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Translational Health Communication Research: From Knowledge to Social Impact

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Health communication research has traditionally focused on producing knowledge, such as developing theories, testing hypotheses, and publishing findings in academic journals. These contributions remain essential. However, as health challenges become increasingly complex, an important question deserves greater attention: What happens after the paper is published? If our health communication research is ultimately intended to improve health and well-being, we need to think about how knowledge moves from scholarship into practice. This is where translational health communication research becomes important.

From knowledge production to knowledge application

A conventional model of academic research might focus on theory, research, publication, and academic impact. Translational research adds another set of steps: practice, stakeholder engagement, and ultimately policy, community, or industry impact. The difference is not that one model values theory while the other does not. Rather, translational research asks us to consider what theory and empirical evidence can do in the world.

For health communication scholars, this means engaging with the people and institutions who encounter health problems directly. Policymakers, healthcare professionals, NGOs, industry partners, community organizations, and members of the public can all play important roles in informing research questions. Such engagement can also change the research itself. A problem that appears straightforward in an academic article may look quite different when examined from the perspective of a community member, healthcare provider, or policymaker. Translational research therefore should not be understood simply as "communicating research findings to the public". It is a process of connecting scholarship with real-world problems, collaborating with stakeholders, designing interventions or solutions, and assessing whether those efforts make a meaningful difference.

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Health communication as a natural setting for translation

Health communication provides many opportunities for this kind of work. For example, identifying the factors associated with health misinformation exposure or belief is important, but it is only one part of the problem. Research can also inform the design of communication campaigns, educational materials, or interventions that help people recognize and respond to misleading information. The same applies to health technology adoption. Understanding why people adopt, or do not adopt, can inform the design of more accessible and inclusive technologies. Research on patient-provider communication can similarly move beyond identifying communication barriers toward developing practices that improve interactions and experiences within healthcare settings. Campaign research can contribute not only to theoretical understanding but also to more effective public health messaging.

Impact requires more than publications

Translational research also requires us to reconsider what counts as a meaningful research output. Journal articles and books remain central to scholarly communication, but they are not the only ways research can create value. Policy briefs, public workshops, communication campaigns, media interviews, podcasts, exhibitions, open-source tools, and public engagement events can all connect research with audiences beyond academia. This does not mean that every study needs to produce a campaign or a policy brief. Nor should impact become a justification for sacrificing theoretical or methodological rigor. Instead, researchers should consider the appropriate pathway through which a particular body of research might create value. Importantly, impact should also be assessed rather than assumed. Relevant indicators may include the reach of an intervention, stakeholder engagement, media visibility, changes in attitudes or behaviors, policy influence, and community outcomes. The appropriate measure will depend on the research question and the context in which the work is conducted.

Taking social impact seriously

A meaningful social impact agenda begins with the choice of problem. Research is more likely to matter when it addresses issues that are significant to communities and recognized as important by relevant stakeholders. Social impact can be local, regional, national, or global; what matters is that the research responds to a problem that people actually experience and care about. This also means that researchers need to be willing to engage with communities rather than simply study them. Partnerships with government agencies, nonprofits, healthcare organizations, industry, and community groups can help ensure that research is relevant and that findings have pathways into practice. In this sense, researchers can contribute not only evidence but also expertise to processes of reflection, decision-making, and action.

There are, of course, significant barriers. Academic evaluation systems continue to place considerable weight on publications. Social change is difficult to measure and often takes years to emerge. Emerging technologies such as AI create new ethical responsibilities, while real-world problems can evolve much faster than academic research cycles. These challenges should not discourage translational research. Rather, they suggest that the field needs a broader

understanding of scholarly contribution. The future of health communication research should not be defined only by how many papers we publish or how often those papers are cited. We should also ask whether our research helps communities address meaningful health problems, whether it informs policy and practice, and whether it contributes to healthier and more inclusive societies. Translation is not the final step after research. It can be part of the research process itself. By bringing scholarship into sustained conversation with practitioners, policymakers, organizations, and communities, health communication research can move beyond knowledge production toward something equally important: knowledge that makes a difference.

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The Thin Ideal and Unhealthy Weight Control: A Study of Social Media Effects Based on the Influence of Presumed Media Influence Model

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Abstract

Media effects extend beyond simple linear processes, operating through complex cognitive inferences. Drawing on the Influence of Presumed Media Influence (IPMI) model, this study explores the indirect associations between thin-ideal information on social media and young women's unhealthy weight control intentions. Based on survey data from 575 young women, structural equation modeling and multigroup analysis were employed, using health consciousness as a grouping variable. Results indicate that attention to thin-ideal information is positively associated with descriptive norms and personal attitudes via presumed influence on others, which subsequently predict unhealthy behavioral intentions. Notably, while high health consciousness breaks the association between personal attitudes and intentions, it cannot counteract the immense pressure of descriptive norms. Normative pressure stably predicts unhealthy intentions across all health consciousness levels. These findings highlight the overwhelming power of social norms over individual health cognition, emphasizing that mitigating media-driven health risks requires interventions targeting normative perceptions rather than mere content regulation.

Keywords: Health communication; Indirect media effects; Influence of presumed media influence; Social media; Unhealthy weight control behaviors

Introduction

The proliferation of social media has decentralized health authority, shifting health beliefs away from professional institutions and rendering individuals highly susceptible to digital health trends (Li & Li, 2022). Thus, it is crucial to explore the health risks associated with social media and their subsequent impact on behavioral intentions.

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Among the various health risks exacerbated by social media, the pervasive promotion of the thin ideal is particularly concerning. By idealizing minimal body weight and body fat, this standard establishes physical benchmarks well below healthy thresholds, rendering them largely unattainable for most individuals through sustainable lifestyle practices (Stice & Shaw, 1994).

Through beauty filters, digital enhancement, and algorithmic curation, social media has distorted perceptions of body image and normalized the unrealistic ideal of extreme thinness. The thin ideal is no longer merely a beauty standard. As society increasingly associates slenderness with personal morality and self-discipline, it has evolved into a strict social norm.

Previous studies have focused more on how media messages exert direct effects through internal psychological processes, often overlooking indirect effects based on perceptions of others. Drawing on the Influence of Presumed Media Influence (IPMI) model, this study examines how young women's attention to thin-ideal content shapes their behavioral intentions through cognitive inference, and how this indirect pathway differs across levels of health consciousness.

Literature Review

The IPMI model is derived from the third-person effect (TPE) hypothesis, serving as a foundational framework for examining indirect media effects. In contrast to paradigms focusing on direct effects, the IPMI model posits that behavioral outcomes are driven by audience perceptions of others. The model consists of two components: (1) individuals presume that media messages influence others (the presumed influence); and (2) they react to this anticipated influence by adjusting their own attitudes and behaviors (the influence of presumed influence) (Gunther et al., 2006).

The first stage of the IPMI model proposes that individuals estimate the degree of others' media exposure based on their own attention to media content. This concept is referred to as presumed reach (Gunther et al., 2006) Prior studies on emerging issues, such as plant-based meat and nano-enabled food, have consistently demonstrated a positive relationship between self-attention and the presumed others' exposure (Ho et al., 2020, 2022). Accordingly, the following hypothesis is proposed:

H1: Young women's attention to thin-ideal information on social media is positively associated with presumed others' exposure to thin-ideal information on social media.

This reasoning is anchored in the "perceived likelihood of exposure" corollary, which posits that individuals generally assume others are more susceptible to media exposure than they are themselves (Eveland Jr. et al., 1999). Furthermore, according to the "persuasive press inference," audiences frequently equate perceived media reach with actual public attitudes (Gunther & Christen, 2002). Consequently, an individual's estimation of others' media exposure serves as a positive predictor for their assessment of the media's influence on those others. Extending this theoretical rationale to the current study context, the following hypothesis is proposed:

H2: Young women's presumed others' exposure to thin-ideal information on social media is positively related to the presumed influence of thin-ideal information on social media on others.

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The second stage of the IPMI model proposes that individuals adjust their own attitudes to maintain social alignment after perceiving media influence on others (Tal-Or et al., 2010). This tendency stems from a fundamental drive to cultivate and sustain social connections (Wood, 2000). Extant research across diverse topics, such as fake science news and healthy dieting, has demonstrated that the presumed influence on others positively predicts individuals' attitudes (Ho et al., 2016, 2022).

Moreover, attitude is a key factor that shapes behavioral intentions and guides specific actions (Ajzen & Fishbein, 1973). Since individuals are naturally inclined toward behaviors they view favorably, a positive attitude leads to a stronger intention to act (Fishbein, 1963). Existing research on cosmetic surgery confirms that attitude is a strong predictor of behavioral intentions (Alduosari et al., 2025). These arguments lead to the following hypotheses:

H3: Young women's presumed influence of thin-ideal information on social media on others is positively related to their attitude toward the thin ideal.

H4: Young women's attitude toward the thin ideal is positively related to their unhealthy weight control behavior intentions.

Descriptive norms refer to an individual's perception of how the majority behaves (Cialdini et al., 1990). When objective data are lacking, people often rely on media exposure to form these social benchmarks (Cialdini et al., 1990). Within the IPMI framework, the presumed influence of media on others serves as a predictor of descriptive norms. This positive association has been documented in previous Singaporean studies regarding pro-environmental actions and pro-natalist policies (Liao et al., 2016; Li, 2024).

Furthermore, descriptive norms exert influence through the fear of social exclusion. To maintain a sense of belonging and avoid marginalization, individuals typically align themselves with the perceived majority (Cialdini et al., 1990). In the context of this study, young women who view the thin ideal as a dominant social standard may pursue unhealthy weight loss as a strategic response to avoid social penalties. Thus, the hypothesis is proposed:

H5: Young women's presumed influence of thin-ideal information on social media on others is positively related to their descriptive norms toward the thin ideal.

H6: Young women's perceived descriptive norms toward the thin ideal are positively related to their unhealthy weight control behavior intentions.

Media effects vary according to individual traits. Health consciousness represents a comprehensive psychological orientation toward overall well-being, reflecting the degree to which an individual prioritizes their health. This disposition fundamentally shapes information-processing patterns. Evidence from research on organic food consumption and health risk communication confirms that individuals with high health consciousness typically exhibit more rational response patterns (Kabir, 2023; Ho et al., 2022). Such variations suggest that different audience segments may respond divergently when exposed to thin ideal aesthetics. In light of these considerations, the following hypothesis is proposed:

H7: The IPMI differs among people with different levels of health consciousness.

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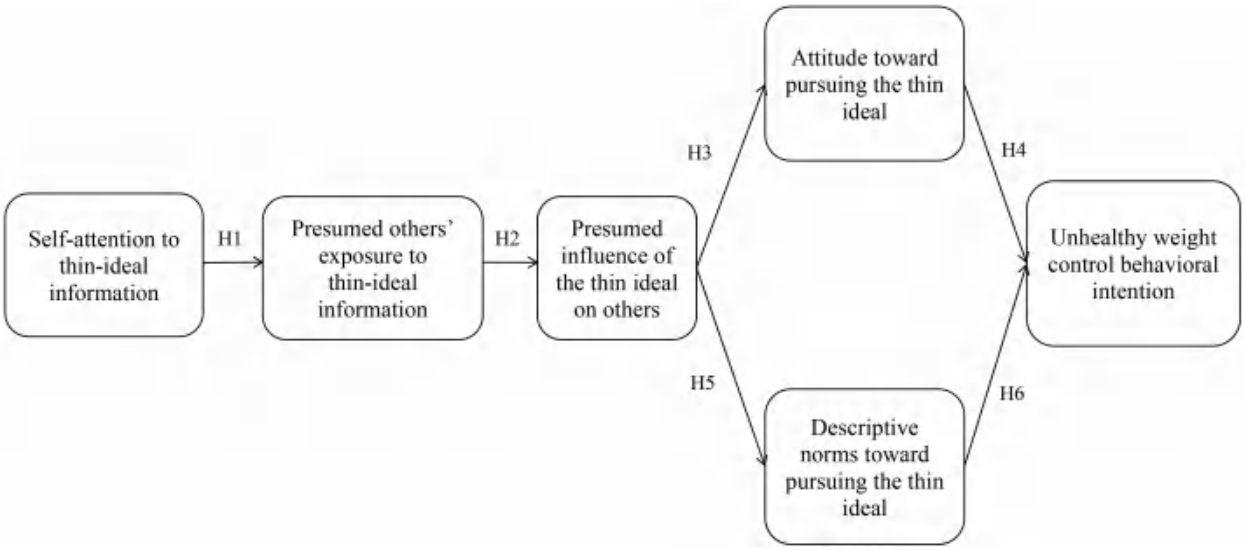


Figure 1.Theoretical Model

Method

Sample

This study focused on female social media users aged 18 to 29 for three key reasons. First, consistent with emerging adulthood theory, individuals in this age bracket are highly sensitive to social norms and peer feedback (Arnett, 2000). Second, they make up the core demographic for visual-centric social media platforms, such as Xiaohongshu and Douyin. Finally, amid the influencer economy and the pervasive thin ideal culture, these young women are particularly susceptible to the aesthetic standards and normative pressures promoted by key opinion leaders (KOLs) (Aparicio-Martinez et al., 2019). Consequently, this demographic serves as an ideal sample for examining indirect media effects.

Data Collection

Data were collected over ten days in February 2026 using Wenjuanxing, a widely used online survey platform in China. The survey link was distributed via WeChat. Participants were recruited through a combination of purposive and snowball sampling strategies. To ensure semantic equivalence, the original English questionnaire was translated into Chinese following a standard translation-back-translation procedure. Prior to the formal survey, a pretest involving 59 participants was conducted to verify the clarity and validity of the instrument.

Several quality control measures were implemented to ensure data integrity. Screening questions at the beginning verified that respondents met the age criteria, and all participants provided informed consent before proceeding. Additionally, attention checks and reverse-coded items were embedded throughout the survey. Out of 634 returned questionnaires, a final sample of 575 valid responses was retained, which is sufficiently powered for structural equation modeling (SEM) and multigroup analysis (MGA).

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Measurements

Control Variables. The following demographic variables were used as control variables in this study: Age, education level, monthly household income and BMI.

Attention to thin-ideal information on social media. Adapted from Shi et al. (2022), participants' attention to thin-ideal information was measured using a single item. Respondents were asked, "How much attention have you paid to thin-ideal content on social media?" Responses were recorded on a 7-point Likert scale ranging from 1 (not at all) to 7 (an extreme amount).

Presumed others' exposure to thin-ideal information on social media. Adapted from Shi et al. (2022), presumed others' exposure to thin-ideal information was measured using a single item. Respondents were asked, "How much do you think other people have been exposed to thin-ideal information on social media?" Responses were recorded on a 7-point Likert scale ranging from 1 (not at all) to 7(an extreme amount).

Presumed influence of thin-ideal information on social media on others. Adapted from Liao et al. (2016), the presumed influence of thin-ideal information on others was measured using a single item. Respondents were asked, "To what extent do you think thin-ideal information on social media has influenced other people?" Responses were recorded on a 7-point Likert scale ranging from 1 (not at all) to 7 (to a great extent).

Attitude toward the thin ideal. Respondents' attitude toward the thin ideal was measured by six 7-point Likert-scale items adapted from Poliakoff and Webb (2007). Responses ranged from 1 (strongly disagree) to 7 (strongly agree). The items were: (1) Having a thin-ideal body shape is very good; (2) Maintaining a thin-ideal body shape is enjoyable; (3) The effort required to achieve the thin ideal is worthwhile; (4) Thinking about a thin-ideal body shape is pleasant; (5) Setting the thin ideal as a goal is a wise choice; and (6) Pursuing the thin ideal is beneficial. A higher score represented a more positive attitude toward the thin ideal.

Descriptive norms toward the thin ideal. Participants' perception of descriptive norms was measured by three 7-point Likert-scale items adapted from Hong and Kim (2020). Responses ranged from 1 (strongly disagree) to 7 (strongly agree). The items were: (1) I feel that most people on social media pursue the thin ideal; (2) I feel that women around me make efforts to achieve the thin-ideal body shape; and (3) I feel that most women in reality take action to attain the thin ideal. A higher score represented a stronger perception of descriptive norms.

Unhealthy weight control behavior intentions. Adapted from Neumark-Sztainer et al. (2012), with revision logic following Levy et al. (2022) and Thøgersen-Ntoumani et al. (2010), this scale consisted of four items. As this study targeted a non-clinical sample, extreme behaviors with very low prevalence, such as self-induced vomiting or the use of diuretics, were excluded. Responses were recorded on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The items were: (1) I intend to eat a very small amount of food every day to control my weight; (2) I am willing to use meal replacements over the long term for weight loss; (3) I am willing to skip meals frequently to achieve a thinner body; and (4) I am willing to try diet pills to reduce my weight. A higher score represented a stronger intention to engage in unhealthy weight control behaviors.

Health consciousness. Participants' health consciousness was assessed using seven items modified from the Health Consciousness Scale developed by Hong (2009). Responses were recorded on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The

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items were: (1) I care about my health status; (2) I pay attention to my internal bodily sensations; (3) I frequently reflect on my health condition; (4) I am concerned about my overall well-being; (5) I actively monitor my physical state; (6) I take responsibility for my health outcomes; and (7) I take proactive actions to maintain my health. A higher score indicated a higher level of health consciousness.

Data Analysis

Data analysis was conducted using SPSS version 27.0 and R lavaan package (version 0.6-21). First, SPSS was utilized to compute descriptive statistics, scale reliability, and Pearson correlations. Subsequently, a confirmatory factor analysis (CFA) was performed in R to assess the fit and construct validity of the measurement model. Once the measurement model was validated, the SEM was estimated using the full sample, with age, education level, body mass index (BMI), and monthly household income included as control variables.

Finally, consistent with the prior study (Yang et al., 2025), an MGA was conducted. The sample was dichotomized into a low health consciousness group (n=258) and a high health consciousness group (n=317) using a median split. To examine group differences in path coefficients, metric invariance was established by constraining factor loadings to be equal across groups, followed by a parameter difference test.

Results

Descriptive Statistics and Correlation Analysis

The final sample comprised 575 female respondents with an average age of 24.13 years. The age distribution was relatively balanced, with 34.1% aged 18–22, 35.5% aged 23–25, and 30.4% aged 26–29. Regarding educational attainment, 27.3% held an undergraduate degree, 23.1% had a junior college education, 21.6% graduated from senior high school, 10.4% had a vocational education, 9.9% completed junior middle school or below, and 7.6% held a master's degree or above. Monthly household income was distributed as follows: 31.2% earned 7,000 CNY or less, 25.9% earned 7,001–10,000 CNY, and 43.0% earned 10,001 CNY or more, placing the median in the 10,001–20,000 CNY range. Finally, 65.6% of the participants had a normal body mass index (BMI; $18.5 \leq BMI < 24.0$), 27.0% were overweight or obese ($BMI \geq 24.0$), and 7.5% were underweight ($BMI < 18.5$).

Table 1 summarizes the descriptive statistics, reliabilities, and bivariate correlations for all study variables. All multi-item scales demonstrated robust internal consistency, with Cronbach's alpha coefficients exceeding 0.80. As expected, significant positive correlations were observed among all core variables.

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Table 1 Descriptive Statistics and Correlations Among Study Variables (N=575)

Variables	M	SD	α	1	2	3	4	5	6	7
1. Attention	5.14	1.51	—	1						
2. Presumed others' exposure	4.67	1.51	—	0.35***	1					
3. Presumed influence on others	4.62	1.61	—	0.30***	0.33***	1				
4. Attitude	5.01	1.15	0.87	0.32***	0.29***	0.33***	1			
5. Descriptive norms	4.79	1.39	0.8	0.31***	0.25***	0.27***	0.35***	1		
6. Intention	5.1	1.03	0.86	0.33***	0.35***	0.35***	0.40***	0.42***	1	
7. Health consciousness	4.96	1.05	0.94	0.30***	0.32***	0.24***	0.24***	0.24***	0.46***	1

***p<0.001

Hypothesis Testing

The structural model demonstrated a good fit to the data ($\chi 2/df$ =2.24, CFI=0.944, TLI=0.936, RMSEA=0.047). As shown in Table 2, all hypothesized paths (H1–H6) were significantly supported. Overall, the proposed model accounted for 14.8% of the variance in unhealthy weight control intentions (R2=0.148). Furthermore, the serial mediation analysis confirmed two significant indirect paths, yielding a total indirect effect of .019 (p<0.001) (see Table 3).

Table 2 Path Coefficients and Hypothesis Testing Results

Hypothesis	Path	β
H1	Attention→Presumed others' exposure	0.35***
H2	Presumed others' exposure→Presumed influence on others	0.33***
H3	Presumed influence on others→Attitude toward the thin ideal	0.35***
H4	Attitude toward the thin ideal→Unhealthy weight control behavior intentions	0.29***
H5	Presumed influence on others→Descriptive norms	0.30***
H6	Descriptive norms→Unhealthy weight control behavior intentions	0.21***

***p<0.001

Table 3 Indirect Effects in the Serial Mediation Model

Indirect Path	β	p
Path1	0.012***	<0.001
Path2	0.007**	0.002

***p<0.001, **p<0.01

Note. Path 1: Attention→Presumed others' exposure→Presumed influence on others→Attitude toward the thin ideal→Unhealthy weight control behavior intentions. Path 2: Attention→Presumed others' exposure→Presumed influence on others→Descriptive norms→Unhealthy weight control behavior intentions.

Multigroup Analysis

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The multigroup model yielded a good fit to the data ($\chi 2/df=1.80$, CFI=0.925, TLI=0.917, RMSEA=0.053). The results of the path comparison supported H7 (see Table 4). Specifically, high health consciousness significantly weakened the predictive effects of presumed influence and personal attitude on behavioral intention, rendering these paths non-significant in the high health consciousness group. In contrast, the path from attention to presumed others' exposure and the path from descriptive norms to unhealthy weight control behavior intentions demonstrated cross-group stability. Furthermore, the serial mediation effect was significant only in the low health consciousness group and became non-significant in the high health consciousness group. "Not Supported" indicates no significant difference between groups for that specific path.

