z-statistics almost all are significant, indicating that the positive coefficients of the interaction terms in our logistic regressions reflect the true interaction effects reasonably well. That is, when emotional language increases, the effect of formal language on participation quality is strengthened, and vice versa. Therefore, hypothesis 3b is confirmed.

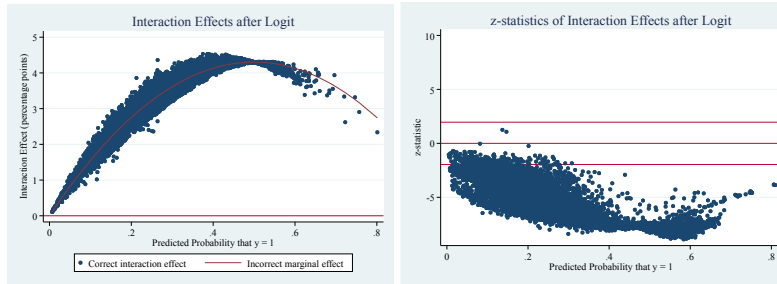


Figure 2. Distribution and Z-Statistics Plot of Interaction Effect

Robustness Check

Alternative Explanation

We conducted several checks to ensure our results were robust. First, we tested the two models with different sample sizes (select user posting situation from 2016 to 2020). Second, we counted citizens' participation behavior within six months after receiving the government's response as a surrogate variable for model 1 for robustness testing. In addition, we reclassified posts in the consulting and advising classes using Word2Vec model to verify the model 2. For each of the above robustness checks, the significance of coefficients was consistent, indicating that our analyses are robust and our findings are consistent.

Coarsened Exact Matching

In order to eliminate endogenous problems caused by self-selection bias, we then use the coarsened exact matching (CEM) approach to alleviate endogeneity concern further. We divide government responses into two groups according to the average value of emotional language and formal language, namely, high-emotion and low-emotion, high-formal and low-formal. We match two groups with two sets of covariates respectively, with a CEM procedure. The logit regression results of the covariates before and after matching are shown in Table 3. Then, we use the matched samples to regress e-participation outcome on the treatment. The result is consistent with our main model's results.

treatment	Emotional language		formal language	
	Unmatched	Matched	Unmatched	Matched
Workingday	-0.016(0.035)	0.000(0.045)	0.034(0.034)	-0.000(0.042)
Time	0.023***(0.005)	0.008(0.008)	0.017***(0.005)	0.017**(0.008)
type	-0.888**(0.033)	-0.004(0.045)	-0.185**(0.031)	0.012(0.039)
Postage	-0.070***(0.015)	-0.004(0.023)	-0.142***(0.015)	-0.006(0.021)
Registeredtime	0.020**(0.008)	-0.000(0.011)	-0.009(0.008)	-0.003(0.011)
Wordcount	0.722***(0.021)	0.042(0.027)	0.295***(0.018)	0.003(0.024)
_cons	-1.727***(0.176)	-0.147(0.265)	0.281*(0.167)	0.009(0.245)
N	22544.000	13922.000	22544.000	16100.000
r2	0.07	0.0002	0.02	0.0002

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3. The Logit Specifications Before and After Matching.

Discussion

Our study suggests that language style of government response is an important predictor of e-participation. Consistent with our hypothesis, we found that emotional language has a positive impact on citizens' continuous participation and participation quality. This may be because emotional language can help increase the public's positive emotions, thereby increasing public satisfaction and trust, and then being willing to participate in the interaction with government. In the analysis of formal language, we found that the formal language has a positive impact on the participation quality, while has a negative impact on continuous participation. This may due to the higher the external political effectiveness perceived by the public when the government's response contains more formal language. When the perceived political effectiveness increases, individuals may pay more attention to the quality of expressions. Specifically, individuals may avoid publishing excessive information that may cause confusion or distraction (Gu et al. 2007), thereby reducing the number of political participation. In addition, we further found the complementary of formal language and emotional language on e-participation. This means that the government response needs to include both language styles to achieve the best effect of promotion.

In order to further understand the complementary between the two in practical applications, we summarize four types of Chinese government responses based on emotional and formal language levels and give examples in Figure 3. According to our findings, government needs to balance the formal language and the emotional language style in order to select the appropriate type to respond to citizens. Due to the complementary effects of emotional language and formal language on e-participation, we can figure out that using more mixed type of government response can significantly increase e-participation levels, while descriptive types should be avoided.

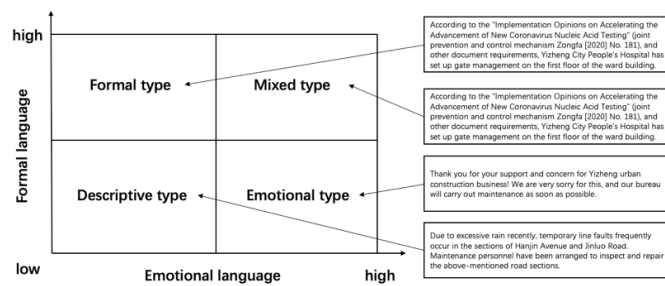


Figure 3. Four response types according to language style

Contributions and Limitations

This study contributes to the growing literature on e-participation from the perspective of government response strategies. Most of previous literature, much of it based on civic engagement models such as Civic Voluntarism Model (CVM) to illustrate individual-level engagement motivation (Oni et al. 2017; Phang and Kankanhalli 2006). In contrast, we have sought to explain how to change language styles of government responses to promote public participation. We identify formal language and emotional language are the critical language styles in e-participation. We also extend the application of language expectation theory (Burgoon et al. 2002) in the context of e-government. In our research in the context of e-government, we suggest the language style of the government's response should follow the value expectations of citizens (Burgoon et al. 2002). We pioneer in exploring the interactive effects of language styles, and found the complementary effects of formal language and emotional language.

For practical implications, the research results of this paper are of great significance to the communication methods of Chinese government managing e-participation platforms. Chinese government commissioners can improve quality and quantity of e-participation platforms by moderating formal and emotional language in responses. Our findings will also provide language style references for e-government chatbots that are gaining popularity in China.

This study can be seen as the first step toward an understanding of language style of government response in e-participation. Our findings are subject to limitations. We only use objective behavioral data, so we cannot capture the impact of potential intrinsic motivation on user participation. Some scholars have suggested that extrinsic motivation (for example, virtual incentives) may reduce the influence of intrinsic motivation (Zhao et al. 2016). However, due to the inherent limitations of empirical data, we cannot explore the interaction between extrinsic motivation and intrinsic motivation in this study. In the future, laboratory experiments can be used to identify the impact of potential intrinsic motivation and the interaction between different types of motivation.

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