Table 4 Comparison of Path Coefficients Between Groups

Path	Low Health Con. (n=258) β	High Health Con. (n=317) β	p	Result
H1: Attention→Presumed others' exposure	0.38***	0.23***	0.114	Not Supported
H2: Presumed others' exposure→Presumed influence on others	0.50***	0.06	<0.001***	Significant Diff.
H3: Presumed influence on others→Attitude toward the thin ideal	0.48***	0.16**	<0.001***	Significant Diff.
H4: Attitude toward the thin ideal→Unhealthy weight control behavior intentions	0.40***	0.09	0.001**	Significant Diff.
H5: Presumed influence on others→Descriptive norms	0.39***	0.15*	0.008**	Significant Diff.
H6: Descriptive norms→Unhealthy weight control behavior intentions	0.17*	0.20**	0.907	Not Supported

***p<0.001, **p<0.01, *p<0.05

Figures 2 and 3 illustrate the differences in model paths between groups with varying levels of health consciousness. Solid lines represent significant paths, while dashed lines represent non-significant paths.

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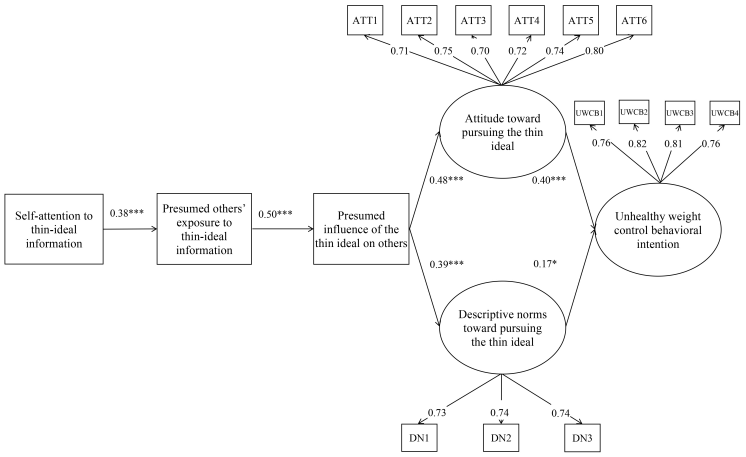


Figure 2: Structural equation model with path coefficients and factor loadings for the low health consciousness group (n=258, ***p<0.001, **p<0.01, *p<0.05)

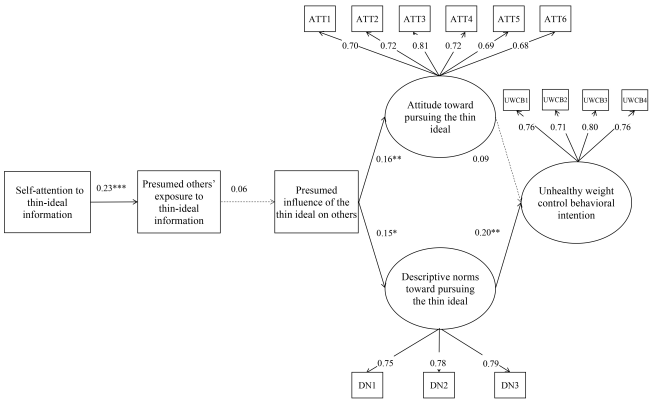


Figure 3: Structural equation model with path coefficients and factor loadings for the high health consciousness group (n=317, ***p<0.001, **p<0.01, *p<0.05)

Table 5 Comparison of Indirect Effects Between Groups

Indirect Path	Low Health Con. (n=258) β	High Health Con. (n=317) β	p
Path 1	0.037***	0.000	<0.001***
Path 2	0.013*	0.000	0.044*
***p<0.001,*p<0.05			

Note. Path 1: Attention→Presumed others' exposure→Presumed influence on others→Attitude toward the thin ideal→Unhealthy weight control behavior intentions. Path 2: Attention→Presumed others' exposure→Presumed influence on others→Descriptive norms→Unhealthy weight control behavior intentions.

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The indirect effects demonstrated significant differences between the two groups (see Table 5). Specifically, both serial mediation paths were significant in the low health consciousness group. In contrast, both paths were non-significant in the high health consciousness group ($\beta \approx 0$, $p > 0.05$). These results suggest that for individuals with high health consciousness, perceived media influence fails to effectively predict their intention to engage in unhealthy weight control behaviors.

Discussion

The findings demonstrate that the IPMI model effectively explains unhealthy weight control behaviors among young women. The support for H1–H6 confirms the indirect effects of media influence, highlighting the value of the IPMI model in capturing the relationship between cognitive inference and behavioral change in health communication.

Furthermore, the MGA supported H7, revealing that the model had greater explanatory power for the low health consciousness group ($R2=0.225$) than for the high health consciousness group ($R2=0.053$). This difference indicates that the association between media attention and the unhealthy weight control behavior intentions is weaker among individuals with high health consciousness. Consequently, the model has limited predictive power for this group.

With the hypotheses supported, the specific differences in indirect media effects between the high and low health consciousness groups warrant further discussion.

The findings show that the positive predictive effect of self-attention on presumed others' exposure remains consistent across both groups ($p=0.114$). This cross-group stability reflects the false consensus effect: individuals intuitively rely on their own experiences to infer others' media exposure (Ross et al., 1977). This cognitive bias is universal and, therefore, unaffected by health consciousness levels.

The predictive effect of presumed others' exposure on presumed influence on others differed between the two groups ($p<0.001$). Drawing on the heuristic-systematic model (HSM) (Chaiken, 1980), individuals with low health consciousness exhibit low involvement and rely on heuristic processing, intuitively equating high media exposure with high influence. Conversely, individuals with high health consciousness possess high involvement and engage in systematic processing. They actively apply their health knowledge to scrutinize the media content, thereby blocking this intuitive inference.

Presumed influence on others had a significantly stronger positive effect on personal attitude in the low group than in the high group ($p<0.001$). Drawing on the HSM, individuals with low health consciousness tend to rely on heuristic processing, using group trends as a shortcut for attitude formation. In contrast, individuals with high health consciousness favor systematic processing and maintain independent judgment. Consequently, this divergence in information processing makes the low group more susceptible to attitude conformity.

The predictive effect of personal attitude on behavioral intention was significant in the low group but non-significant in the high group ($p=0.001$). This difference comes from the high group's baseline of health responsibility (Conner & Norman, 2015). For the high group, the thin ideal is just an aesthetic preference. When facing weight control behaviors that cause real physical harm, their health responsibility is stronger than their aesthetic desires. Therefore, their aesthetic attitudes do not predict the intention to engage in unhealthy weight control behaviors.

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Presumed influence on others had a significantly stronger positive effect on descriptive norms in the low group than in the high group (p=0.008). This indicates that the low group is highly prone to cognitive generalization, directly equating media influence with real-world social norms, while the high group effectively separates the two.

This difference comes from audiences' varying levels of real-world knowledge (Potter, 2004). Individuals in the high group possess stronger real-world health knowledge. This knowledge anchor allows them to draw a clear boundary between the media landscape and real society, recognizing that media portrayals do not equal actual public behaviors. Conversely, without this knowledge anchor, the low group more easily internalizes perceived media influence as descriptive norms.

Notably, the positive effect of descriptive norms on behavioral intention did not differ significantly between the two groups (p=0.907), remaining significant in both. This cross-group stability comes from the overwhelming power of "social discipline" (Cialdini & Trost, 2004). Personal health consciousness cannot overcome harsh external body standards. When extreme thinness becomes a widespread norm, women face immense social pressure. To fit in and avoid marginalization at work or in dating, even women with high health consciousness compromise with these norms, despite knowing the health risks. As a result, descriptive norms bypass health consciousness to stably predict behavioral intentions across both groups.

Conclusion

This study confirms the indirect pathway through which thin-ideal information on social media affects behavioral intentions. By inferring others' exposure and how much they are influenced, audiences form norm perceptions and personal attitudes, which then lead to the intention to engage in unhealthy weight control behaviors. MGA shows that while high health consciousness breaks the link between these attitudes and behaviors, it cannot resist the pressure of descriptive norms. This demonstrates that perceived normative pressure remains a powerful predictor within indirect media effects.

This study offers both theoretical and practical implications. Theoretically, this study shows that media effects come not only from individual information processing but also from perceived social norms. Often, this normative pressure is stronger than personal health cognition. Practically, social media platforms should take action. They should add warning labels to edited or extreme content to reduce algorithm-driven cognitive biases. Furthermore, media literacy education should teach the public to critically view online interactions, helping to lessen the pressure of social norms. Finally, health communication must challenge the single beauty standard by promoting diverse body types, fundamentally alleviating the social pressure on young women.

This study has certain limitations. Like many studies that employ the IPMI model, this study used cross-sectional survey data to test the hypotheses, in which causality could not be inferred, requiring future longitudinal research. Moreover, self-reported data may be subject to social desirability bias, leading participants to provide untrue answers. Importantly, since treating social media as a monolith limits specificity, future studies need to examine the distinct effects of specific platforms and content themes.

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Competing interests

The author(s) declared no competing interests.

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Narrative as Strategy: A Study on Central–Local Interaction in China's Tobacco Control Policy

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Abstract

China's tobacco control policy presents a central-local asymmetric pattern characterized by "long-term absence of central legislation and continuous progress in local legislation." Against this institutional backdrop, how the central and local governments coordinate actions and form policy consensus on tobacco control has become a theoretical question in need of an answer. This study, based on the Narrative Policy Framework (NPF) and integrated with the Social Construction of Target Populations (SCTP) theory, adopts a bilingual corpus comparative text analysis method to systematically code and analyze 110 central and local media reports and seven local tobacco control regulations from 2016 to 2026. The study finds that central and local narratives exhibit a coordinated model of "central government sets the direction, local governments ensure implementation." Central narratives construct the problem framework through the "villain-victim" pair and strong causal attribution; local narratives demonstrate action outcomes through the "hero-beneficiary" pair and emotional mobilization. Narrative characters correspond to target group types in the regulations: victims correspond to dependents, villains correspond to contenders and deviants, heroes correspond to the advantaged, and beneficiaries correspond to the service recipients of incentive-based tools. Under the constraint of absent national unified legislation, central narratives perform a compensatory function, providing a discursive framework and legitimacy foundation for local legislation; local legislation then provides supplementation through specific provisions. The two cases of Chongqing and Xi'an further reveal that when local interests conflict with central narratives, a pattern of narrative compliance but institutional deviation may emerge. This study expands the narrative interaction typology within the NPF by adding a new variant of narrative coordination, providing theoretical tools and empirical evidence for understanding the operational logic of policy narratives under a consensus-based political system.

Keywords: Narrative Policy Framework; Social Construction of Target Populations; tobacco control; central-local coordination; health communication

Corresponding author: Meng Huiru, School of Journalism and Communication, Peking University, China **Email:** 2401210804@stu.pku.edu.cn © The Author(s), 2026. Published under the Creative Commons Attribution 4.0 International License (CC BY 4.0; https://creativecommons.org/licenses/by/4.0/), which permits use, distribution, adaptation, and reproduction in any medium, provided the original work is properly cited.

Introduction

As the world's largest producer and consumer of tobacco, China has over 300 million smokers(National Health Commission of China, 2021). Faced with this serious public health challenge, the Chinese government has been continuously advancing the construction of a tobacco control policy system.

However, unlike the conventional model in many public policy areas where the central government legislates and local governments implement, the evolution of China's tobacco control policy presents a unique pattern of local pioneering. Since 2014, when the former National Health and Family Planning Commission drafted the "Regulation on Smoking Control in Public Places (Draft for Review)" and submitted it to the Legislative Affairs Office of the State Council, no breakthrough has been achieved in unified national tobacco control legislation. At the local level, however, since the "Shanghai Regulations on Smoking Control in Public Places" took effect in March 2010, becoming the first local tobacco control regulation enacted by a provincial people's congress in mainland China, local tobacco control legislation has shown a trend of continuous acceleration.

This is not merely a legislative phenomenon; it constitutes the core institutional landscape for understanding China's tobacco control policy process. Against this backdrop, a key question emerges: How is policy consensus formed between the central and local governments? This study employs the Narrative Policy Framework (NPF), combined with the Social Construction of Target Populations (SCTP) theory, to provide analytical tools for answering this question.

Theoretical Framework

Narrative Policy Framework

A policy narrative is a story with clearly defined structural elements that enables the public to understand policy implications and support policy proposals through storytelling(Guo, He, & Su, 2020). Jones and McBeth first established the theoretical positioning of the NPF in 2010, integrating narrative perspectives with empirical methods to analyze how policy narratives function within the policy process. At the micro level, it examines the influence of narratives on individual beliefs and behaviors; at the meso level, it focuses on the role of narratives in the formation and strategies of policy coalitions; and at the macro level, it explores how cultural and institutional narratives shape policy(Jones & McBeth, 2010). In 2014, Sabatier and Weible incorporated the NPF into the theoretical system of policy process theory, further noting that although the NPF was not yet widely applied in empirical research, its proponents had made it clearer and more transparent(Weible, 2014). Subsequent researchers have further supplemented the philosophical foundations of the theory, emphasizing the investigation of causal effects through empirical methods(Ming, 2019).

Specifically, the Narrative Policy Framework identifies the constituent elements of narratives in the policy process: setting, characters, plot, and moral. Among these, characters are the most central element of a policy narrative—they are the specific bearers of agency within the narrative and constitute the cognitive focus of the policy problem(Jones, Shanahan, & McBeth, 2014). According to the minimal operational definition of the NPF, a policy narrative must contain at

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least one character. It further classifies characters into four types: victims, villains, heroes, and beneficiaries. Victims are generally those who bear the burden of the policy problem; villains are those who produce the policy problem; heroes are those who solve the policy problem; and beneficiaries are those who gain from the resolution of the policy problem. The bearers of these characters can be either individuals or organizations. Among the four elements of the NPF, characters occupy the central position in the narrative structure, as they are not only the subjects driving the plot but also the personalized carriers of the moral. Given the central role of characters in the narrative, this study adopts character construction as the primary analytical dimension of the NPF, focusing on examining the differences in the portrayal of heroes, villains, victims, and beneficiaries in central versus local media narratives.

Building on previous research, this paper takes China's tobacco control policy as an empirical field and seeks to enrich the development and application of the NPF in the Chinese context.

Integration of the Narrative Policy Framework and the Social Construction of Target Populations Theory

The NPF provides a fine-grained structural tool for analyzing policy narratives, yet its theoretical resources for explanation remain limited. While it can describe the various elements of a narrative, it struggles to fully answer why a narrative is constructed in a particular way. This limitation has prompted scholars to seek integration of the NPF with other theories, including Schneider and Ingram's SCTP.

The core proposition of the SCTP is that target groups in policy are socially constructed into four categories: advantaged, contenders, dependents, and deviants. This social construction, combined with political power, determines the choice of policy tools. The theory posits that how a group is perceived by society directly affects the policy resources it receives. Social construction refers to the shared images, stereotypes, symbols, and value judgments assigned to particular social groups by the public, political elites, and the media. Groups with higher political power typically possess greater lobbying capacity, more direct access to decision-making channels, and stronger influence over public opinion; groups with lower political power often lack effective political representation and avenues for voicing their concerns. The two dimensions—social construction (positive/negative) and political power (high/low)—intersect to form four ideal types of target groups. At the explanatory level of policy tool selection, the theory provides a clear mechanism: the social construction of a target group shapes policymakers' perception of that group's deservingness, which in turn influences the choice of policy tools. This offers an analytical framework for understanding who gets what, and why, in policy design.

In recent years, some progress has also been made in integrating the NPF with the SCTP. In a study on weight policy, scholars drew on the target population framework and used the NPF to examine the impact of target groups' social construction on public policy support (Husmann, 2015). In terms of cross-context application, Terlizzi took Italian border management and external migration control as a case study, integrating the Social Construction of Target Populations theory with the NPF, and qualitatively traced the evolution of the narrative strategies of key government actors (Terlizzi, 2021). At the level of theoretical integration, Capano and Howlett systematically reviewed multiple analytical frameworks in public policy, pointing out that social construction and policy design theory can complement the NPF's shortcomings in explaining why narratives are persuasive (Capano & Howlett, 2020), that is, social construction

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determines the moral foundation of narratives, while narratives provide discursive expression for social construction.

Table 1 Four types of target populations

Social Construction	Political Power	Group Type	Policy Tool Orientation
Positive	High	Advantaged	Incentive-based tools (tax incentives, subsidies, privileges)
Negative	High	Contenders	Covert tools (regulation, restrictions, supervision)
Positive	Low	Dependents	Symbolic tools (public education, voluntary services)
Negative	Low	Deviants	Coercive tools (punishment, imprisonment, deprivation of rights)

It is easy to discover that the NPF and SCTP have natural complementarity in explaining policy narratives: the NPF provides analytical tools for narrative structure, and the SCTP provides the dynamic mechanism of social construction. However, existing integrated studies have mostly focused on Western contexts and rarely involve the field of tobacco control policy. Therefore, building on the above theoretical integration, this study takes China's tobacco control policy as an empirical field to identify the mapping relationship between narrative characters and the social construction of groups, as well as how both interact with policy tools.

Research Methods

This study adopts a bilingual corpus comparative text analysis method, constructing a media text corpus (Corpus A) and a policy text corpus (Corpus B) respectively, to analyze the structural correspondence between narratives and policies.

In terms of theoretical application, the analysis of Corpus A is guided by the NPF. However, given that the study focuses on the mapping between narrative characters and the social construction of target groups, we only select the character dimension from the NPF for coding. The analysis of Corpus B applies the SCTP. The two theories are linked through the "character–construction type" correspondence, supporting paired comparisons.

Theoretical Integration

The NPF regards character construction as the core of the narrative, carrying attribution of responsibility and value judgments; the SCTP posits that policy tool selection depends on the social construction of target groups. Both point to the same proposition: the group images shaped by narratives resonate with the target groups and policy tools found in policy texts. NPF characters (heroes, villains, victims, beneficiaries) correspond to the four SCTP group types (advantaged, contenders, dependents, deviants) based on the polarity of social construction (positive/negative) and the level of power. Victims (positive, low power) correspond to dependents; villains (negative, high power) correspond to contenders; villains (negative, low

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power) correspond to deviants; heroes (positive, high power) correspond to the advantaged; beneficiaries (positive, variable power) can correspond to either the advantaged or dependents.

In the bilingual corpus comparative analysis of this study, this correspondence provides a direct operational bridge for cross-corpus pairing.

Table 2 Correspondence between Character Roles in NPF and SCTP

NPF Character Role	Social Construction	Typical Power Position	Corresponding SCTP Type
Victim	Positive (innocent, in need of protection)	Low (lacking organizational resources)	Dependent
Villain (high power)	Negative (dangerous, should be restricted)	High (economic resources, organizational capacity)	Contender
Villain (low power)	Negative (illegal, immoral)	Low (individual, stigmatized)	Deviant
Hero	Positive (capable, trustworthy)	High (institutional authority, social prestige)	Advantaged
Beneficiary	Positive (benefiting, deserving recognition)	Variable	Advantaged or Dependent

Therefore, in this study, the victim characters coded in Corpus A correspond to the groups coded as dependents in Corpus B; the villain characters coded in Corpus A correspond to the groups coded as either contenders or deviants in Corpus B; the hero characters coded in Corpus A correspond to the advantaged in Corpus B. The beneficiary characters in Corpus A, meanwhile, can correspond either to the advantaged or to the dependents.

In the coding design of Corpus B, in addition to classifying various groups into the four quadrants, this study separately adds a coding dimension for policy tool types. In the original theoretical framework of the SCTP, the social construction of target groups is not the end goal; rather, it aims to reveal how social construction influences the selection of policy tools.

In terms of specific policy tool selection, this study adopts four categories: prohibitive tools, punitive tools, persuasive tools, and incentive-based tools. The proposers of the SCTP once proposed a five-fold classification of policy tools: authoritative, incentive-based, capacity-building, symbolic and exhortative, and learning-based (Peters & Pierre, 2014). This study consolidates and translates these categories into the context of tobacco control policy, resulting in the four core tools. Prohibitive and punitive tools together constitute the authoritative tools based on the government's legitimate power in the original classification. Persuasive tools correspond to symbolic and exhortative tools. Incentive-based tools correspond to incentive-based, capacity-building, and learning-based tools. Ranging from coercive to guiding, these four types of tools form a complete policy spectrum, closely aligning with the mixed approaches actually used in tobacco control regulations. In coding practice, this classification has proven to be mature and operationalizable (Li, Yang, Wang, & Sun, 2023).

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Operational Procedures

Step 1: Construct Corpus A of media policy narratives. Using the time window from 2016 to 2026, search for keywords such as "tobacco control," "smoke-free," and "e-cigarettes" on central and local government websites and media outlets. Screen and select texts from central and local media, and code them accordingly.

Step 2: Construct Corpus B of policy design texts. Select several cities that have enacted local tobacco control regulations as the analytical sample. Code each regulation.

Table 3 Corpus B Coding

Level 1 Category	Level 2 Category	Operational Definition
Social Construction Type	Advantaged (positive + high power)	Given a positive image and possessing relatively high power
	Contender (negative + high power)	Subjected to restrictions or obligations, but possessing relatively high power
	Dependent (positive + low power)	Given a positive protective image, but lacking power
	Deviant (negative + low power)	Given a negative description and lacking power
Policy Tool Type	Prohibitive Tool	Explicitly prohibits certain types of behavior
	Punitive Tool	Imposes penalties on violations
	Persuasive Tool	Encourages, prompts, or reminds
	Incentive-based Tool	Rewards compliance, provides smoking cessation support

Data Analysis

Construction and Analysis of Corpus A

A total of 212 initial news texts were obtained after multiple searches. The initial texts were systematically screened according to the following three criteria: First, the topic must focus on the core issues of China's tobacco control policy; any texts that merely mention economic data of the tobacco industry or are unrelated to policy issues were excluded. Second, the text content must present a complete narrative structure, particularly containing identifiable narrative characters. Third, the text must involve clear policy proposals or implementation actions, which should be reflected as actionable policy plans or implementation measures. Since some texts contained multiple themes, they needed to be split according to the criteria. Ultimately, 55 central media reports and 55 local media reports were selected, totaling 110 texts as the formal analytical sample.

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When coding all texts, to improve coding reliability and validity, two coders randomly selected 30 texts from the sample pool for pre-coding. After the two coders completed coding independently, the Kappa coefficient was used to test the coding consistency for each category. The results showed that Kappa values for all dimensions ranged from 0.764 to 0.968, with an average Kappa value of 0.853. During the formal coding phase, the average Kappa value for each node reached 0.87, demonstrating good coding consistency in this study (Sim & Wright, 2005).

Construction and Analysis of Corpus B

The collection of local tobacco control regulation texts followed the dual screening principles of specificity and pairing. First, taking 2006, when the Framework Convention on Tobacco Control (FCTC) entered into force in China, as the starting point, specialized tobacco control regulations were retrieved from the National Laws and Regulations Database, Peking University Fabao, and the official websites of local people's congresses and governments. Provisions scattered in non-specialized laws such as the Advertising Law and the Law on the Protection of Minors were excluded. After retrieval, a total of 30 specialized tobacco control regulations were identified nationwide. Second, the cities where these regulations were enacted were cross-compared with the cities of the 55 local media reports in Corpus A. Only cities that had at least one tobacco control report in Corpus A were retained. This yielded seven cities: Beijing, Shanghai, Shenzhen, Chongqing, Xi'an, Qingdao, and Wuhan, corresponding to seven specialized tobacco control regulations or measures. The sample size of Corpus B is seven regulations, totaling approximately 25,000 Chinese characters.

Unlike media texts, the language of regulations is highly formatted, with clear clause boundaries. Expressions regarding policy tools, protected subjects, and penalty measures are mostly objective statements, with rare rhetorical expressions. Because the subjectivity of coding is much lower than that of media texts, each regulation was coded independently by a single coder.

The Construction of Narrative Elements in China's Tobacco Control Policy

Overview of Central, Local Differences in Character Construction

In central narratives, the order of character mention rates is as follows: beneficiaries (218.2%) > villains (205.5%) > victims (196.4%) > heroes (158.2%). The highest mention rate of beneficiaries indicates that central narratives attach great importance to presenting policy outcomes. Villains and victims form a highly matched "problem maker–problem bearer" dyad, both with mention rates exceeding 195%, constituting the moral foundation for policy intervention. The mention rate of heroes is significantly lower than that of the other three character types.

In local narratives, the order of character mention rates is as follows: beneficiaries (267.3%) > heroes (209.1%) > villains (190.9%) > victims (187.3%). The mention rate of beneficiaries reaches 267.3%, meaning that on average each local report contains 2.67 references to beneficiaries, making beneficiaries the core constructed object in local narratives. Heroes have the second highest mention rate, forming a "beneficiary–hero" bimodal dominant pattern. In contrast, both villains and victims have relatively low mention rates and are comparatively marginalized.

Table 4

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Comparison of Character Mention Rates in Central and Local Narratives

Narrative Subject	Rank	Character Type	Mention Rate
Central Narrative	1	Beneficiary	218.2%
	2	Villain	205.5%
	3	Victim	196.4%
	4	Hero	158.2%
Local Narrative	1	Beneficiary	267.3%
	2	Hero	209.1%
	3	Villain	190.9%
	4	Victim	187.3%

Note: Mention rate = (Total number of occurrences of a given character type across all reports / Total number of reports) × 100%. Since the same character type can appear multiple times within a single report, mention rates can exceed 100%.

The NPF posits that one of the core functions of policy narratives is to provide a diagnosis of the policy problem. The villain character assumes the function of attribution, transforming an abstract social problem into an identifiable responsible subject. The victim character assumes the function of moral mobilization, evoking the audience's sympathy and demand for intervention by presenting the harm suffered by innocent parties. With a wrongdoer and a sufferer, the necessity of policy intervention becomes self-evident. In central narratives, the mention rates of villains (+14.6%) and victims (+9.1%) are higher than those in local narratives, continuing the traditional function of the central government as a framer of the policy problem. If "villains + victims" answer the question of why action is needed, then "heroes + beneficiaries" answer the question of what action has brought. The hero character assumes the function of demonstrating the acting subject, presenting who is solving the problem and how, providing replicable models and actionable pathways for policy implementation. The beneficiary character assumes the function of outcome justification, providing empirical support for policy continuity and legitimacy by showcasing groups that have gained benefits after policy implementation. Together, the two form a complete action narrative. In local narratives, the mention rates of heroes (+50.9%) and beneficiaries (+49.1%) are far higher than those in central narratives, clearly presenting a narrative orientation toward action outcomes. This distribution reflects the core division of labor between central and local narratives: central narratives take "villains–victims–beneficiaries" as a triangular pillar, completing the process from problem definition to policy intervention to outcome justification; local narratives take "beneficiaries–heroes" as a dual core, focusing more on the practical actors and beneficiary groups of policy implementation.

Central Narratives: Equal Emphasis on Problem Framing and Outcome Justification

In central-level tobacco control media texts, character construction presents a dual structure: on the one hand, the high frequency of "villains + victims" continues the traditional function of the central government as a framer of the policy problem; on the other hand, the mention rate of beneficiaries is also high, indicating that central narratives likewise attach great importance to presenting policy outcomes, forming a narrative pattern that balances problem definition with outcome justification.

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Construction of the Problem Framework: Villains and Victims

In central narratives, the mention rate of villains is 205.5%; the mention rate of victims is 196.4%. Both far exceed that of heroes, constituting the primary feature of central narratives. Their core function is to provide moral legitimacy for policy intervention. By clarifying who is doing harm and who is being harmed, the issue of tobacco control is embedded within a macro-narrative framework in which public health is threatened and state intervention is required. Take, for example, a 2016 report by CCTV News criticizing the smoking scenes in the film "Mr. Six." The report portrayed the film as a villain misleading adolescents, "completely disregarding Beijing's tobacco control regulations, a major failure in the excessive use of smoking scenes (ZY-09)." This criticism was not merely cultural commentary; rather, by constructing a villain image, it transformed smoking scenes in films into a public issue requiring policy intervention. At the same time, adolescent viewers were placed at the center of the narrative as potential victims. Through this narrative pairing, the legitimacy of policy intervention became self-evident. A 2021 CCTV Online report similarly followed this narrative logic. The report portrayed the e-cigarette industry as a villain adept at capturing adolescent psychology, while rural adolescents became victims "facing higher risks due to insufficient health literacy (ZY-46)." Notably, the report pointed out that e-cigarette marketing emphasizes elements such as coolness and freedom, transforming abstract industry practices into perceptible acts of enticement and reinforcing the moral negativity of the villain. The depiction of rural adolescents' insufficient health literacy highlighted the innocence and vulnerability of the victims. This pairing made the policy appeal more persuasive: strengthening regulation of e-cigarette marketing is necessary, especially to protect rural adolescents.

Reinforcement of Outcome Justification: The Beneficiary Role

The mention rate of beneficiaries in central narratives is as high as 218.2%, meaning that on average each central report contains 2.18 references to beneficiaries. The high frequency of the beneficiary role allows central narratives to move beyond a purely problem-framing function, forming a closed loop from problem identification to solution to demonstrable results. Take, for example, the CCTV News report from May 2025 titled "Over 50,000 Fewer Acute Heart Attacks, Over 420,000 Fewer COPD Cases: Beijing's 10 Years of Tobacco Control Yield Remarkable Results." The report constructs "the 56,554 avoided acute heart attacks and 422,355 avoided COPD cases (ZY-53)" as policy beneficiaries, using authoritative data to demonstrate the actual effectiveness of tobacco control policies. This narrative strategy clearly serves multiple functions: for the public, beneficiary data makes abstract tobacco control outcomes perceptible; for policymakers, beneficiary evidence provides empirical support for policy continuity and expansion; for the international community, beneficiary outcomes showcase China's positive progress in implementing the FCTC. A 2019 response letter to a CPPCC proposal posted on the National Health Commission's official website constructs "citizens of tobacco control legislation cities such as Beijing, Shanghai, Shenzhen, and Xi'an (ZY-21)" as a collective beneficiary, emphasizing the health gains brought by smoke-free environment construction. It is evident that beneficiaries in central media texts often appear as collective entities, presented through macro-level data or policy coverage, which complements the individualized beneficiary stories in local narratives discussed later.

Relative Weakening and Its Internal Logic: The Hero Role

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In central narratives, the mention rate of heroes is only 158.2%, significantly lower than that of beneficiaries, villains, and victims. This distribution reflects the specific functional positioning of central narratives. The relative weakening of the hero role in central narratives does not mean that the central level disregards actors. On the one hand, under the issue of tobacco control, accepting the leadership of the Party Central Committee is taken for granted. Central narratives do not need to prove the legitimacy of action by constructing concrete heroic figures such as law enforcement officers or volunteers, as local narratives do, because the authority of policy itself stems from the central government's top-level design and institutional arrangements. On the other hand, the core concern of narratives at this level is to sufficiently demonstrate why action is needed and what action has brought. Local narratives may need heroes to demonstrate the feasibility of policy implementation, whereas central narratives need to establish the legitimacy of policy intervention and, even more so, need beneficiaries to authoritatively prove policy effectiveness.

Triple Role Support

Considering all four character types, central narratives form a triangular structure: the villain role assumes the function of attribution, concretizing the root causes of the problem into identifiable responsible subjects; the victim role assumes the function of moral mobilization, evoking demands for intervention by presenting the harm suffered by innocent parties; the beneficiary role assumes the function of outcome justification, reinforcing institutional authority by showcasing policy beneficiaries. Each element in this structure serves the central government's functional positioning: as the highest-level policy narrative subject, the relevant authorities need both to open space for policy through problem definition and to provide legitimacy for policy through outcome justification.

Local Narratives: Dual Focus on Action and Outcomes

In local-level reports, character construction presents a bimodal dominant pattern: the mention rate of beneficiaries reaches 267.3%, and that of heroes reaches 209.1%. This distribution reveals the action-outcome orientation of local narratives, showcasing the vivid practices and positive results of policy implementation through the frequent construction of heroic figures and beneficiary groups.

Diverse Presentations of the Hero Role

The mention rate of heroes in local narratives is as high as 209.1%, meaning that on average each local report contains at least two references to heroic figures. In contrast to the relative weakening of the hero role in central narratives, local media clearly focus more on the frontline actors implementing policy.

A 2025 Chongqing tobacco control report by CQNews constructed a diverse heroic spectrum: "Tobacco control legislators successfully established the rule of law foundation through the Chongqing Regulations on Smoking Control in Public Places; enforcers from 28 coordinated departments gave teeth to the regulations; builders from 3,557 smoke-free Party and government organs, 4,593 schools, and 561 enterprises started from micro-level units and successfully built a smoke-free ecosystem (DF-50)." Some local governments also portrayed entire units as heroic collectives working together to protect health, emphasizing "leading officials taking the lead in quitting smoking, and ordinary employees actively discouraging others (DF-18)." Heroes are not merely individuals but symbols of collective action. This conveys a core message through the

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narrative: tobacco control is not the business of a few but a public action that everyone can and should take part in.

The Recurring High Frequency of the Beneficiary Role

The beneficiary role, with an extremely high occurrence rate of 267.3%, is also very noticeable, appearing on average 2.67 times per local report. Beneficiaries are not only a high-frequency role but also the core constructed object of local narratives, exhibiting multi-layered and multi-type characteristics.

Individual-transformation beneficiaries are the most compelling. Local reports describe citizens who successfully quit smoking under the influence of policy publicity: "I used to smoke two packs a day, but now I have not only quit myself but also advised others to quit (DF-23)." This allows readers to see vivid examples of beneficiaries. The core value of this type of beneficiary lies in being identifiable, empathizable, and imitable.

2. Group-data beneficiaries are the most persuasive. "Tens of thousands of acute heart attack cases reduced (DF-08)." Although such beneficiaries lack specific faces, their scale effect reinforces the persuasiveness of policy outcomes and transforms abstract policies into more perceptible health benefits.

3. Development-opportunity beneficiaries are the most forward-looking. Some local reports include compliant enterprises that gain opportunities for regulated development within the scope of beneficiaries: "He Ze, chairman of the company, signed the Letter of Commitment on Lawful and Honest Business Operations and stated that he would strictly regulate operations, actively cooperate with supervision, and jointly create a favorable market environment (DF-17)." This emphasizes the synergistic effects between tobacco control and industrial upgrading. Such beneficiaries expand the traditional dimension of health benefits, presenting the diverse positive impacts of tobacco control policy.

Backgrounding of Villain and Victim Roles

In contrast to the high-frequency presentation of beneficiaries and heroes, the mention rates of villains (190.9%) and victims (187.3%) in local narratives are notably lower than the former two. This means that in local narratives, who creates the problem or who is harmed is no longer the narrative focus and often recedes into background information.

This backgrounding has its own internal logic. Compared to opening moral space for policy, the core function of local narratives is to demonstrate the feasibility and positive outcomes of policy implementation. When central media have already deeply embedded narratives of tobacco harm and harm to minors in the public consciousness, local media need not repeatedly engage in attributive justification.

A Closed Loop of Dual Focus: Action Demonstration and Outcome Justification

The high frequency of the hero and beneficiary roles gives local narratives a dual-focus structure. The hero role assumes the function of action demonstration, answering who is acting and how, providing the public with replicable role models and actionable pathways through vivid examples of diverse action subjects. The beneficiary role assumes the function of outcome justification, answering what the action has brought, demonstrating the value of the policy. This positive narrative logic endows local narratives with a more tangible mobilizing force, aligning with the core functional positioning of local narratives: as demonstrators of policy

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implementation, they both showcase the feasibility of policy implementation and the active participation of diverse actors through the hero role, and prove the perceptibility of policy outcomes through the beneficiary role. Thus, the social mobilizing power of local narratives is constructed.

The Compensatory and Supplementary Functions of Narratives

In the field of tobacco control, China has long lacked unified national legislation. Narratives therefore assume a compensatory function. Institutional theory points out that there is a functional substitution relationship between formal institutions and informal institutions (North, 1990). When the supply of formal institutions is blocked, informal institutions can exert normative effects by building consensus, setting agendas, and shaping expectations, paving the way for subsequent institutionalization. We define this relationship as compensation.

The triangular structure of central narratives reveals their compensatory function in the absence of formal institutions. As noted in the previous analysis, the villain, victim, and beneficiary roles in central narratives form a stable triangular structure. Against the institutional backdrop of long-standing absence of unified national tobacco control legislation, this narrative structure actually substitutes for the prohibited objects, protected objects, and policy objectives that would otherwise be specified in legal texts. Through continuous problem framing and value justification, central narratives provide local actors with a unified discursive framework and a foundation of legitimacy, performing a quasi-legislative normative function. This is the core manifestation of compensation: informal institutional narratives assume alternative normative functions when formal institutional laws are absent.

The dual-focus structure of local narratives also reflects their supplementary support for local legislation. The high frequency of hero and beneficiary roles in local narratives indicates that local narratives focus on demonstrating the feasibility and outcomes of policy implementation. Narratives are not merely propaganda for local tobacco control practices but also a social validation of the effectiveness of local legislation. By presenting heroic figures such as law enforcers, volunteers, and successful quitters, as well as beneficiary figures such as members of the public with improved health and compliant enterprises, local narratives provide perceptible empirical support for the legitimacy and effectiveness of local legislation. In the context of absent central legislation, this narrative supplementation enables local legislation to gain social acceptance and implementation momentum more easily.

The complementary relationship between the two narrative structures constitutes a complete "compensation-supplementation" mechanism. Central narratives are responsible for setting the direction, establishing the cognitive framework of the policy problem through villain and victim roles. Local narratives are responsible for ensuring implementation, demonstrating execution outcomes through hero and beneficiary roles. When the central government cannot directly regulate local behavior through law, central narratives maintain the unity of policy discourse through compensation. When local governments need further legitimacy for their own legislation, local narratives provide outcome evidence through supplementation. The two support each other, jointly facilitating the operation of the policy system.

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Structural Correspondence between Narrative and Policy

Immunization programs are national programs, which means communication has to fit the realities of the society in which the program operates. If a country wants the program to work well, it has to engage with society, engage with stakeholders, and especially engage with parents in thinking through what the program should look like, what it should do, what it should protect against, and how convenient it should be. What really matters is not forcing an international framework onto a local setting, but making sure the communication approach truly fits the local social context.

Comparison of Institutional Features of Seven Local Regulations

To reveal the correspondence between media narratives and policies, this study first systematically compares the seven local tobacco control regulations in Corpus B. The basic coded data are presented below.

Table 5 Results of Social Construction of Target Groups

City of Regulation	Advantaged	Contenders	Dependents	Deviants
Chongqing	18	4	12	12
Wuhan	20	3	8	6
Shenzhen	25	5	10	10
Xi'an	15	3	9	4
Shanghai	18	3	8	5
Beijing	16	3	9	5
Qingdao	14	2	7	3

Table 6 Results of Social Construction of Target Groups

City of Regulation	Prohibitive Tools	Punitive Tools	Persuasive Tools	Incentive-based Tools
Chong	6	4	6	2

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City of Regulation	Prohibitive Tools	Punitive Tools	Persuasive Tools	Incentive-based Tools
qing				
Wuhan	5	3	5	2
Shen zhen	7	5	6	4
Xi'an	4	3	5	1
Shang hai	5	3	5	3
Beijing	6	4	5	3
Qingdao	5	3	4	1

Note: Coding is based on the SCTP. Advantaged = positive image + high political power; Contenders = negative image + high political power; Dependents = positive image + low political power; Deviants = negative image + low political power. Prohibitive tools = provisions that explicitly ban certain behaviors; Punitive tools = independent penalty provisions; Persuasive tools = publicity/education, signage, or discouragement obligations; Incentive-based tools = smoking cessation services, rewards, or recognition. The values are reference point counts. For a given provision, the same type of tool or group is counted only once. Data source: tobacco control regulation texts of the seven cities.

The seven regulations come from Beijing, Shanghai, Shenzhen, Chongqing, Xi'an, Qingdao, and Wuhan, covering different regions of eastern, central, and western China. They present a highly consistent overall framework in the construction of the four types of groups—advantaged, contenders, dependents, and deviants—but differ in specific composition, intensity of construction, and level of detail.

Comparison of Social Construction of Target Groups

In all seven tobacco control regulations, the advantaged group consists of government regulatory departments, which are assigned responsibilities such as leadership, coordination, and supervision of enforcement, reflecting the principle of government-led action. The intensity of construction varies depending on how detailed the regulation lists the relevant departments: Shenzhen is highest (25 points), where the regulation lists 29 member units of the joint conference and their respective responsibilities; Qingdao is lowest (14 points). However, this difference stems from the level of legislative detail rather than substantive institutional divergence.

The contenders include premises managers and tobacco sellers, who are obligated to establish systems, post signs, discourage smoking, etc., and violators are subject to penalties. All regulations specify the responsibilities of premises operators, but the intensity of regulation on tobacco sellers and enterprises varies: Shenzhen is the most detailed (5 points), Qingdao the most

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brief (2 points); Chongqing and Beijing include tobacco enterprises as contenders, reflecting a stricter regulatory orientation.

Dependents include the general public, minors, non-smokers, children, pregnant women, etc. Policies toward them are primarily symbolic support, including publicity and education, signage, and obligations to discourage smoking. All city regulations are highly consistent in this regard.

Deviants primarily consist of individuals who smoke in violation of the rules, as well as those who sell tobacco to minors or publish illegal advertisements. Policies toward them are primarily coercive punishment. The intensity of construction is positively correlated with the level of detail of penalty provisions and the amount of fines: Chongqing (12 points) and Shenzhen (10 points) have separate penalty provisions for various violations, resulting in higher scores; Xi'an (4 points) and Qingdao (3 points) have more coarse penalty provisions and lower scores.

Overall, the construction of dependents is the most consistent across local tobacco control regulations, reflecting a broad consensus on values; the intensity of construction for contenders and deviants is positively correlated with the level of legislative detail and regulatory strictness of each city.

Comparison of Policy Tool Configuration

The seven regulations show clear differences in the four types of tools, prohibitive, punitive, persuasive, and incentive-based, reflecting the different orientations of tobacco control legislation across cities.

Prohibitive tools refer to provisions that explicitly ban smoking. Shenzhen has the highest number of such provisions (7), followed by Chongqing and Beijing (6), with Xi'an the lowest (4). Except for Chongqing, all six other cities have achieved comprehensive smoking bans in indoor public places, workplaces, and public transportation. Chongqing, by allowing smoking areas in three types of indoor premises, catering services, accommodation services, and public entertainment venues, is the only partially compliant city, with a substantially weaker substantive smoking ban than the other cities.

Punitive tools show dual differences: the amount of fines and the level of detail of penalty provisions. For individual fines, Xi'an imposes only 10 yuan; Qingdao has a flat fine of 200 yuan without gradation; the other cities have graded fines (e.g., different amounts for first-time violators versus those who refuse to correct), with Shenzhen and Beijing setting maximums of 500 yuan. For institutional fines, Beijing has a maximum of 200,000 yuan, Shenzhen 100,000 yuan, and Xi'an only 1,000 yuan. The level of detail in penalty provisions also varies. Shenzhen has the most (5 provisions), with separate penalties for individual smoking, operator non-compliance, illegal tobacco sales, etc.; Chongqing and Beijing each have 4 provisions; most other cities have 3 provisions.

Persuasive tools include publicity and education, no-smoking signage, obligations to discourage smoking, etc. All seven cities are highly consistent in providing such tools. Shenzhen and Chongqing each have 6 points, Wuhan, Xi'an, Shanghai, and Beijing each have 5 points, and Qingdao has 4 points. The differences mainly stem from the level of detail regarding responsibilities for publicity and education: Shenzhen systematically specifies the publicity and education responsibilities of multiple departments; Chongqing specifically establishes centralized activities such as Smoke-Free Day; Qingdao is the most brief. This consistency undoubtedly reflects the broad consensus on "prevention first, publicity foremost."

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Incentive-based tools include smoking cessation services, reporting rewards, recognition, volunteer participation, etc. Shenzhen has 4 points (smoking cessation services, reporting rewards, volunteer participation); Shanghai and Beijing each have 3 points; Wuhan and Chongqing each have 2 points; Xi'an and Qingdao each have 1 point. The variation in the configuration of incentive tools reflects cities' fiscal capacity and governance philosophy: more developed cities such as Shenzhen, Shanghai, and Beijing place greater emphasis on positive incentives, while Xi'an and Qingdao rely more on coercive and persuasive tools.

Social Construction of Target Groups: From Media Narrative to Regulatory Text

Central and local media narratives present a clear functional division: central narratives focus on problem framing, frequently constructing victims and villains; local narratives focus on action demonstration, frequently constructing heroes and beneficiaries. This division aligns with the institutional pattern of China's tobacco control policy, in which central legislation is absent and local legislation pioneers. Comparing the central-local narrative data with the construction intensity of the four target group types in the seven city regulations reveals a macro-level correspondence—the moral legitimacy and public pressure provided by central narratives match the construction of dependents and deviants in the regulations, while the social recognition and implementation momentum conveyed by local narratives complement the construction of advantaged groups and beneficiaries in the regulations.

Victim Narrative and Dependent Construction: Top-Down Transmission of Moral Legitimacy

The mention rate of the victim role in central narratives is as high as 196.4%, ranking just below beneficiaries (218.2%) and villains (205.5%), making it a core pillar of the central narrative problem framework. Through extensive reporting on the harms of secondhand smoke to children, pregnant women, and public health, central media shape a collective image of innocent victims, anchoring the tobacco control issue on the moral high ground of protecting the vulnerable.

This narrative receives an institutionalized response in the regulatory texts. All seven city regulations list minors, the public, pregnant women, etc., as dependents, and the intensity of construction is generally high (points range from Qingdao's 7 to Chongqing's 12). The core characteristics of dependents perfectly match the victim role in the narrative: positive construction, low political power, need for symbolic protection, and so on. More importantly, the construction of dependents shows virtually no substantive variation across cities. Regardless of economic development level or stringency of tobacco control, all regulations without exception list minors as key protected subjects and set special outdoor smoke-free zones around schools and kindergartens. This highly consistent institutional arrangement confirms the powerful shaping force of the victim protection discourse in central narratives—when central media repeatedly emphasize "young people are the future of the motherland" and "secondhand smoke harms children," local legislators can hardly overlook the protection of minors in their regulations.

In terms of construction intensity, the difference between cities with higher dependent points (Chongqing 12, Shenzhen 10) and Qingdao (7) is primarily due to the level of detail in the regulatory text, rather than any substantive weakening of dependent status. The victim discourse in central-local narratives has formed a cross-provincial policy consensus. Local legislation has no choice on the question of who to protect: although unified legislation is absent, the central government, through narrative, sets an unavoidable moral agenda for local legislation.

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Villain Narrative and Contender/Deviant Construction: Institutionalizing Attributional Pressure

The mention rate of the villain role in central narratives is as high as 205.5%, making it the second most frequent role after beneficiaries. Central media construct tobacco enterprises, violators who smoke, non-compliant operators, and others as problem makers. This provides an institutionalized target for contenders and deviants in the regulations.

The contenders in the regulations, premises managers, tobacco sellers, etc., are precisely the conceptualized images of the villain role in central narratives. All seven city regulations impose clear obligations on operators, such as discouraging smoking, posting signs, not providing ashtrays, etc., with penalties for violations. The intensity of contender construction varies across cities: Shenzhen is highest (5 points), Qingdao lowest (2 points). This variation is related to the importance each city places on tobacco control enforcement, but even in the most brief case of Qingdao, the regulation clearly specifies the basic obligations of operators. This indicates that central narratives have successfully established operator responsibility as an essential element of tobacco control legislation.

The deviants in the regulations, primarily individuals who smoke in violation of the rules, are the institutionalized expression of the "rule-breaker" in central narratives. The intensity of deviant construction is highly correlated with the severity of punishment: Shenzhen and Chongqing have high deviant points (10-12 points), with detailed penalty provisions and higher fines; Xi'an and Qingdao have low points (3-4 points), with brief penalties and very low fines. It is worth noting that the villain role in central narratives does not distinguish between "high-power villains" (tobacco enterprises, operators) and "low-power villains" (individual smokers), but the regulations, through the distinction between contenders and deviants, achieve differentiated regulation of villains at different power levels—contenders are subject primarily to implicit constraints, emphasizing obligations and supervision; deviants are subject primarily to coercive punishment, such as fines.

Hero Narrative and Advantaged Construction: Social Mobilization of Action Legitimacy

The mention rate of the hero role in local narratives is as high as 209.1%, far exceeding the 158.2% in central narratives. Local media extensively report heroic images such as law enforcement personnel, tobacco control volunteers, successful quitters, and smoke-free unit builders, transforming tobacco control policy from government requirements into social action. This narrative provides social recognition and implementation momentum for the advantaged group in the regulations, namely, government departments and regulatory agencies at various levels.

The construction of advantaged groups in the regulations is universal; all seven city regulations clearly specify advantaged actors, and their core responsibilities are highly consistent: organization and leadership, joint conferences, division of labor among departments, supervision, and enforcement. This commonality itself reflects the broad recognition of government authority in local narratives. The high frequency of appearances by law enforcement personnel and regulatory agencies helps shape public trust in the government's tobacco control capacity, making it necessary for legislators to specify the responsibilities of advantaged actors in detail. Even in Qingdao, which has the most brief construction of advantaged actors (14 points), the regulation clearly specifies the leadership responsibilities of the Patriotic Health Campaign Committee and the health administrative department. However, the level of detail in advantaged

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construction varies across cities: Shenzhen's advantaged points reach as high as 25, while Qingdao has only 14. This variation to some extent reflects differences in the level of legislative detail across cities, related to local governance traditions and administrative styles.

Beneficiary Narrative and Beneficiary Construction: Social Proof of Policy Outcomes

The mention rate of the beneficiary role in local narratives is as high as 267.3%, the highest of all seven character roles. Local media report images of successful quitters, members of the public with improved health, compliant enterprises gaining development opportunities, and other beneficiaries, providing outcome justification for tobacco control policy. This narrative is reflected in the regulations as the configuration of incentive-based tools, such as smoking cessation services, reporting rewards, and smoke-free unit recognition, transforming the beneficiaries in the narrative into actual beneficiaries in the system.

All seven city regulations provide at least one type of incentive-based tool. Basic smoking cessation services exist in all cities. This commonality indicates that the high-frequency presentation of beneficiaries in local narratives has created a social expectation that tobacco control policy should benefit the public, making it difficult for legislators to pass regulations without any incentive-based tools. Even in Xi'an and Qingdao, which have the fewest incentive-based tools (1 point each), the regulations explicitly require health administrative departments to provide smoking cessation counseling services.

In summary, the macro-correspondence between the central-local narrative division and the construction of target groups in the regulations reveals the interaction mechanism between narrative and institutions. Central narratives, through the high-frequency construction of victims and villains, provide moral legitimacy and an attributional framework for dependents and contenders/deviants in the regulations. Local narratives, through the high-frequency construction of heroes and beneficiaries, provide social recognition and outcome justification for advantaged groups and beneficiaries in the regulations. The division of labor—"central government sets the direction, local governments ensure implementation"—is also institutionally expressed in the regulatory texts: dominated by central narratives, the construction of dependents and deviants is relatively uniform, while the construction of advantaged groups and beneficiaries, though varying locally, is universal and responds to the social mobilization function of local narratives.

The Gap between Narrative and Action under Narrative Coordination: **The Cases of Chongqing and Xi'an**

In this study, we analyze the tension between narrative and institutions using the regulations of Chongqing and Xi'an as case studies. Both central and local media tell stories of comprehensive smoke-free environments and strict enforcement, yet the regulations in these two cities exhibit certain gaps from this narrative in key institutional designs. This section analyzes these two regions to illustrate how narrative coordination encounters institutional compromise, demonstrating that the relationship between narrative and institutions in tobacco control policy is a complex interaction mediated by local interests, governance capacity, and political will.

Chongqing: Comprehensive Smoke-Free Narrative vs. Indoor Smoking Area Exemption

Chongqing is the only city among the seven where indoor smoking area exemptions exist. Article 8 of its regulation explicitly states, "Smoking is prohibited in indoor areas of public places," but immediately follows with a proviso allowing the designation of smoking areas in three types of indoor premises: catering service venues, accommodation service venues, and

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public entertainment venues. This institutional design directly contradicts the narrative's long-standing advocacy for "comprehensive smoking bans in all indoor public places."

The underlying cause of this tension lies in the profound influence of local industrial interests. Chongqing is a major province for tobacco cultivation and cigarette production, and the tobacco industry has a significant impact on local fiscal revenue and tobacco farmers' income (Cai, Chen, Zhu, et al., 2015). During legislative research, a municipal people's congress representative and the director of the Fuling Cigarette Factory of China Tobacco Chongqing Industrial Co., Ltd. explicitly stated that overly stringent tobacco control measures would be undesirable, arguing that although tobacco control is an inevitable trend, the tobacco industry also invests heavily in poverty alleviation and education; if measures are too strict, fiscal tax revenue and the income of farmers and retailers would decline(Yan, 2020) . Research by Duke Kunshan University, based on interviews with policymakers and experts, also found that Chongqing's retention of indoor smoking areas in local legislation directly stems from resistance from the tobacco industry during the legislative process(Ren, 2025).

This gap between narrative and institutions essentially reflects the outcome of a contest between central discursive authority and local industrial interests: maintaining consistency with the central government in narrative while leaving room for local interests in institutions.

Xi'an: "Strictest Smoking Ban" vs. "10 Yuan Fine"

Xi'an has the lowest individual fine among the seven cities. Article 25 of the Xi'an Administrative Measures for Smoking Control (effective November 1, 2018) states: "Anyone who smokes in a place where smoking is prohibited in violation of these Measures shall be given a warning and a fine of ten yuan by the tobacco control supervision and administration department." The maximum institutional fine is only 1,000 yuan. Xi'an has the lowest individual fine among the seven regulations, at just 10 yuan. This fine amount is at the lowest level among all tobacco control regulations nationwide, forming a sharp contrast with the narrative's long-standing calls for "strict enforcement" and "raising the cost of violations."

From the perspective of media narratives, when reporting on tobacco control enforcement, the media often adopt a discursive framework of "strictest smoking ban." This narrative strategy places enforcement actions—rather than penalty severity—at the center of reporting. However, the reasons for the tension between this "strictest" narrative and the 10 yuan fine are complex. As a western city, Xi'an's tobacco control legislation came relatively late, and enforcement resources and experience are relatively limited. From enforcement data: as of September 2019, Xi'an had imposed a total of over 388,000 yuan in fines on smokers and non-compliant enterprises, deploying over 162,000 enforcement personnel (Wenming Xi’an, 2019) , resulting in an extremely low average fine per enforcement action.

This also indicates that when local enforcement capacity is limited and social consensus is insufficient, regulations may opt for symbolic penalties to achieve passage, while the narrative continues to maintain a strict tone consistent with the central government. This misalignment between weak institutional constraints and strong discursive narratives is a typical dilemma in local implementation of tobacco control policy.

Theoretical Implications of the Narrative-Action Gap

The cases of Chongqing and Xi'an meaningfully complicate the core argument of this chapter. They show that narrative coordination does not mean complete consistency between narrative

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and institutions; rather, under pressure from central discourse and constraints of local interests and capacity, local actors may adopt a strategy of narrative compliance but institutional compromise. Specifically, media narratives continue to use the central government's advocated discourse of "comprehensive smoke-free" and "strict enforcement," while regulatory texts make room for local interests or implementation difficulties through exception clauses or symbolic penalties.

From the theoretical perspective of the Narrative Policy Framework (NPF), this finding challenges the simple model of narrative-to-policy influence and response, suggesting that we need to incorporate factors such as local interests, administrative capacity, and political will into the analytical framework of narrative-institution relations. The cases of Chongqing and Xi'an demonstrate that narrative coordination does not necessarily lead to institutional coordination; when local interests conflict with central narratives, a pattern of narrative compliance but institutional divergence may emerge. This both supplements the applicability of the NPF and provides a new analytical perspective for understanding the complex interaction between discourse and institutions in China's policy process.

Conclusion

The narrative competition hypothesis of the NPF presupposes an institutional environment in which multiple interest groups compete for discursive power in an open and competitive policy subsystem. However, this study finds that the interaction between central and local narratives in China's tobacco control policy exhibits a distinct pattern of consensus and coordination. In terms of character construction, central narratives focus on the "villain-victim" pair, emphasizing problem framing and providing moral legitimacy for policy intervention; local narratives focus on the "hero-beneficiary" pair, emphasizing action demonstration and outcome justification. Rather than adversarial rhetoric that demonizes opponents or glorifies oneself, central and local narratives form a functionally complementary pattern of "central government sets the direction, local governments ensure implementation."

The universality of policy tool configurations further confirms the institutionalized effects of narrative coordination. The seven local regulations are highly consistent in punitive and persuasive tools, and basic incentive-based tools are also universally present. If one were to reason from the logic of narrative competition, localities should exhibit significant tool differentiation, but the opposite is true. The central-local coordinated division of labor explains this consistency. Central narratives provide legitimacy for punitive and persuasive tools, while local narratives provide the foundation for social mobilization of incentive-based tools. The cases of institutional compromise in Chongqing and Xi'an serve as boundary evidence for narrative coordination: even when institutions deviate from central requirements, local media strive to maintain discursive consistency, forming a pattern of "narrative compliance, institutional deviation," which in turn reinforces the dominance of narrative coordination.

Against the institutional backdrop of long-term absence of unified national tobacco control legislation, central narratives perform a compensatory function through problem framing and value justification, providing a discursive framework and legitimacy foundation for local legislation; local legislation then provides supplementation through specific provisions. This

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interactive pattern is not a zero-sum game among interest groups, but rather a discursive collaboration and institutional complementarity between central and local governments. Thus, China's tobacco control policy narratives build consensus on tobacco control through functional complementarity and discursive linkage between central and local levels.

Competing interests

The author(s) declared no competing interests.

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Public Expectations for E-Cigarette Regulation in China: A Quantitative Study Using the Kano Model

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Abstract

Objective To identify the evaluative reaction types and priorities of six e-cigarette regulatory policy attributes among adult respondents in a Chinese online sample using the Kano model, and to compare classification differences between users and non-users. Because all six attributes had already been enacted at the time of the survey, the Kano items measured counterfactual evaluative reactions to the presence versus absence of existing regulations, rather than expectations concerning future policy introduction.

Methods A cross-sectional online survey was conducted. Six policy attributes were measured using standardized Kano dual-item scales. The revised Kano classification matrix was applied, Better-Worse coefficients were calculated with four-quadrant analysis, chi-square tests compared classification distributions between users and non-users, and multinomial logistic regression was performed for the flavor restriction attribute.

Results Age verification and mandatory standards and review emerged as core anchors of policy expectations. Online sales restrictions and packaging warnings exhibited baseline guarantee characteristics; advertising restrictions and flavor restrictions showed significant group differentiation. Four-quadrant analysis grouped the six attributes into a core priority group and an optimization adjustment group, while Kano classification revealed a differentiation pattern of must-be dominant, one-dimensional dominant, and indifferent dominant attributes. Significant classification differences between users and non-users were observed for most attributes, with flavor restriction showing the strongest divergence; usage status was a key factor associated with

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its classification.

Conclusions The public's expectations for e-cigarette regulatory policies exhibit a two-tier priority structure and multi-dimensional classification features. The two analytical perspectives complement each other, providing empirical reference for differentiated policy design.

Keywords: e-cigarette policy; Kano model; tobacco control; Better-Worse analysis; policy priority; China

Introduction

E-cigarettes, which emerged in the early twenty-first century, have rapidly become one of the central issues in global tobacco control (World Health Organization, 2021). As a novel alternative to conventional cigarettes, e-cigarettes have some potential to reduce exposure to harmful substances (McNeill et al., 2020). However, e-cigarette use has also created public health challenges, including the risk of addiction among adolescents, uncertain long-term health effects, and the disruption and reconfiguration of tobacco control norms (Glantz & Bareham, 2018). The central controversy surrounding e-cigarette regulation among governments and health authorities worldwide concerns how to balance harm reduction for adult smokers with the prevention of initiation among nonsmokers, particularly adolescents (Ashley et al., 2020).

As the world's largest producer and exporter of e-cigarettes, China has followed a distinctive and landmark trajectory in the evolution of its e-cigarette policies. In 2018, the State Administration for Market Regulation and the State Tobacco Monopoly Administration jointly issued a circular prohibiting the sale of e-cigarettes to minors (State Administration for Market Regulation & State Tobacco Monopoly Administration, 2018). In 2019, online sales channels for e-cigarettes were further closed (State Tobacco Monopoly Administration & State Administration for Market Regulation, 2019). In 2021, the State Council amended the Regulations for the Implementation of the Tobacco Monopoly Law of the People's Republic of China, bringing e-cigarettes under the tobacco monopoly regulatory framework (State Council of the People's Republic of China, 2021). In 2022, the Measures for the Administration of Electronic Cigarettes officially came into effect, establishing institutional arrangements for product review, licensing administration, and a unified national trading platform (State Tobacco Monopoly Administration, 2022). In the same year, the mandatory national standard GB 41700–2022, Electronic Cigarette, was officially issued, further specifying the technical requirements for e-cigarette products (State Administration for Market Regulation & Standardization Administration of China, 2022). This rapidly evolving policy framework reflects a governance model characterized by simultaneous implementation and adjustment in the absence of sufficient domestic empirical evidence in China (Jiang & Zheng, 2024; Yao et al., 2026).

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Existing research on e-cigarette policy in China has primarily focused on analyses of regulatory frameworks, evaluations of policy implementation effects, and industry responses (Jiang & Zheng, 2024; Lyu et al., 2024; Yao et al., 2026; Zheng et al., 2024). These studies have traced the evolution of China's e-cigarette regulatory system and discussed implementation issues related to policies concerning the protection of minors, online sales, product standards, and restrictions on flavored e-cigarettes. However, compared with research on regulatory institutions and policy effects, relatively few studies have directly examined how the public evaluates different e-cigarette regulatory policies.

Existing studies of public attitudes indicate that levels of public support vary across e-cigarette policy instruments. In a survey of young people in China, Pettigrew et al. (2023) found relatively high levels of support for restrictions on purchases by minors, health warnings on packaging, and advertising restrictions, but comparatively lower support for restrictions on flavored e-cigarettes. These findings suggest that the public does not simply support or oppose e-cigarette regulation in general; rather, individuals make different judgments depending on the specific content of a policy. Therefore, relying solely on overall levels of policy support may not fully capture the public's specific expectations regarding different policy attributes.

E-cigarette use status is an important factor influencing policy attitudes. Previous studies have shown that current e-cigarette users generally express lower levels of support than nonusers for sales restrictions, advertising restrictions, and restrictions on flavored products (Chung-Hall et al., 2020; Czaplicki et al., 2020b; Hairi et al., 2022; Posner et al., 2022). Group differences are particularly pronounced with respect to restrictions on flavored e-cigarettes. Research using a sample of young people in the United States found that e-cigarette users were substantially less supportive than nonusers of restrictions on the sale of flavored products (Posner et al., 2022). Multicountry surveys in Europe have likewise shown that e-cigarette users and dual users report relatively lower levels of support for restrictive policies (Chung-Hall et al., 2020). However, users do not oppose all regulatory measures. Some studies have found that users continue to express relatively high levels of support for policies such as minimum purchasing-age requirements and product safety standards (Hairi et al., 2022). In addition, research involving samples of parents suggests that family circumstances related to the protection of minors may increase support for restrictions on advertising and flavored products (Czaplicki et al., 2020a). Taken together, these findings indicate that public expectations regarding e-cigarette policies may be influenced by both policy attributes and e-cigarette use status.

Existing studies of attitudes toward e-cigarette policies have generally used Likert scales or "support–oppose" items to measure policy support (Chung-Hall et al., 2020; Czaplicki et al., 2020a, 2020b; Hairi et al., 2022; Pettigrew et al., 2023; Posner et al., 2022). Although these approaches allow comparisons of support levels across different policies, they are less able to distinguish the different ways in which policy attributes may operate. For example, a high level

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of support may indicate that the public regards a policy as an indispensable regulatory baseline, or it may indicate that the public believes the policy should be implemented as fully as possible. At the same time, conventional support scales have difficulty assessing whether policy implementation and policy absence generate evaluative responses of different magnitudes, and they are also limited in identifying indifferent or reverse attitudes toward the same policy across different groups.

The Kano model was proposed in 1984 by the Japanese quality-management scholar Noriaki Kano (Kano et al., 1984) and is a widely used classification tool in consumer-preference research. The model classifies product or service attributes into five categories: attractive (A), one-dimensional (O), also referred to as performance attributes, must-be (M), indifferent (I), and reverse (R). Its central innovation lies in distinguishing the asymmetric effects of fulfillment and nonfulfillment. The absence of a must-be attribute produces strong dissatisfaction, whereas its presence is taken for granted; the fulfillment of a one-dimensional attribute is linearly associated with satisfaction; and the presence of an attractive attribute generates unexpected satisfaction, whereas its absence does not cause dissatisfaction (Matzler & Hinterhuber, 1998). In recent years, the Kano model has been applied to research on health-care service quality, patient needs, and health-service priorities (Barrios-Ipenza et al., 2021; Chen et al., 2019; Materla et al., 2019). Compared with conventional measures of policy support, the Kano model can not only identify the dominant classification of a policy attribute but also use Better-Worse coefficients to separately assess the positive gain associated with the presence of a policy and the negative effect associated with its absence. In this study, the Kano model is employed as an exploratory classification tool rather than as a direct measure of satisfaction. The paired responses are interpreted as capturing respondents' evaluative reactions to the hypothetical presence versus absence of a regulatory measure, which may reflect normative approval, perceived necessity, or policy support. These constructs are not treated as equivalent to consumer satisfaction, and the Better–Worse coefficients are accordingly interpreted as descriptive indicators of asymmetric evaluative patterns rather than as validated measures of policy priority. Because all six policy attributes had already been enacted at the time of the survey, the Kano items measured counterfactual evaluative reactions to the presence versus absence of existing regulations, rather than expectations concerning future policy introduction.

In summary, three limitations remain in the existing literature. First, research on e-cigarette policy in China has focused primarily on regulatory systems and policy effects, while systematic comparisons of adult public expectations regarding different policy attributes remain limited. Second, although previous studies have identified differences in policy attitudes between e-cigarette users and nonusers, few have examined whether these differences specifically take the form of must-be, one-dimensional, attractive, indifferent, or reverse classifications. Third,

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although conventional support scales can compare levels of policy support, they have difficulty revealing the asymmetric evaluations generated by policy implementation and policy absence.

Accordingly, this study focuses on six core attributes of China's e-cigarette regulatory policies and applies the Kano model to quantify the types and priorities of public expectations regarding each policy attribute. The specific objectives are to: (1) classify the six policy attributes using the Kano model and calculate their Better-Worse coefficients; (2) compare differences in policy-attribute classifications between e-cigarette users and nonusers; (3) use restrictions on flavored e-cigarettes as the dependent variable and conduct multinomial logistic regression to explore the sociodemographic correlates of classification differences; and (4) propose policy-priority recommendations based on four-quadrant analysis and the integration of multidimensional characteristics. This study aims to provide empirical evidence based on public preferences for the more refined design of e-cigarette regulatory policies.

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Method

Development of Policy Attributes

The selection of policy attributes followed a three-stage process: policy-text mapping, expert review, and pilot-survey refinement.

(1) Policy-Text Mapping

The U.S. e-cigarette policy classification framework developed by the Institute for Global Tobacco Control at Johns Hopkins University was used as a reference (Institute for Global Tobacco Control, n.d.). This framework categorizes e-cigarette regulatory policies into eight domains: minimum purchase age, sales restrictions, marketing restrictions, packaging and labeling, product regulation, reporting and notification, clean air, and taxation. The research team systematically compared these domains with China's current policy documents and mapped the eight domains onto operationalizable policy attributes, thereby generating an initial pool of 10 candidate attributes. The Chinese e-cigarette policy documents included in the coding are presented in Table 1.

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Table 1 Chinese E-Cigarette Policy Documents Included in the Coding

No.	Policy Document	Year of Issuance
P1	Circular on Prohibiting the Sale of Electronic Cigarettes to Minors	2018
P2	Circular on Further Protecting Minors from the Harms of Electronic Cigarettes	2019
P3	Measures for the Administration of Electronic Cigarettes	2022
P4	Provisions on Warning Labels for Electronic Cigarettes	2022
P5	GB 41700–2022 Mandatory National Standard for Electronic Cigarettes	2022
P6	Implementation Rules for the Technical Review of Electronic Cigarette Products (Revised)	2024
P7	Rules for the Administration of Electronic Cigarette Transactions (Revised)	2024
P8	Notice on Launching a Special Campaign to Protect Minors from the Harms of Electronic Cigarettes	2024
P9	Announcement on Levying Consumption Tax on Electronic Cigarettes	2022
P10	Announcement on Matters Concerning the Administration of Electronic Cigarette Consumption Tax Collection	2022

The initial pool of 10 candidate attributes included: (1) minimum age verification at point of sale; (2) prohibition of online sales; (3) restriction of advertising and promotion; (4) prohibition of flavored products; (5) mandatory product testing and technical review; (6) mandatory packaging warnings; (7) taxation on e-cigarette products; (8) reporting and notification requirements for manufacturers; (9) restrictions on use in indoor public places; and (10) restrictions on retail outlet density. Following expert review, attributes (7) and (8) were merged into attribute (5) because the experts judged that taxation and reporting requirements were perceived by the public as components of a broader product regulatory regime rather than as distinct policy instruments. Attributes (9) and (10) were excluded because the experts noted that clean-air restrictions and outlet-density restrictions are not yet comprehensively implemented in China, and their inclusion would have introduced substantial heterogeneity in respondents' reference points. The remaining six attributes were retained.

(2) Attribute Screening and Pilot Survey

Five experts in tobacco control, with expertise spanning public health, health policy, law, and epidemiology, were invited to assess content validity. Using a 4-point scale, the experts evaluated the content relevance of each candidate attribute, and the item-level content validity index (I-CVI) was calculated. The inclusion criterion was an I-CVI of 0.80 or higher. Following

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the review, 8 of the 10 candidate attributes met the criterion, with all eight achieving an I-CVI of 1.00; the remaining two attributes were merged or excluded because of excessive overlap.

A pilot survey was subsequently conducted with a convenience sample of 150 participants to assess the comprehensibility of the paired functional and dysfunctional Kano items and the questionnaire completion rate. After the wording was revised based on participant feedback, six policy attributes were retained. Their policy sources, corresponding domains, and the wording of the functional and dysfunctional items are presented in Table 2.

Table 2 Mapping from Policy Documents to Kano Attributes and Item Wording

Attribute	Policy Source	Legal Status	Effective Date	Mapped Domain	Functional Item	Dysfunctional Item
K1	P1, P2, P8	Enacted	2018/2019/2024	Protection of minors	Age verification is required when purchasing e-cigarettes.	Age verification is not required when purchasing e-cigarettes.
K2	P3 (Article 23)	Enacted	2022	Sales channels	The online sale of e-cigarettes is prohibited.	The online sale of e-cigarettes is permitted.
K3	P3 (Article 22)	Enacted	2022	Advertising and promotion	E-cigarette advertising and marketing activities are strictly restricted.	E-cigarette advertising and marketing activities are permitted.
K4	P5 (GB 41700)	Enacted	2022	Ingredient/flavor restrictions	The sale of flavored e-cigarettes is prohibited, with only tobacco-flavored products permitted.	The sale of e-cigarettes in a variety of flavors is permitted.
K5	P5, P6	Enacted	2022/2024	Product standards	E-cigarettes must pass testing and review under mandatory national standards.	E-cigarettes are not required to pass testing and review under mandatory national standards.
K6	P4	Enacted	2022	Packaging and labeling	Health warnings must be printed on e-cigarette packaging.	Health warnings are not required on e-cigarette packaging.

Study Design and Participants

This study employed a cross-sectional online survey design. From June to July 2026, convenience sampling was conducted among adults aged 18 years or older across China through the Wenjuanxing platform. The questionnaire was distributed through social media platforms, including WeChat and QQ, as well as through a professional research panel. Respondents participated voluntarily and completed an anonymous, self-administered questionnaire.

The sample size estimation was informed by a previous study using the Kano model (Zhang et al., 2024). To detect between-group differences in the distribution of Kano classifications between users and nonusers, with an effect size of $w = 0.20$, $\alpha = 0.05$, and statistical power of 0.80, the minimum sample size required for the chi-square test was approximately 200. To ensure adequate statistical power for stratified analyses and multivariable regression, while allowing for an anticipated exclusion rate of approximately 10% for invalid questionnaires, the target sample size was set at more than 700 participants.

The inclusion criteria were as follows: being 18 years of age or older and being able to complete the Chinese-language questionnaire independently. The exclusion criterion was a questionnaire completion time of less than one-third of the median completion time observed in the pilot survey, which was considered indicative of an invalid response. The study was approved by the institutional ethics committee, and all respondents provided electronic informed consent before completing the questionnaire.

Measurement Instruments

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The questionnaire consisted of three modules: (1) sociodemographic characteristics and e-cigarette use behaviors; (2) Kano evaluations of the six policy attributes; and (3) questionnaire quality-control items. The Kano evaluation used the standard paired functional and dysfunctional question format (Kano et al., 1984). Because all six policy attributes had already been enacted at the time of the survey, the Kano items measured counterfactual evaluative reactions to the presence versus absence of existing regulations, rather than expectations concerning future policy introduction. These responses may reflect policy awareness, normative endorsement, perceived necessity, or satisfaction with implementation; these constructs were not separately measured and are not distinguished in the present analysis. Each pair of items included five standard response options: "I like it that way," "It must be that way," "I am neutral," "I can live with it that way," and "I dislike it that way." Respondents separately evaluated the implementation of a given policy using the functional item and the nonimplementation of that policy using the dysfunctional item. The combination of responses to the functional and dysfunctional items was mapped onto the five Kano categories: must-be (M), attractive (A), one-dimensional (O), indifferent (I), and reverse (R).

Kano Classification and Better–Worse Coefficients

Policy attributes were classified using the modified Kano evaluation matrix (Matzler & Hinterhuber, 1998). This matrix reassigns response combinations classified as questionable or conflicting (Q) in the standard matrix to the nearest Kano category based on the principle of minimal reclassification. This approach was adopted because the Q category typically represents contradictory or random responses, and reassignment permits the use of all available data. However, we acknowledge that this approach removes a potential indicator of item misunderstanding. Consequently, the frequency of the Q category is always zero in the modified matrix. The modified evaluation matrix is presented in Table 3. To assess the robustness of the results, a sensitivity analysis was also conducted using the standard matrix, with Q frequencies and coefficient changes reported in Section 3.2.

Table 3 Modified Kano Evaluation Matrix

Functional Item \ Dysfunctional Item	I like it that way	It must be that way	I am neutral	I can live with it that wat	I dislike it that way
I like it that way	A	A	O	O	O
It must be that way	M	I	I	I	M
I am neutral	M	I	I	I	M
I can live with it that way	M	I	I	I	M
I dislike it that way	A	R	R	R	M

Note. A = attractive; O = one-dimensional; M = must-be; I = indifferent; R = reverse.Better-Worse The Better–Worse coefficients were calculated as follows:

Better = (A + O) / (M + A + O + I)

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$$\text{Worse} = -1 \times (M + O) / (M + A + O + I)$$

The Better coefficient ranges from 0 to 1, with higher values indicating a greater increase in satisfaction when the attribute is present. The Worse coefficient ranges from −1 to 0, with a larger absolute value, |Worse|, indicating a greater decrease in satisfaction when the attribute is absent. The standard errors of the coefficients were calculated using a binomial approximation, and the 95% confidence intervals were constructed as Better ± 1.96 × SE.

Statistical Analysis

Statistical analyses were conducted using R version 4.3.0. Kano classifications were calculated using frequency cross-tabulations, and the Better–Worse coefficients and their confidence intervals were calculated using custom-written scripts. Between-group comparisons were performed using chi-square tests. For attributes with zero frequencies in some categories, sensitivity analyses were conducted by combining the R category or using Fisher's exact test. Effect sizes were measured using Cramér's V (Chen et al., 2019).

For the restriction on flavored e-cigarettes (K4), multinomial logistic regression was conducted with Kano classification as the dependent variable, using the indifferent category (I) as the reference group, and sociodemographic variables as the independent variables. Adjusted odds ratios (aORs) and 95% confidence intervals were calculated. Model fit was evaluated using the likelihood-ratio test and Nagelkerke's R^2. Fisher's exact test results were reported when sparse cells were present. All tests were two-sided, and $P < 0.05$ was considered statistically significant.

Results

Zhao said that the effectiveness of tobacco control communication is determined not only by the construction of message content but also by the appropriateness of its delivery strategies. In intervention practice, message content strategy and message execution strategy function as an integrated system. The former aims to define the thematic focus and normative orientation of the campaign, while the latter concerns the selection of media channels and expressive formats to optimize how the target audience receives, interprets, and engages with the message.

Sample Characteristics

A total of 768 questionnaires were collected. After 47 invalid questionnaires with excessively short completion times or logically inconsistent responses were excluded, 721 valid questionnaires remained, yielding a valid response rate of 93.9%. Based on e-cigarette use status, 200 respondents were current users (27.7%), 59 were former users (8.2%), and 462 were never users (64.1%). Statistically significant differences were observed among the three groups in sex, age, income, city tier, and co-residence with minors (all $P < 0.01$), whereas the difference in educational attainment was not statistically significant ($P = 0.362$). The distribution of sample characteristics by e-cigarette use status is presented in Table 4.

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Table 4 Sample Characteristics by E-Cigarette Use Status (N = 721)

Characteristic	Current Users (n=200)	Former Users (n=59)	Never Users (n=462)	χ^2	P
Sex				35.88	<0.001
Male	125 (62.5)	31 (52.5)	174 (37.7)		
Female	75 (37.5)	28 (47.5)	288 (62.3)		
Age group (years)				55.02	<0.001
18-25	57 (28.5)	22 (37.3)	257 (55.6)		
26-35	83 (41.5)	18 (30.5)	114 (24.7)		
36-45	51 (25.5)	13 (22.0)	67 (14.5)		
46-55	9 (4.5)	3 (5.1)	16 (3.5)		
⩾56	0 (0.0)	3 (5.1)	8 (1.7)		
Educational attainment				8.77	0.362
Middle school or below	0 (0.0)	0 (0.0)	1 (0.2)		
High school/secondary vocational school/technical school	2 (1.0)	0 (0.0)	15 (3.2)		
Junior college	17 (8.5)	9 (15.3)	45 (9.7)		
Bachelor's degree	156 (78.0)	44 (74.6)	334 (72.3)		
Master's degree or above	25 (12.5)	6 (10.2)	67 (14.5)		
Monthly income (RMB)				42.76	<0.001
⩽ 3000	9 (4.5)	3 (5.1)	58 (12.6)		
3001-5000	23 (11.5)	19 (32.2)	131 (28.4)		
5001-8000	79 (39.5)	17 (28.8)	133 (28.8)		
8001-12000	53 (26.5)	13 (22.0)	82 (17.7)		
12001-20000	25 (12.5)	5 (8.5)	41 (8.9)		
⩾20001	11 (5.5)	2 (3.4)	17 (3.7)		
City tier				21.93	0.005
Rural area	2 (1.0)	2 (3.4)	12 (2.6)		
Township	4 (2.0)	2 (3.4)	25 (5.4)		
County seat/county-level city	27 (13.5)	9 (15.3)	72 (15.6)		
Prefecture-level city	52 (26.0)	24 (40.7)	168 (36.4)		
Municipality/provincial capital	115 (57.5)	22 (37.3)	185 (40.0)		
Living with minors				31.92	<0.001
Yes	123 (61.5)	24 (40.7)	175 (37.9)		
No	77 (38.5)	35 (59.3)	287 (62.1)		

Note. Data are presented as n (%). The χ^2 and P values represent comparisons among the three groups.

Kano Classifications and Better–Worse Coefficients in the Full Sample

The Kano classification results and Better–Worse coefficients for the six policy attributes are presented in Table 5. Age verification (K1) was classified as a must-be attribute (M) by 47.7% of respondents, making M its dominant classification. Mandatory standards and review (K5) was classified as a one-dimensional attribute (O) by 46.7% of respondents, making O its dominant classification; it was the only attribute dominated by the one-dimensional category. Online sales restrictions (K2) and packaging warnings (K6) were both dominated by the M category, at 41.7% and 45.4%, respectively. Advertising and marketing restrictions (K3) and restrictions on flavored e-cigarettes (K4) were both dominated by the indifferent category (I), at 35.0% and 39.4%, respectively.

K5 had the highest Better coefficient (0.477) and |Worse| coefficient (0.922), followed by K1 (0.456 and 0.918, respectively). K4 had the lowest Better coefficient (0.301) and |Worse| coefficient (0.524). For all attributes, the |Worse| coefficients were markedly higher than the Better coefficients, indicating that, descriptively, respondents assigned greater evaluative weight to policy absence than to policy presence. Because loss aversion was not experimentally tested,

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this pattern is reported as a descriptive asymmetry rather than as evidence of loss aversion. Under the standard matrix, the Q frequencies for the six attributes were as follows: K1: 0 (0.0%), K2: 1 (0.1%), K3: 3 (0.4%), K4: 6 (0.8%), K5: 0 (0.0%), K6: 1 (0.1%). The low Q frequencies indicate that contradictory responses were rare. Reclassification of Q responses under the modified matrix produced minimal changes in category distributions. For K4, the largest differences were an increase of 0.4 percentage points in the indifferent category and a decrease of 0.3 percentage points in the reverse category; these changes did not alter the dominant classification. The Better–Worse coefficients changed by less than 0.01 for all attributes under the modified matrix, and all coefficient rankings remained identical. Complete classification distributions under both matrices are presented in Supplementary Table S1.The distributions of Kano classifications for the six attributes are shown in Figure 1.

Table 5 Kano Classifications and Better–Worse Coefficients in the Full Sample (N = 721)

Attribute	Dominant Category	M%	A%	O%	I%	R%	Better (95%CI)	Worse (95%CI)
K1 Age verification	M	47.7	1.5	44.1	6.7	0.0	0.456 (0.422,0.492)	−0.918 (−0.939,−0.899)
K2 Online sales restrictions	M	41.7	2.9	28.6	26.0	0.8	0.317 (0.282,0.352)	−0.709 (−0.739,−0.675)
K3 Advertising and marketing restrictions	I	33.7	2.6	25.9	35.0	2.8	0.294 (0.262,0.328)	−0.613 (−0.651,−0.576)
K4 Restrictions on flavored e-cigarettes	I	26.5	5.5	22.9	39.4	5.7	0.301 (0.268,0.337)	−0.524 (−0.559,−0.486)
K5 Mandatory standards and review	O	45.5	1.0	46.7	6.8	0.0	0.477 (0.441,0.513)	−0.922 (−0.942,−0.902)
K6 Packaging warnings	M	45.4	2.5	35.4	16.6	0.1	0.379 (0.345,0.415)	−0.808 (−0.835,−0.781

Note. M = must-be; A = attractive; O = one-dimensional; I = indifferent; R = reverse. The Better coefficient ranges from 0 to 1, and the Worse coefficient ranges from −1 to 0. Percentages may not sum to 100.0% because of rounding.

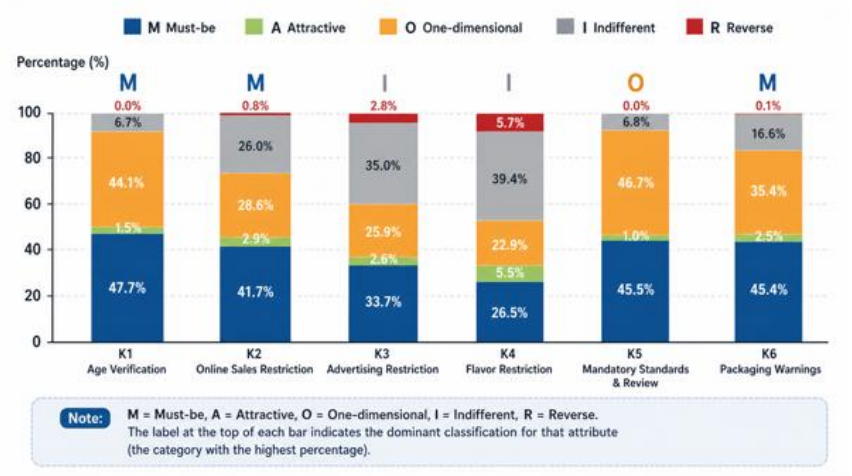


Figure 1 Kano Classification Distribution of Six Policy Attributes (N=721)

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Between-Group Comparison of Kano Classifications Between Users and Nonusers

Table 6 presents the distributions of Kano classifications for the six policy attributes and the corresponding between-group comparisons between current users (n = 200) and never users (n = 462). Former users (n = 59) were not included in this analysis. Among the six attributes, statistically significant differences in classification distributions were observed for all attributes except K5 (all $P < 0.001$). K4 showed the largest between-group difference (Cramér's V = 0.38). The proportions classified as attractive (13.0%) and reverse (15.5%) were substantially higher among users than among nonusers (2.7% and 1.9%, respectively). For K2, the indifferent category was dominant among users (38.0%), whereas the must-be category was dominant among nonusers (44.5%). For K1, the must-be category was dominant among users (52.0%), whereas the one-dimensional category was dominant among nonusers (47.8%). A comparison of the classification distributions between the two groups is shown in Figure 2.

Table 6 Between-Group Comparison of Kano Classifications Between Current Users and Never Users

Attribute	Current Users						Never Users						χ^2	P	Cramér's V
	Dominant Category	M%	A%	O%	I%	R%	Dominant Category	M%	A%	O%	I%	R%			
K1	M	52.0	0.5	34.5	13.0	0.0	O	46.1	1.9	47.8	4.2	0.0	25.49	<0.001	0.19
K2	I	34.5	4.0	21.0	38.0	2.5	M	44.5	2.5	31.5	21.3	0.2	34.94	<0.001	0.22
K3	I	28.5	3.5	13.0	49.5	5.5	M	35.7	2.3	30.9	29.4	1.7	45.04	<0.001	0.25
K4	I	18.5	13.0	10.0	43.0	15.5	I	29.6	2.7	27.8	38.0	1.9	102.24	<0.001	0.38
K5	O	43.5	0.5	45.5	10.5	0.0	O	46.3	1.2	47.2	5.4	0.2	6.55	0.088	0.10
K6	M	41.5	3.0	26.0	29.5	0.0	M	46.8	2.3	39.0	11.7	0.2	35.93	<0.001	0.22

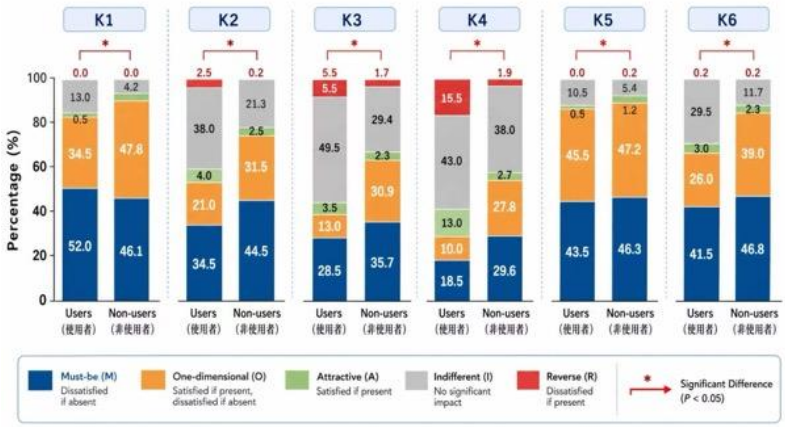


Figure 2 Kano Classification Distribution by User Group (Users vs. Non-users)

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Multinomial Logistic Regression Analysis of Restrictions on Flavored E-Cigarettes

The multinomial logistic regression model using the Kano classification of K4 as the dependent variable, with the indifferent category (I) as the reference category, demonstrated an overall good fit (LR $\chi^2 = 144.44$, df = 28, $P < 0.001$, Nagelkerke's $R^2 = 0.194$). The results are presented in Table 7. Compared with nonusers, current users were more likely to be classified in the attractive category (A; aOR = 4.488) and the reverse category (R; aOR = 8.448), and less likely to be classified in the must-be category (M; aOR = 0.462) and the one-dimensional category (O; aOR = 0.302). Living with minors was associated with a greater likelihood of classification in the M category (aOR = 1.688) and a lower likelihood of classification in the R category (aOR = 0.403). The effect estimates and confidence intervals for each variable across the different category comparisons are shown in Figure 3.

Table 7 Multinomial Logistic Regression Analysis of K4 Restrictions on Flavored E-Cigarettes (Reference Category = I; N = 721)

Variable	M vs I		A vs I		O vs I		R vs I	
	aOR (95%CI)	P	aOR (95%CI)	P	aOR (95%CI)	P	aOR (95%CI)	P
Current e-cigarette user	0.462 (0.288-0.743)	0.001	4.488 (2.080-9.683)	<0.001	0.302 (0.172-0.531)	<0.001	8.448 (3.732-19.127)	<0.001
Male	0.790 (0.537-1.163)	0.233	1.143 (0.564-2.318)	0.710	0.578 (0.382-0.877)	0.010	1.002 (0.495-2.030)	0.995
Age (ordinal)	1.204 (0.961-1.509)	0.106	0.779 (0.483-1.257)	0.306	1.391 (1.106-1.750)	0.005	0.983 (0.610-1.584)	0.944
Junior college education or higher	0.350 (0.086-1.426)	0.143	0.271 (0.025-2.876)	0.278	0.300 (0.072-1.248)	0.098	20.836 (0.000-183790996.686)	0.710
Income (ordinal)	0.980 (0.834-1.151)	0.804	0.925 (0.685-1.248)	0.608	1.018 (0.859-1.207)	0.834	1.038 (0.754-1.428)	0.820
City tier	0.945 (0.775-1.154)	0.580	0.757 (0.502-1.143)	0.185	0.946 (0.768-1.165)	0.600	0.795 (0.518-1.220)	0.293
Living with minors	1.688 (1.102-2.585)	0.016	1.050 (0.476-2.316)	0.903	1.016 (0.648-1.594)	0.945	0.403 (0.175-0.926)	0.032

Note. aOR = adjusted odds ratio; estimates were adjusted for all other variables included in the table. The indifferent category (I) served as the reference category. For junior college education or higher in the R versus I comparison, the confidence interval was extremely wide, indicating an unstable estimate due to sparse data. Overall model fit: LR $\chi^2 = 144.44$, df = 28, $P < 0.001$, Nagelkerke's $R^2 = 0.194$.

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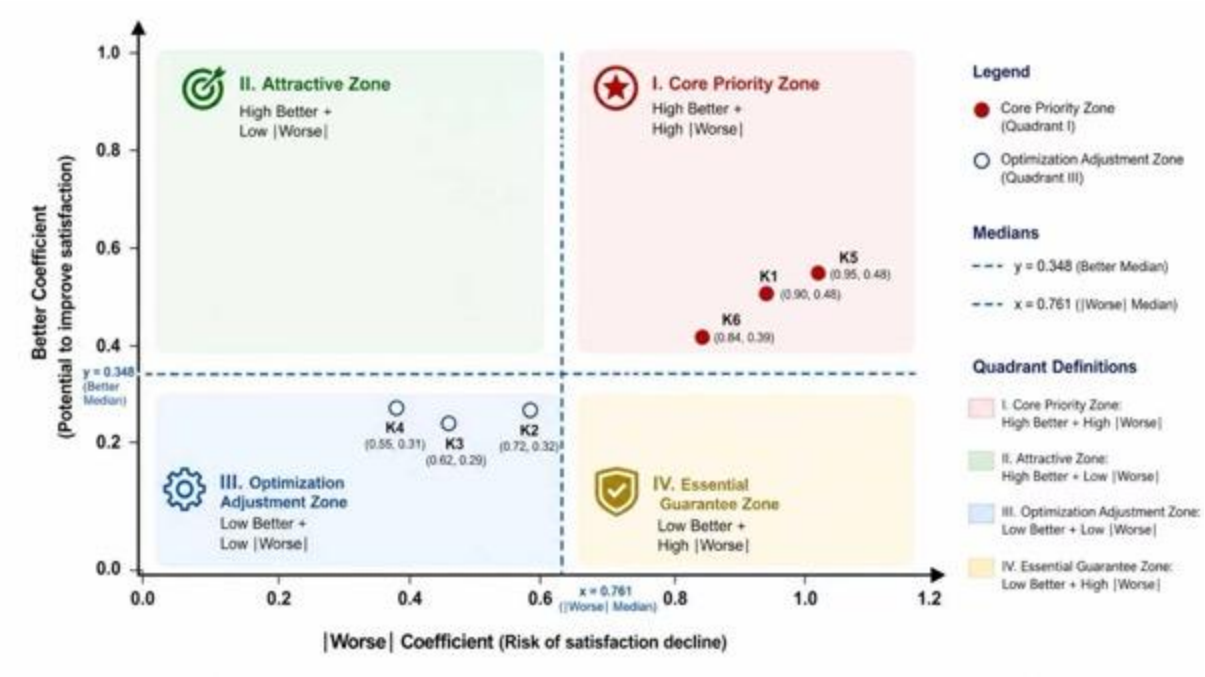


Figure 3 Better-Worse Four-Quadrant Policy Priority Analysis

Identification of Policy Levers Using Four-Quadrant Analysis

Using the median Better coefficient (0.348) and the median |Worse| coefficient (0.761) as the cutoff points, the six policy attributes were mapped onto four quadrants (Figure 4). Quadrant I, the core priority area, included K1, K5, and K6; Quadrant III, the optimization and adjustment area, included K2, K3, and K4. No attributes fell into Quadrants II or IV, resulting in a clear two-tier structure.

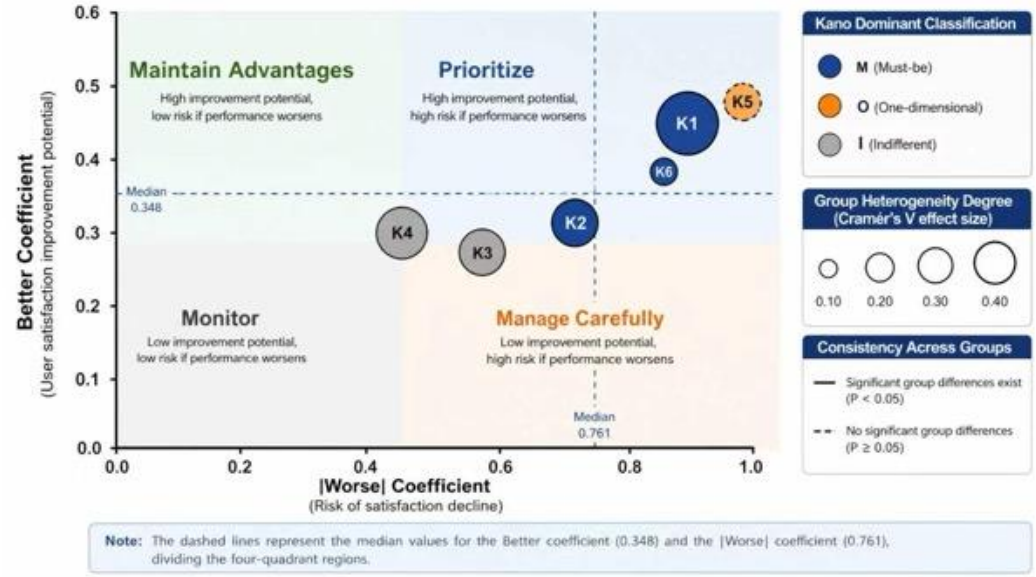


Figure 4 Better-Worse Bubble Chart with Group Heterogeneity Analysis

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Integration of the Multidimensional Characteristics of Policy Attributes

To further reveal the relationships among policy priority, Kano classification, and the degree of between-group differentiation, the Better–Worse coefficients, dominant classifications, and effect sizes of between-group differences (Cramér's V) for the six attributes were integrated into a single bubble matrix plot (Figure 5). The position of each bubble indicates its quadrant assignment, the color denotes its dominant Kano classification, and the bubble size represents the degree of between-group differentiation. A dashed border indicates consistency across groups (K5). The figure visually demonstrates the distinctive status of K5 as a "high-priority, high-consensus" attribute and the salient characteristics of K4 as a "low-priority, highly differentiated" attribute. It therefore provides direct visual evidence for the two-tier structure discussed below and for the complementarity of the two analytical perspectives.

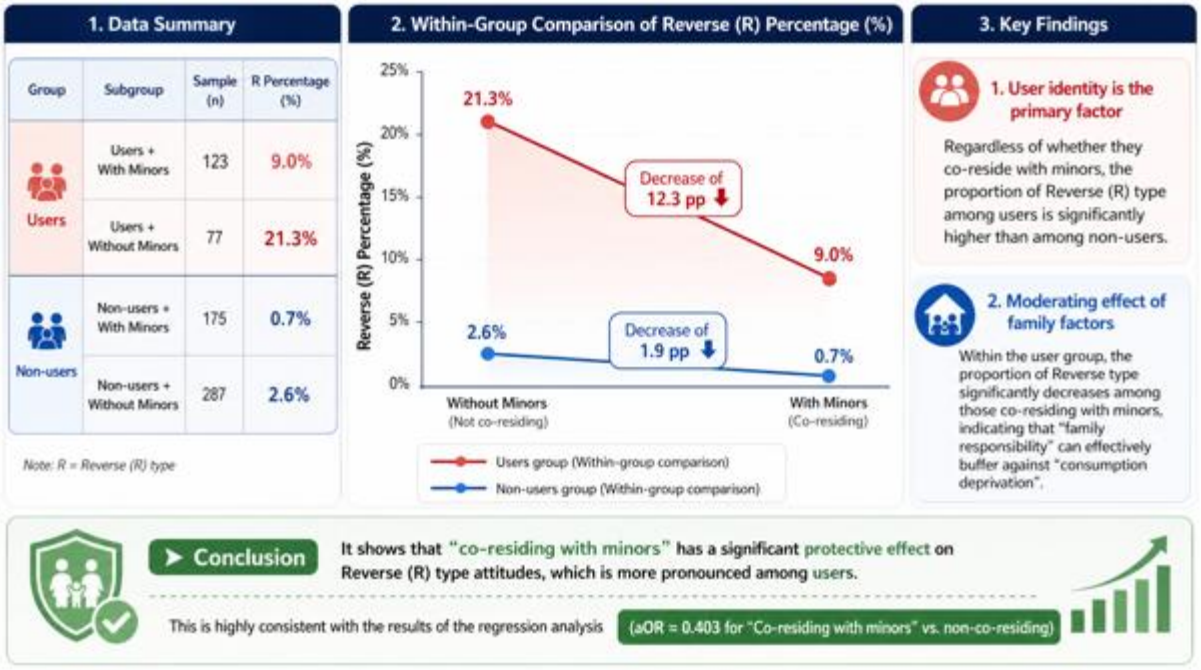


Figure 5 Interaction Effect of "User Identity" and "Co-residing with Minors" on Reverse (R) Classification

The message content strategy addresses the fundamental question of what to communicate. In the context of tobacco control, commonly adopted content approaches include: (1) emphasizing the health risks associated with smoking (Hammond et al., 2007); (2) highlighting its social and economic costs (Hiilamo et al., 2014); and (3) employing moral framing to construct normative opposition (Yang & Yang, 2023). For instance, health risk–centered messages often rely on epidemiological statistics and graphic imagery to heighten individual risk perception (Hammond et al., 2007). Messages emphasizing social costs underscore the burdens of smoking on family well-being and public resources, aiming to evoke a sense of collective responsibility (Hiilamo et al., 2014). Moral framing approaches frequently focus on issues such as secondhand smoke exposure and tobacco industry manipulation, encouraging audiences to question the legitimacy of smoking behaviours through ethical reflection (Yang & Yang, 2023). For instance, health risk–centered messages often rely on epidemiological statistics and graphic imagery to heighten individual risk perception (Hammond et al., 2007).

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The persuasiveness of a message depends not only on the internal coherence of its argumentative logic but also on its resonance with the lived experiences of the intended audience. For instance, research indicates that adolescents are generally less responsive to warnings about long-term health risks (Latimer et al., 2012). Instead, messages that emphasize the immediate consequences of smoking—such as its effects on appearance, breath, athletic performance, or social image—are more likely to elicit emotional reactions and shape behavioural intentions (Hallfors et al., 2005). Furthermore, studies have found that integrating moral value frameworks, such as the ethics of care or the ethics of purity, can strengthen adolescents' identification with tobacco control norms, fostering internal reflection and promoting greater self-regulation of smoking behaviours (Yang & Yang, 2023).

By contrast, the message execution strategy focuses on how to communicate. This involves selecting appropriate information channels, scheduling dissemination effectively, and making stylistic decisions regarding both visual and linguistic presentation. Execution is not merely a technical extension of content design; rather, it plays a pivotal role in determining whether messages enter the audience's perceptual field, are cognitively processed, and ultimately retained (Noar et al., 2016). Even well-crafted content may lose its persuasive power if the mode of delivery fails to align with the audience's expectations and media consumption habits. Zhao cited the U.S. "Truth" campaign as an exemplary case of synergy between message content and execution strategy. Rather than relying on fear appeals, the campaign strategically exposed how tobacco companies manipulated youth consumer psychology, thereby provoking scepticism and resistance among adolescents (Farrelly et al., 2005). On the execution side, it employed live-action storytelling, rapid editing, and visually arresting imagery, while deliberately avoiding didactic or patronizing language (Farrelly et al., 2009). This approach created a communication style that appeared youth-driven, reinforcing both authenticity and emotional identification. The convergence of content intent and execution design enabled the campaign to build a foundation of trust and affective resonance among young audiences, ultimately contributing to a significant decline in youth smoking rates over a decade (Farrelly et al., 2005). It is widely regarded as a benchmark case in integrated tobacco control communication.

In applied contexts, the effectiveness of communication strategies often hinges on the degree of alignment between message content and its mode of execution. For instance, among older rural populations, channels such as radio broadcasts, village bulletin boards, and in-person health talks tend to be more effective due to their immediacy and accessibility. In contrast, for urban youth, short-form video platforms, popular culture references, and interactive formats are more likely to attract attention and encourage engagement. Moreover, highly educated audiences typically place greater value on logical coherence and data transparency, whereas general audiences may respond more strongly to vivid, concrete, and emotionally resonant messages. Ultimately, the impact of communication on behavioural decision-making depends not only on message validity, but—more critically—on whether the delivery format aligns with the audience's cognitive schemas and media consumption habits.

Discussion

A Two-Tier Policy Structure of Core Priorities and Optimization and Adjustment

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The four-quadrant analysis and the multidimensional feature integration plot jointly revealed a two-tier structure in public policy expectations. Age verification (K1), mandatory standards and review (K5), and packaging warnings (K6) constituted the core priority tier. All three attributes were characterized by both high gains in satisfaction and high risks of dissatisfaction. K1 was dominated by the must-be category, reflecting its role as a fundamental safeguard against minors' access to e-cigarettes. K5 was dominated by the one-dimensional category, indicating that the public expected product standards to be "the stricter, the better." Although K6 was classified as a must-be attribute under the Kano framework, its Better–Worse coefficients placed it in the core priority area, indicating that packaging warnings have an important influence on overall satisfaction.

Online sales restrictions (K2), advertising and marketing restrictions (K3), and restrictions on flavored e-cigarettes (K4) fell within the optimization and adjustment area. K2 may have had a relatively limited marginal effect because of perceived constraints on its implementation feasibility. K3 may have had limited public salience because its effects are indirect, whereas K4 was associated with pronounced between-group differentiation. This structure suggests that, from the perspective of public evaluative reactions, policy implementation might first consolidate the core priority tier and then progressively optimize and adjust the second tier according to the level of social acceptance. Although the three attributes in the core priority tier differed in their Kano classifications, they shared a common Better–Worse pattern of "high Better and high |Worse|." Although the three attributes in the core priority tier differed in their Kano classifications, they shared a common Better–Worse pattern of "high Better and high |Worse|."

Mechanisms Underlying Group Differentiation in Policies Restricting Flavored E-Cigarettes

Restrictions on flavored e-cigarettes exhibited the largest between-group difference (Cramér's V = 0.38). Most nonusers regarded this attribute as indifferent, whereas users showed substantial internal differentiation: a considerable proportion strongly opposed the restriction and were classified in the reverse category, while others regarded it as an unexpected benefit and were classified in the attractive category. The multinomial logistic regression results further confirmed that current-user status increased the likelihood of classification in both the A and R categories, whereas living with minors was associated with a greater likelihood of classification in the must-be category and a lower likelihood of classification in the reverse category. These findings indicate that resistance to a flavored e-cigarette ban primarily originates from specific subgroups rather than from uniform opposition among users. A one-size-fits-all ban may provoke strong resistance, and differentiated communication and transitional arrangements may therefore represent more appropriate strategies. This study did not measure conventional cigarette use, dual use, or nicotine dependence. These factors may represent important dimensions for explaining heterogeneity among users and warrant further investigation.

Differences in Perceptions of Institutional Safeguard Policies

K5 was the only attribute dominated by the one-dimensional category and showing no statistically significant between-group difference. This finding indicates consistent recognition of product standards and review across groups, with the public tending to regard them as a linear determinant of satisfaction for which "the stricter, the better." Its highest Better and |Worse| coefficients suggest that improving product standards can effectively increase satisfaction, while inadequate standards may also generate dissatisfaction, thereby producing a "double-edged sword" effect. K3 fell within both the indifferent category and the optimization and adjustment

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area. This result may be related to the public's indirect perception of advertising and marketing restrictions, whose importance has not yet been fully recognized.

Research Contributions and Limitations

This study is the first to apply the Kano model to research on public expectations regarding e-cigarette policies. By adopting the perspective of asymmetric satisfaction, it revealed a tiered structure that extends beyond conventional policy-support scores. The complementary use of four-quadrant analysis and Kano classification, together with the design of the multidimensional feature integration plot, provides a new tool for prioritizing policies. This study nevertheless has several limitations. First, the Kano model was originally developed within the context of product and service quality; its application to public-policy evaluation remains exploratory. Although the present study interprets the Kano responses as evaluative reactions to hypothetical policy presence and absence rather than as consumer satisfaction, formal psychometric validation of the Kano items against established measures of policy support and normative approval was not conducted. Future research should examine the convergent and discriminant validity of Kano-based classifications in policy contexts. Second, the six policy attributes do not exhaustively cover all domains of e-cigarette regulation in China. Taxation, reporting and notification, and clean-air restrictions were not included because they are either less comprehensively implemented or judged to be less salient to the public. Future research should examine these domains separately. Third, online convenience sampling may have affected sample representativeness, particularly because older adults, individuals with lower levels of education, and rural residents were underrepresented. Fourth, the cross-sectional design precludes causal inference. Fifth, potential influencing factors such as conventional cigarette use and nicotine dependence were not measured. Sixth, the frequencies of the R category were sparse for some attributes. Future studies could address these limitations by incorporating longitudinal designs, probability sampling, and more refined measures of use behavior.

Policy Implications

Based on the findings above, three recommendations are proposed. First, age verification, product standards and review, and packaging warnings should be prioritized and continuously strengthened because these three core policies constitute the foundation of public trust. Second, online sales restrictions, advertising restrictions, and restrictions on flavored e-cigarettes should be progressively optimized and accompanied by differentiated communication based on group feedback, after the core policies have been firmly established. Third, given the pronounced group differentiation surrounding restrictions on flavored e-cigarettes, reasonable transition periods and alternatives could be considered for adult users to reduce policy resistance, while protection against the appeal of flavored e-cigarettes among adolescents should be strengthened.

Conclusion

This study applied the Kano model to quantitatively analyze expectations regarding e-cigarette policies among adult respondents in a Chinese online sample. The principal findings were as follows. First, the four-quadrant analysis divided the six policy attributes into a core priority group (K1, K5, and K6) and an optimization and adjustment group (K2, K3, and K4). Kano classification further revealed a three-part pattern characterized by must-be-dominant, one-dimensional-dominant, and indifferent-dominant attributes. These two perspectives complemented each other and provided a multidimensional characterization of public policy expectations. Second, the |Worse| coefficient for every attribute was markedly higher than its

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Better coefficient, reflecting a general pattern of loss aversion. Third, restrictions on flavored e-cigarettes showed the largest difference between users and nonusers, and use status was an important factor associated with differences in classification. These findings provide empirical evidence for the more refined design of e-cigarette regulatory policies.

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Ethics Approval and Informed Consent:

This study was approved by the institutional ethics committee. All respondents provided electronic informed consent.

Competing interests

The author(s) declared no competing interests.

Data Availability

The raw data are available from the corresponding author upon reasonable request.

Supplementary Table S1. Comparison of Kano Classifications Under Standard and Modified Matrices

Attribute	Matrix	M%	A%	O%	I%	R%	Q%	Better	Worse
K1	Standard	47.7	1.5	44.1	6.7	0.0	0.0	0.456	−0.918
K1	Modified	47.7	1.5	44.1	6.7	0.0	0.0	0.456	−0.918
K2	Standard	41.6	2.9	28.5	26.1	0.8	0.1	0.316	−0.708
K2	Modified	41.7	2.9	28.6	26.0	0.8	0.0	0.317	−0.709
K3	Standard	33.5	2.5	25.7	35.1	2.8	0.4	0.292	−0.611
K3	Modified	33.7	2.6	25.9	35.0	2.8	0.0	0.294	−0.613
K4	Standard	26.2	5.3	22.6	39.4	5.7	0.8	0.298	−0.520
K4	Modified	26.5	5.5	22.9	39.4	5.7	0.0	0.301	−0.524
K5	Standard	45.5	1.0	46.7	6.8	0.0	0.0	0.477	−0.922
K5	Modified	45.5	1.0	46.7	6.8	0.0	0.0	0.477	−0.922
K6	Standard	45.3	2.5	35.3	16.7	0.1	0.1	0.378	−0.807
K6	Modified	45.4	2.5	35.4	16.6	0.1	0.0	0.379	−0.808

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Autonomy Support and Perceived Agency in AI Chatbots: Motivational and Social Pathways in Health Communication

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Abstract

As AI health chatbots become increasingly prevalent, the psychological processes underlying users' behavioral alignment remain insufficiently understood. Drawing on Self-Determination Theory and the Computers Are Social Actors paradigm, this study examines a decomposed specification of the TIME-HAII action route, comprising motivational and social pathways in health communication. Data were collected and analyzed using a multi-method design integrating self-report measures and behavioral indicators. The findings provide robust support for the motivational pathway through indirect associations, while evidence for the social pathway was more limited. Within the motivational pathway, perceived chatbot autonomy support was positively associated with perceived autonomy and self-efficacy, which sequentially mediated its association with interactional behavioral alignment. Within the social pathway, perceived chatbot agency was associated with interactional behavioral alignment through perceived presence. Overall, The findings advance theoretical understanding of human-AI interaction in health communication contexts and offer evidence-based design implications for AI-driven health systems.

Keywords: AI chatbots; human-AI interaction(HAII); motivation; social; health communication

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Introduction

Artificial intelligence (AI) technologies are increasingly taking over health communication roles once reserved for professionals, transforming how people access and use health information (Bickmore & Picard, 2005; Liu et al., 2025). Within this broader transformation, health chatbots have emerged as a particularly consequential technological development, offering scalable, on-demand, and personalized health advice to populations that would otherwise face significant barriers to accessing professional care (Laranjo et al., 2018). These developments hold particular salience in contexts marked by structural inequalities in health resource distribution, most notably in China (Jiang et al., 2021).

Early health information technologies often followed a paternalistic model, delivering standardized content to users with limited attention to individual preferences, literacy, or motivation (Eysenbach, 2000). This model reflected broader asymmetries of knowledge and authority in health communication, while offering limited space for user autonomy (Nassehi et al., 2024). In contrast, a growing body of research has shown that autonomy is central to sustained health behavior change and well-being (Deci & Ryan, 2000; Mackert et al., 2016; Ryan, 1995). These insights have encouraged the development of autonomy-supportive health technologies that rely on personalization, adaptive dialogue, and user control to position users as active participants rather than passive recipients (Laranjo et al., 2018; Singh et al., 2023).

Nevertheless, empirical evidence regarding chatbot effectiveness remains inconsistent. While some studies report gains in health knowledge, self-management, and health behavior change, others identify negligible or adverse effects, especially among digitally vulnerable populations (Rafikova & Voronin, 2025). These mixed findings point to the need for more systematic investigation of the psychological mechanisms underlying human–AI interaction (HAII). Within the TIME-HAII model (Sundar, 2020), AI influence is commonly explained through cue and action routes (Hancock et al., 2020). Existing research has focused primarily on the cue route, examining how interface signals and algorithmic cues shape user perceptions, expectations, and trust (Lee et al., 2023; Waddell, 2019). The action route, which concerns users' active engagement with AI systems, remains less developed. Its internal psychological processes are still under-theorized and under-tested, leaving the action route a conceptual "black box" in HAII research (Raees et al., 2024; Shneiderman, 2020).

The present study seeks to address these deficiencies through a theoretically grounded empirical investigation of autonomy-supportive communication in AI health chatbots. Drawing on Self-Determination Theory (Ryan & Deci, 2002) and the Computers Are Social Actors paradigm (Nass & Moon, 2000), this study examines two complementary mechanisms of the TIME-HAII action route through which AI-mediated interaction may be associated with interactional behavioral alignment. One is a motivational pathway, through which autonomy-supportive human-AI interaction interfaces enhance individuals' perceived sense of autonomy and self-efficacy, thereby serving as a catalyst for interactional behavior (Ng et al., 2012; Pham & Duong, 2025). The other is a social pathway, through which socially embedded conversational agent cues cultivate perceptions of social presence and interpersonal support, consequently facilitating and sustaining continued interactional behavior (Al-Oraini, 2025). By examining these pathways in tandem, the study aims to understand

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the psychological mechanisms underlying the action route and to inform the design of AI health systems that meaningfully support user autonomy.

Theoretical Framework

AI health communication has moved from expert-driven systems toward conversational platforms that offer natural language exchange, adaptive dialogue, and personalized responsiveness (Hunt et al., 1998; Laranjo et al., 2018). Although these systems may expand informational access, scholars caution that opaque algorithmic architectures and commercial imperatives can still constrain user autonomy (Eysenbach, 2000; Garg et al., 2005; Kumar et al., 2013). In AI-powered health chatbots, this tension is especially consequential: greater conversational sophistication may improve engagement, but it may also intensify users' reliance on machine-generated advice through mechanisms such as the "machine heuristic" (Sundar, 2020). Given the variable effectiveness of conversational agents across physical activity, dietary behavior, and mental health domains (Laranjo et al., 2018; Li et al., 2023), this study examines the psychological mechanisms through which chatbot affordances are associated with health-related interactional behavior.

The study is grounded in the input–mechanism–output framework advanced by Chib and Lin (2018), which links technological features of digital health tools to behavioral outcomes through psychological mechanisms. As depicted in Figure 1, the framework is adapted to connect chatbot affordances with observable interaction behavior through motivational and social pathways.

At the input level, the framework incorporates two perceived affordances of AI health chatbots: autonomy support and perceived agency. Autonomy support refers to the extent to which the chatbot facilitates user volition and avoids controlling communication, whereas perceived agency refers to the perceived capacity of the chatbot to independently organize, regulate, and direct its responses in ways that appear intentional and goal-directed (Deci & Ryan, 1985; Ng et al., 2012; Wegner, 2004).

At the mechanism level, the motivational pathway draws on Self-Determination Theory through perceived autonomy and self-efficacy, whereas the social pathway draws on the Computers Are Social Actors through perceived presence and perceived support (Nass & Moon, 2000; Ryan & Deci, 2002).

At the output level, observable interaction behavior represents the behavioral manifestation of the action route, indicating whether users' active configuration choices are retained in the chatbot's terminal state.

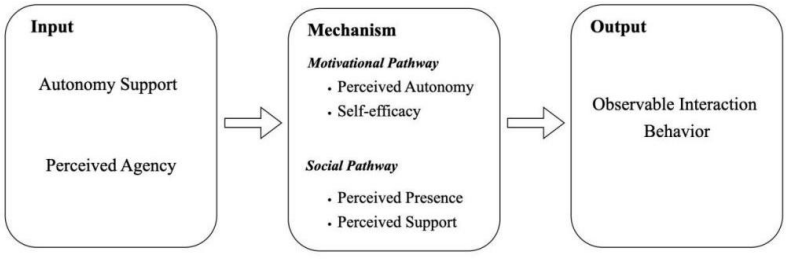


Figure 1 Conceptual Framework

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The Motivational Pathway: Self-Determination Theory (SDT)

SDT provides the motivational foundation for the present study (Deci & Ryan, 1985, 2000). The theory identifies autonomy, competence, and relatedness as basic psychological needs, with autonomy referring to the experience of acting with volition rather than under external pressure. In health contexts, autonomy-supportive environments are associated with more self-determined motivation, greater perceived competence, and improved behavioral outcomes (Chen et al., 2015; Ng et al., 2012). This makes SDT particularly useful for theorizing how AI health chatbots may support users' internal motivational resources.

A key SDT claim is that autonomy support facilitates internalization by providing meaningful choice, non-pressuring rationale, and acknowledgment of the individual's perspective (Williams et al., 1996, 2004, 2006). In health communication, this process suggests that users are more likely to engage with recommended behaviors when they experience the interaction as aligned with their own goals and values rather than as externally imposed.

The present study theorizes that structurally parallel processes operate within AI-mediated health contexts. Chatbot-provided autonomy support is expected to generate perceived autonomy, which activates autonomous motivational regulation, deepens engagement, and ultimately strengthens health self-efficacy. Self-efficacy, defined by Bandura (1977) as an individual's domain-specific belief in their capacity to execute behavior successfully, is theorized to be enhanced through chatbot-facilitated mastery experiences, modeled behaviors, and progress feedback. The convergence of SDT's internalization mechanism with Bandura's self-efficacy construct provides a coherent theoretical basis for the proposed model.

Recent digital health evidence supports this extension, with research linking psychological need satisfaction and autonomous motivation to positive health outcomes (Ng et al., 2012), and identifying self-efficacy as a key internal motivational process shaped by personal and environmental factors that drives choice, effort, persistence, and achievement (Schunk & DiBenedetto, 2021). Collectively, these findings are consistent with the following hypotheses:

H1: Autonomy support is positively associated with perceived autonomy.
H2: Autonomy support is positively associated with self-efficacy.
H3: Autonomy support is positively associated with observable interaction behavior.
H4: Autonomy support is indirectly associated with observable interaction behavior through a sequential pathway from perceived autonomy to self-efficacy.

The Social Pathway: The CASA Paradigm and Artificial Sociality

The Computers Are Social Actors (CASA) paradigm provides the theoretical foundation for understanding the relational dimension of human-chatbot interaction. Originally proposed by Nass et al. (1994) and consolidated in Reeves and Nass's (1996) media equation thesis, the CASA paradigm has been substantially refined over time. More recently, Go and Sundar (2019) and Glikson and Woolley (2020) have extended the CASA paradigm to AI-driven conversational agents, incorporating affordances such as natural language processing and affective computing.

Building on CASA, the present study conceptualizes chatbot agency as an interactional affordance, referring to the perceived capacity of a chatbot to regulate,

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organize, and direct its responses in ways that appear intentional and goal-directed. At the user level, this affordance is captured by perceived agency, defined as the extent to which users perceive the chatbot as capable of self-regulated, intentional, and organized action. Perceived agency does not imply consciousness or actual autonomy; rather, it reflects users' interpretation of chatbot behavior as generated and organized by an agent. This conceptualization distinguishes perceived agency from broader anthropomorphism and from generalized attributions of mental capacity (Wegner et al., 2004; Gray et al., 2007; Gray & Wegner, 2012).

In this study, perceived agency refers to the subjective sense that the chatbot is a meaningful social entity (Lombard & Ditton, 1997). Because agentic behavior provides a denser array of social cues, it intensifies the user's experience of genuine social interaction (Go & Sundar, 2019). Perceived presence, in turn, facilitates perceived support, defined following House (1987) as the user's perception that the chatbot provides informational, emotional, and appraisal resources functionally equivalent to those of human relationships. Studies confirm that emotionally responsive and informationally competent chatbots generate social support perceptions comparable to human providers (Lee & Hahn, 2024). These social perceptions may manifest in observable interaction behavior, reflecting the consistency between users' active chatbot configuration choices and their final chatbot configurations. Hence, we posit:

H5: Perceived agency is positively associated with perceived presence.
H6: Perceived agency is positively associated with perceived support.
H7: Perceived agency is positively associated with observable interaction behavior.
H8: Perceived agency is indirectly associated with observable interaction behavior through a sequential pathway from perceived presence to perceived support.

Methodology

Participants and Procedure

Participants were recruited from the active user base of EasyHealth AI (www.easyhealth-ai.com), a Chinese AI-powered health communication application that incorporates health incentive prompts within its initialization interface. Research invitations were disseminated to registered users of EasyHealth AI via in-application push notifications, with recruitment commencing on August 1, 2025. Of the 1,100 individuals who provided informed consent to participate, 613 completed the pre-survey, which included a demographic questionnaire assessing background characteristics. Following completion of the demographic questionnaire, 600 participants proceeded to interact with the AI chatbot, constituting the first behavioral observation point.

Of the 600 participants who proceeded to the chatbot interaction stage, 409 completed the post-survey and had corresponding behavioral trace data available for analysis, yielding a final analytic sample of 409 participants (68.2% retention). The post-survey assessed participants' perceptions of their ongoing chatbot interactions, including attitudes, beliefs, and experiential evaluations. The remaining 191 participants were excluded because the required behavioral trace data were unavailable.

Participants were observed for three months following enrollment. Behavioral trace data were collected throughout the observation period, although most participants completed the required chatbot interactions and post-survey within the first month. The broader study protocol comprised three components: (1) behavioral observation

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following entry into the chatbot interaction stage, (2) a post-interaction survey assessing participants' perceptions, and (3) behavioral trace collection during the three-month observation period. The present study uses only a subset of these data. Final sample inclusion was based on completion of the required procedures and availability of complete, analyzable data. A participant flow diagram is shown in Figure 2.

Among the 409 participants, 57.2% were male. Participants' ages ranged from under 18 to over 60 years, with the largest proportion (49.1%) falling within the 18–25 age group. More than half of the sample (55.7%) reported holding a bachelor's degree or higher. Additionally, 52.1% of participants had a professional background in the health-related sector. A substantial majority (75.1%) resided in urban areas. Regarding annual personal income, 41.1% of participants reported earning less than 30,000 CNY, 45.2% earned between 30,000 and 100,000 CNY, and 13.7% earned more than 100,000 CNY (see Table 1).

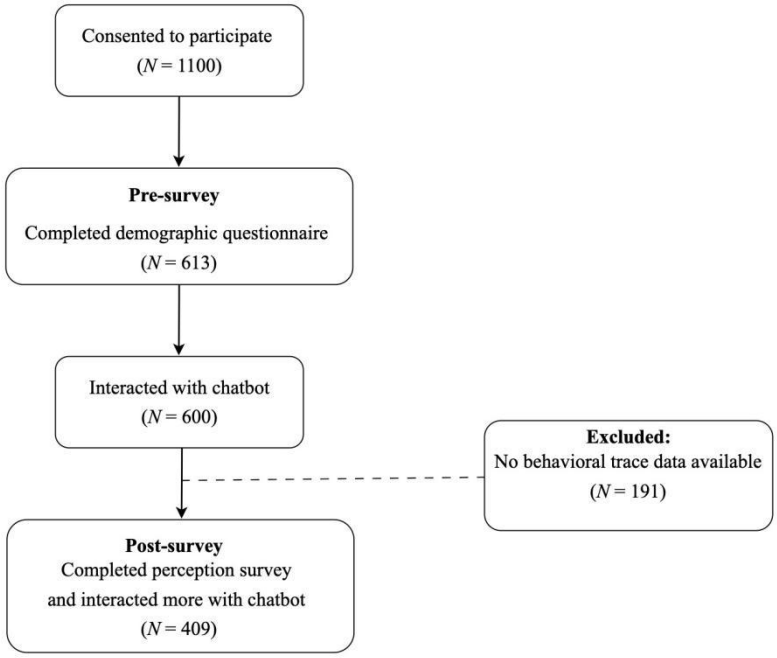


Figure 2 Study Procedure

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Table 1 Sociodemographic characteristics of participants (N = 409)

	Category	Percentage
Gender		
	male	57.2%
	female	42.8%
Age (years old)		
	below 18	2.2%
	18-25	49.1%
	26-35	36.9%
	36-45	9.3%
	46-59	1.5%
	Above 60	1.0%
Education		
	High school or below	17.6%
	Some college/technical school	26.7%
	College graduate or higher	55.7%
Professional Background		
	others	47.9%
	Health-related professionals	52.1%
Residential Location		
	Urban	75.1%
	Rural	24.9%
Income		
	less than 30,000 CNY	41.1%
	30,000–100,000 CNY	45.2%
	More than 10,000 CNY	13.7%

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Measures

The present study employed a multi-method measurement design, integrating self-report survey instruments with behavioral indicators. All self-report constructs were operationalized using five-point Likert-type scales (1 = strongly disagree, 5 = strongly agree), with items adapted from previously validated instruments as detailed below and in Table 2. Construct reliability and validity were subsequently evaluated (Table 2; Hair et al., 2019), and discriminant validity was assessed using the heterotrait–monotrait (HTMT) ratio of correlations (Table 3).

Perceived Agency: Following Wegner et al.'s (2004) conceptualization of agency as the perceived capacity to act autonomously and causally, perceived agency was operationalized at the user level as the extent to which users perceive a chatbot as capable of self-regulated, intentional, and organized action. The construct reflects users' interpretations of chatbot behavior as generated and organized by an agent and does not imply consciousness or actual autonomy. The construct was measured reflectively using five indicators adapted from established measures of perceived mental capacity and agency (Gray et al., 2007; Gray & Wegner, 2012). The indicators assessed the chatbot's perceived ability to regulate its reactions, make and implement judgments, express internally organized thoughts or emotions, think, and respond in a planned manner. Collectively, these indicators capture users' perceptions of the chatbot's capacity to independently organize and regulate its behavior during interaction, rather than anthropomorphism or general mind perception. The scale demonstrated acceptable internal consistency ($M = 3.96$, $SD = 0.75$; Cronbach's $\alpha = 0.752$).

Autonomy Support: Grounded in SDT (Deci & Ryan, 2000), autonomy support was operationalized as users' perceived sense of volition and choice within the chatbot interaction environment, measured via three items. The scale demonstrated acceptable internal consistency ($M = 4.17$, $SD = 0.71$; Cronbach's $\alpha = 0.702$), with higher scores reflecting a stronger sense of having options and freedom in interacting with the chatbot.

Perceived Presence: We operationalized perceived presence drawing on Lombard and Ditton's (1997) social presence framework, which conceptualizes perceived presence as the experiential quality of mediated interaction, specifically the subjective sense of "being there with" another agent rather than merely engaging with system outputs. Three items captured distinct but interrelated facets of this construct: sociability, communicative engagement, and interactional responsiveness. Internal consistency for this scale was acceptable ($M = 4.09$, $SD = 0.87$; Cronbach's $\alpha = 0.809$).

Perceived Autonomy: This construct was defined as users' subjective experience of self-determination during chatbot interactions, reflecting the extent to which health-related interaction behaviors were perceived as self-endorsed and congruent with their internalized values and goals, rather than externally imposed (Ryan & Deci, 2006). Three items were adapted from the Health Care Climate Questionnaire (HCCQ; Williams et al., 1996) and reworded to reflect AI-mediated health communication contexts, capturing perceived self-initiation, values congruence, and volitional willingness ($M = 4.20$, $SD = 0.71$; Cronbach's $\alpha = 0.715$)

Perceived Support: Grounded in House's (1987) conceptualization, perceived support was operationalized as users' appraisals that the AI chatbot provides communicative resources functionally analogous to those exchanged in supportive human relationships. Seven items were adapted from the Online Social Support Scale (Nick et al., 2018) and reworded to reflect AI-mediated health communication contexts,

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tapping emotional support and social companionship dimensions (M = 4.07, SD = 0.66; Cronbach's α = 0.817).

Self-Efficacy: This construct was operationalized as users' confidence in their capability to successfully execute a designated configuration behavior relevant to the chatbot interaction context, based on Bandura's (2006) social cognitive theory. Three items were adapted from validated configuration behavior self-efficacy scales, targeting three distinct dimensions: capability belief, persistence under difficulty, and obstacle management. Internal consistency was acceptable (M = 4.13, SD = 0.73; Cronbach's α = 0.716), supporting the reliability of the scale.

Behavioral Alignment Score (BAS): Observable interaction behavior was operationalized as the Behavioral Alignment Score (BAS), a proximal behavioral manifestation of the action route reflecting whether users' active configuration choices were retained in the chatbot's terminal state.

Easyhealth-AI offered five configurable features: (1) customizable chatbot response settings, (2) integrated user health profiles, (3) transparent algorithmic reasoning displays, (4) chat record management, and (5) personalized chatbot tone settings. Each feature had two configuration states and could be actively modified no more than once per interaction. For each feature, an active modification was treated as an observable expression of the user's configuration preference. An alignment indicator was coded 1 if the state selected through the active modification was retained in the terminal configuration and 0 otherwise. Participants who did not actively modify any feature were excluded during data cleaning because BAS requires an observable configuration action. The five feature-level indicators were summed to yield a BAS ranging from 0 to 5, with higher scores indicating that more active configuration choices were retained in the terminal chatbot configuration. BAS was treated as a behavioral composite index rather than a reflective psychometric scale because the indicators represent distinct configuration opportunities rather than interchangeable manifestations of a latent construct. Indicators were equally weighted because each represented a single configuration opportunity and there was no theoretical basis for differential weighting.

Data Analysis

Preliminary analyses were conducted to determine which variables to include as covariates. Zero-order correlation analyses revealed that participant education level, professional background, and income were significantly associated with at least one focal study variable and were therefore included as covariates (see Table 4); these variables were therefore included as covariates in the subsequent analyses.

Structural equation modeling (SEM) was used for hypothesis testing, using the sem package in Stata 17. The indirect effects were assessed using 5,000 bootstrapped samples and bias-corrected 95% confidence intervals (Hayes & Scharkow, 2013), with mediation considered significant when the confidence intervals excluded zero. To ensure the robustness of the models, multicollinearity diagnostics were conducted prior to model estimation. Variance inflation factors (VIFs), obtained from auxiliary regression analyses, were all below the commonly accepted threshold of 5 (all VIFs < 2.5).

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Table 2 *Measurement Items and Scale Reliability*

Variables	Items	Loading	Cronbach's	CR	AVE
Perceived Agency (Wegner, 2004)	The chatbot can control its own reactions.	0.687	0.752	0.771	0.460
	The chatbot can distinguish right from wrong and take the correct actions.	0.732			
	The chatbot can express thoughts or emotions to me.	0.615			
	The chatbot is capable of thinking.	0.687			
Autonomy Support (Deci & Ryan, 2000)	The chatbot responds to me in a planned manner.	0.664	0.702	0.718	0.529
	I feel that the chatbot provides me with choices and options.	0.717			
	The chatbot believes that I am capable of making choices.	0.737			
	The chatbot understands my perspective before offering suggestions.	0.728			
Perceived Presence (Lombard & Ditton, 1997)	Interacting with the chatbot feels like communicating with a real person.	0.741	0.809	0.791	0.635
	The chatbot seems to pay close attention to what I say.	0.787			
	The chatbot's responses make me feel like I am engaged in a real conversation.	0.858			
Perceived Autonomy (Ryan & Deci, 2006; Williams et al., 1996)	I believe I have the choice to decide whether to engage with the chatbot.	0.819	0.715	0.722	0.542
	I feel that the choices I make during interactions with the chatbot are truly my own.	0.648			
	I engage with the chatbot because I choose to do so voluntarily.	0.731			
Perceived Support (House, 1987; Nick et al., 2018)	The chatbot seems to care about me.	0.696	0.817	0.820	0.452
	The chatbot makes me feel good about myself.	0.603			
	The chatbot encourages me during interactions.	0.722			
	I can receive emotional help and support from the chatbot.	0.679			
	I can share both positive and negative health experiences with the chatbot.	0.603			
Self-efficacy (Bandura, 2006)	During interactions, the chatbot seems to understand my situation.	0.733	0.716	0.729	0.542
	During interactions, the chatbot expresses liking for what I say or do.	0.655			
	I am confident in my ability to improve my health through interactions with the chatbot.	0.669			
	Even when faced with challenges, I believe I can successfully address health-related problems with the	0.755			
	I am confident in my ability to manage health-related obstacles following my interactions with the chatbot.	0.780			

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Table 3 *Heterotrait–Monotrait Ratios (HTMT) for Assessing Discriminant Validity*

	Perceived Agency	Autonomy Support	Perceived Presence	Perceived Autonomy	Perceived Support	Self-efficacy
Perceived Agency	—	0.736	0.676	0.566	0.686	0.723
Autonomy Support		—	0.671	0.661	0.757	0.714
Perceived Presence			—	0.362	0.547	0.547
Perceived Autonomy				—	0.785	0.576
Perceived Support					—	0.579
Self-efficacy						—

Note. Values represent HTMT ratios. All HTMT ratios were below the conservative threshold of .85, supporting discriminant validity.

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Table 4 *Zero-order Correlations Among Main Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Gender	—												
2. Age	-0.005	—											
3. Education	0.254***	-0.026	—										
4. Professional Background	0.187***	0.016	0.072	—									
5. Residential Location	-0.064	0.001	-0.236***	0.021	—								
6. Income	-0.029	0.193***	0.086	-0.031	-0.054	—							
7. Perceived Agency	0.061	0.079	0.044	-0.075	0.039	0.037	—						
8. Autonomy Support	0.024	0.032	-0.01	-0.048	0.017	0.061	0.535***	—					
9. Perceived Presence	-0.043	0.089	-0.063	-0.226***	0.088	0.026	0.532***	0.506***	—				
10. Perceived Autonomy	-0.008	0.051	0.046	0.015	0.021	0.013	0.410***	0.467***	0.280***	—			
11. Perceived Support	0.038	0.096	-0.019	-0.124*	-0.013	0.116*	0.538***	0.574***	0.447***	0.598***	—		
12. Self-efficacy	***0.066***	***0.081***	***0.103****	***-0.058***	***-0.02***	***0.037***	***0.524*****	***0.507*****	***0.415*****	***0.413*****	***0.441*****	—	
13. Behavioral Alignment Score	***0.005***	***0.011***	***-0.002***	***-0.178*****	***0.085***	***0.053***	***0.227****	***0.141****	***0.223*****	***0.009***	***0.09***	***0.159****	—

Note. Gender (0 = male, 1 = female); professional background (0 = other, 1 = health-related); residential location (0 = urban, 1 = rural).
**p < .05; **p < .01; ***p < .001*

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Table 5 *Indirect Effects and 95% Bootstrapped Confidence Intervals*

Pathways	*Effects*	*BootSE*	*BC 95% CI*
Autonomy Support→ Perceived Autonomy→ BAS	-0.063	0.037	[-0.139, 0.005]
Autonomy Support→ Self-efficacy→ BAS	0.076	0.038	**[0.013, 0.162]**
Autonomy Support→ Perceived Autonomy→ Self-efficacy→ BAS	0.019	0.011	**[0.004, 0.049]**
Perceived Agency→ Perceived Presence→ BAS	0.111	0.044	**[0.034, 0.204]**
Perceived Agency→ Perceived Support→ BAS	-0.045	0.033	[-0.115, 0.014]
Perceived Agency→ Perceived Presence→ Perceived Support→ BAS	-0.012	0.010	[-0.038, 0.002]

Note. Unstandardized estimates, bootstrapped standard errors, and bias-corrected confidence intervals were obtained from path analyses based on 5,000 bootstrap samples.

Results

Preliminary Analyses

Construct reliability and validity were subsequently assessed (Table 2). Composite reliability (CR) values ranged from .718 to .820 across constructs. Average variance extracted (AVE) values ranged from .452 to .635 across constructs: perceived agency (CR = .771, AVE = .460), autonomy support (CR = .718, AVE = .529), perceived presence (CR = .791, AVE = .635), perceived autonomy (CR = .722, AVE = .542), perceived support (CR = .820, AVE = .452), and self-efficacy (CR = .729, AVE = .542). Although the AVE values for perceived agency and perceived support were slightly below the conventional .50 threshold, their CR values indicated acceptable reliability. All pairwise HTMT values were below the conservative .85 threshold, indicating no problematic construct overlap (Table 3). Overall, the results provide adequate evidence of internal consistency and discriminant validity, supporting the empirical distinctiveness of the study constructs.

Behavioral trace data further described participants' human–chatbot interaction patterns. The mean session duration was 3.1 minutes, and the mean cumulative interaction time was 9.9 minutes per participant. On average, participants interacted with the chatbot interface six times over approximately one month. Notably, 18.1% of participants showed relatively high engagement, recording more than ten chatbot interactions. For the outcome variable, BAS showed a moderate level of behavioral alignment (M = 3.15, SD = 1.36; scale range: 0–5), with considerable variability across participants.

Table 4 presents the zero-order correlations among the main study variables. Perceived agency, autonomy support, perceived presence, perceived autonomy, perceived support, and self-efficacy were moderately to strongly and positively correlated.

Hypothesis Testing

To test the proposed hypotheses, two serial mediation models were estimated separately, corresponding to the motivational pathway (H1-H4) and the social pathway (H5-H8). Prior to these analyses, an integrated model including all predictors and mediators was also initially specified to examine both pathways simultaneously. Although the bootstrap estimation converged, the integrated model yielded an inadmissible solution, indicating substantial estimation instability and limiting the interpretability of the results. Specifically, the model produced nonsignificant total associations for autonomy support ($\beta = -0.249$, $p = .649$, 95% CI

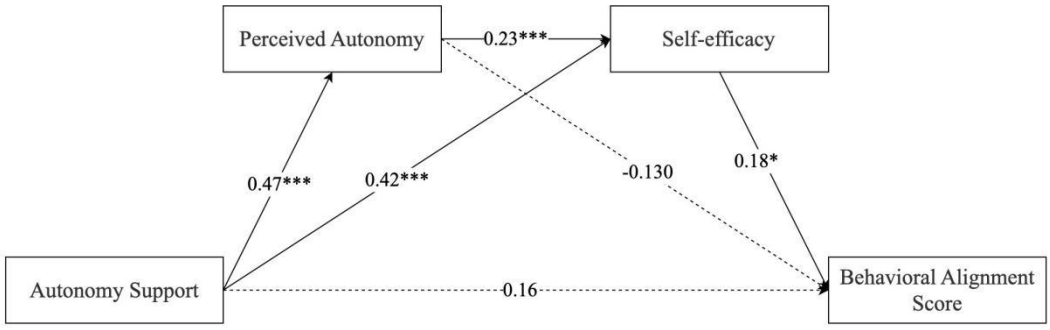
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[−1.587, 0.408]) and perceived agency (β = 0.475, p = .382, 95% CI [−0.100, 1.895]). Given the substantial shared variance among constructs and the resulting estimation instability, the integrated model was not retained for substantive interpretation. The motivational and social pathways were therefore examined separately.

Motivational Pathway

The estimated path model for the motivational path is presented in Figure 3. The model showed a good fit to the data: $\chi^2(4) = 3.391$, p = .495, RMSEA = .000, CFI = 1.000, TLI = 1.007, SRMR = .017. Autonomy support was positively associated with both perceived autonomy (β = 0.47, p < .001) and self-efficacy (β = 0.42, p < .001). However, the direct association between autonomy support and the Behavioral Alignment Score (BAS) was not statistically significant (β = 0.16, p = .060). Thus, H1 and H2 were supported, but H3 was not supported.

Bootstrapping analyses further clarified these indirect mechanisms (see Table 5). Autonomy support had a significant indirect effect on BAS via self-efficacy (indirect effect = 0.076, BootSE = 0.038, BC 95% CI [0.013, 0.162]), as well as a serial indirect effect through perceived autonomy and self-efficacy (indirect effect = 0.019, BootSE = 0.011, BC 95% CI [0.004, 0.049]). These results indicate a significant indirect association between autonomy support and BAS through self-efficacy, as well as a significant sequential mediation by perceived autonomy and self-efficacy. Thus, H4 was supported.



Notes. Standardized coefficients are depicted in the figure. *p < .05, ***p < .001.

Figure 3 Standardized path estimates for the Motivational Pathway

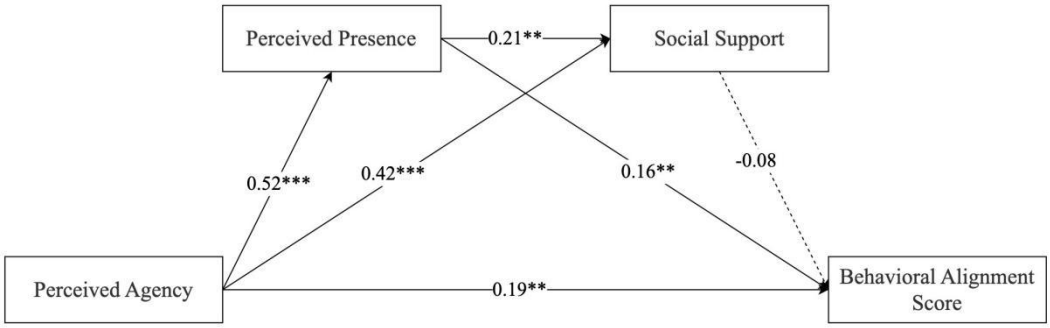
Social Pathway

The estimated path model for the social path is presented in Figure 4. The social pathway model showed an acceptable fit, $\chi^2(3) = 9.96$, p = .019, RMSEA = .075, CFI = .980, TLI = .921, SRMR = .032. Consistent with H5–H7, perceived agency was positively associated with perceived presence (β = 0.52, p < .001), perceived support (β = 0.42, p < .001), and BAS (β = 0.19, p = .002). These findings indicate that higher levels of perceived agency were associated with higher levels of perceived presence, perceived support, and behavioral alignment.

Bootstrapping results showed a statistically significant indirect association between perceived agency and BAS through perceived presence (indirect effect = 0.111, BootSE = 0.044, BC 95% CI [0.034, 0.204]). The indirect association through perceived support was not statistically

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significant (indirect effect = −0.045, BootSE = 0.033, BC 95% CI [−0.115, 0.014]), and neither was the sequential indirect association through perceived presence and perceived support (indirect effect = −0.012, BootSE = 0.010, BC 95% CI [−0.038, 0.002]). These results indicate that perceived agency influences BAS primarily through perceived presence, providing partial support for H8.



Notes. Standardized coefficients were depicted in the figure. *p < .05, ***p < .001.

Figure 4 Standardized path estimates for the Social Pathway

Discussion

Drawing on the input–mechanism–output framework (Chib & Lin, 2018), this study examined two theoretically distinct pathways within a decomposed TIME-HAII action route. Drawing on the input–mechanism–output framework (Chib & Lin, 2018), this study examined two theoretically distinct pathways within a decomposed TIME-HAII action route. In the motivational pathway, perceived chatbot autonomy support was positively associated with perceived autonomy and self-efficacy, but its direct association with BAS was not statistically significant. The association between autonomy support and BAS was instead statistically accounted for by motivational mechanisms, with self-efficacy emerging as the principal mediator and perceived autonomy functioning as an upstream factor in the sequential mediation pathway. In the social pathway, perceived chatbot agency was associated with BAS through social perceptions. Perceived presence was the primary mediator, whereas the hypothesized sequential pathway involving perceived support was not statistically significant. Overall, the findings suggest that the motivational pathway was primarily characterized by self-efficacy, while the social pathway was primarily characterized by perceived presence. These findings carry several theoretical implications for understanding the psychological architecture of the action route in human–AI health communication.

Theoretical Implications

The present study advances theory by unpacking the action route in human–AI health communication. Rather than treating the action route as a unitary mechanism through which technological affordances translate into behavioral outcomes, our findings suggest that it is better understood as a differentiated psychological architecture composed of asymmetric motivational and social processes. This theoretical move helps open the black box of the action route by

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specifying not only whether AI affordances matter, but also how different affordances activate distinct psychological mechanisms that subsequently shape health-related interactional behavior. In this sense, the study contributes to communication theory by showing that the action route may not operate as a single coherent pathway, but as a set of parallel processes driven by distinctive affordance–mechanism linkages.

A central implication concerns the motivational mechanism underlying autonomy-supportive AI. The findings suggest that autonomy support promotes behavioral intention not simply by increasing users' perceived freedom or choice, but by strengthening behavior-specific capability beliefs. Self-efficacy therefore serves as a key motivational bridge between autonomy-supportive interaction and intended health behavior. This pattern is theoretically coherent with self-determination theory, which treats autonomy and competence as distinct but mutually reinforcing psychological needs (Deci & Ryan, 2000). Although self-efficacy is not identical to competence need satisfaction, it can be understood in this context as a behavior-specific capability belief closely related to perceived competence. Prior SDT research has shown that autonomy-supportive environments tend to foster competence-related perceptions and self-determined motivation, and that these motivational processes are consequential for health behavior change (Edmunds et al., 2006; Hagger & Chatzisarantis, 2009; Ntoumanis et al., 2021). Extending this line of work to AI-mediated health communication, the present findings suggest that autonomy-supportive AI may shape behavioral intention by helping users feel not only free to act, but also capable of acting.

The study also refines the social mechanism through which AI agency shapes behavioral intention. The findings suggest that AI agency may influence users less through perceived social support than through the more immediate experience of social presence. This distinction is theoretically important because perceived presence and perceived support capture different layers of social response. Perceived presence reflects an experiential sense that a socially responsive other is available within the interaction, whereas perceived support reflects a more evaluative judgment that the other provides useful emotional, informational, or instrumental resources. This conceptual distinction is consistent with classic accounts of presence as the subjective experience of being with another entity in a mediated environment (Lombard & Ditton, 1997), as well as with social support research that conceptualizes support as an appraisal of available or received relational resources (Thoits, 2011). In the context of AI health chatbots, agentic cues may therefore matter because they make the system feel socially present, attentive, and interactionally responsive, even if users do not necessarily evaluate the system as a substantive source of support.

This distinction contributes to communication theory by suggesting that social influence in human–AI interaction may begin with presence before support. Users may not need to perceive an AI agent as genuinely supportive in an interpersonal sense for the agent to shape their behavioral intentions. Instead, a thinner but psychologically consequential sense of co-presence may be sufficient to activate social responses. The social pathway identified here therefore complicates support-based accounts of digital health communication by showing that the experiential immediacy of social presence may be more central than users' reflective appraisal of support provision. This interpretation also aligns with emerging work on AI-mediated relational processes, which suggests that users may respond to agentic systems as socially meaningful actors even when such systems do not provide support in the same way human partners do (Scherr et al., 2025).

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Practical Implications

Our findings suggest that merely incorporating autonomy-supportive features, such as offering customizable interface options, is insufficient to promote meaningful user engagement. Instead, chatbot design should prioritize enhancing users' self-efficacy, which emerged as the key mechanism driving behavioral alignment. Practically, this can be achieved by embedding structured feedback systems (e.g., progress tracking and reinforcement), providing step-by-step guidance for health-related tasks, and enabling users to actively participate in decision-making processes rather than passively selecting options. Such strategies align with prior research showing that self-efficacy is strengthened through guided, actionable instruction and participatory engagement in health decision-making (Ng et al., 2012; Williams et al., 2006; Yardley et al., 2016). In this sense, effective design should move beyond "allowing choice" toward "supporting competence," ensuring that users feel capable of executing recommended behaviors.

Moreover, the results highlight that perceived presence plays a more critical role than perceived support in shaping user interaction outcomes. This finding offers a more actionable design direction, as perceived presence can be directly enhanced through interface and interaction features. Specifically, chatbots should prioritize responsiveness (e.g., timely and contingent replies), conversational continuity (e.g., maintaining context across turns), and adaptive personalization (e.g., referencing prior interactions). Additional strategies documented in prior literature include using natural language styles, simulating turn-taking dynamics, and incorporating subtle socio-emotional cues that signal attentiveness (Go & Sundar, 2019; Janson, 2023). Together, these features can strengthen users' sense of "being with" the system, thereby fostering sustained engagement even in the absence of perceived emotional support.

Limitations and Future Directions

Despite its contributions, this study has several limitations that suggest directions for future research. First, participant attrition and potential selection bias may limit the generalizability of the findings. Of the 1,100 individuals who initially consented, 409 were retained in the final analytic sample. Because baseline characteristics were not collected for the full consented sample, we could not assess whether retained participants differed systematically from those excluded. Thus, selective retention and data-availability bias cannot be ruled out. Future studies should collect baseline measures for all recruited participants and systematically document attrition and missing behavioral data. Second, the professional background question in the demographic questionnaire employed a binary response format, categorizing participants as either "health-related professionals" or "others," which substantially constrains the granularity of occupational data collected. This dichotomous classification restricted a more nuanced examination of how specific professional backgrounds may differentially shape participants' responses. Third, the motivational and social pathways were modeled separately, which precludes examination of their potential interactions. Future research should adopt integrated and longitudinal designs to capture the dynamic interplay between these mechanisms over time. Fourth, despite integrating behavioral trace and survey data, the observational design precludes firm conclusions about temporal precedence or causality. Experimental and field-based approaches are therefore needed to more rigorously test the proposed action-route mechanisms. Finally, the study focused on Chinese users interacting with a single AI health platform, which may limit cross-cultural and contextual generalizability. Future research should replicate these findings across diverse cultural contexts, AI systems, and healthcare settings.

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In addition, several findings point to important avenues for further inquiry. The non-significant role of perceived social support raises unresolved theoretical questions regarding the conditions under which AI systems can function as meaningful sources of social support. Future research should explore potential boundary conditions, such as user characteristics or interaction contexts, that may moderate this relationship. Finally, although the BAS provides a novel behavioral indicator of human–AI interaction, its relationship with downstream health behaviors and outcomes remains unclear. Further research is needed to establish its predictive validity in relation to concrete health-related outcomes.

Conclusion

This study examined how autonomy-supportive and agentic features of AI health chatbots are associated with users' behavioral alignment. Drawing on the input–mechanism–output framework and a decomposed TIME-HAII action route, the findings suggest two distinct pathways: autonomy support was linked to behavioral alignment primarily through motivational mechanisms, especially self-efficacy, whereas chatbot perceived agency was linked to behavioral alignment primarily through perceived presence. These patterns indicate that the action route may be better understood as a differentiated psychological architecture. The findings suggest that effective AI health chatbots should support both users' capability beliefs and their sense of socially responsive interaction.

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Disclosure Statement

No potential conflict of interest was reported by the authors.

Ethics Statement

Survey respondents provided informed consent. The study protocol was approved by the City University of Hong Kong Ethics Committee (Approval No. HU-STA-00001638). As access to the Easyhealth-AI platform requires use of WeChat, and Tencent requires users under 18 years of age to obtain parental or legal guardian consent, all respondents younger than 18 years had obtained prior written consent from a parent or legal guardian before participating in the questionnaire study.

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Science, Strategy, and Critique in Mediatized Health Communication: A Review of the 2nd Panel Session at MHM 2026

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Abstract

The second panel session of the 9th International Academic Conference on Medicine, and Media and Doctoral Symposium took place on the afternoon of 18 July 2026 at the School of Journalism and Communication, Peking University. The session was titled Health Communication in the Age of Mediatization: Science, Strategy and Critique (Part I). Jian Rui, Professor at the School of Journalism and Communication, South China University of Technology, chaired the session. Zheng Yang, Associate Professor at the School of Communication, Suzhou University, co-chaired the session. Both also served as discussants. Five studies examined trust in generative artificial intelligence (AI) for health, popularity cues and message framing in women's exercise intentions, and puffery in short videos on traditional Chinese medicine. They also addressed temporally differentiated threat appeals and expectant fathers' support for breastfeeding, as well as the visual design of AI-doctor interfaces for older users. The commentary converged on parsimony in model specification, experimental-stimulus construction, the interpretability of engagement indicators, and the incorporation of contextual particularity into theoretical explanation. The open discussion distinguished phenomenon-driven from theory-driven research. This distinction bears directly on how locally grounded scholarship can generate propositions that travel beyond the immediate case.

Keywords: health communication; mediatization; generative artificial intelligence; threat appeals; theory-driven research

Introduction

Mediatization has reorganised the conditions under which health knowledge circulates. Recommendation algorithms, short-video platforms, conversational AI systems, and the visual grammar of interfaces now mediate between institutional expertise and lay publics. They do so in ways that are neither uniformly enabling nor uniformly distorting. Research in this field therefore carries a double obligation. It must describe emerging communicative practices with methodological precision and explain them in terms that hold beyond the immediate case. The second panel session of MHM 2026 was organised around this tension, which recurred throughout the exchange between presenters and discussants.

The session took place on the afternoon of 18 July 2026 in Lecture Hall 113 at the School of Journalism and Communication, Peking University. Its theme was Health Communication in the Age of Mediatization: Science, Strategy and Critique (Part I). Jian Rui, Professor at the School of Journalism and Communications, South China University of Technology, and Zheng Yang, Associate Professor at the School of Communication, Suzhou University, served as panel chairs

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and discussants. Presentations were delivered by Jörg Matthes of the University of Vienna, Xinchan Xiang of Wuhan University, Wanqing Wang of the University of Macau, Jiaqi Liu of the University of California, Santa Barbara, and Wanting Zhang of South China Normal University.

Trust in generative artificial intelligence for health in Austria and Japan

Jörg Matthes opened the session with What Leads to Trust in Generative AI for Health? Cross-Country Evidence on Playful and Information-Seeking Use, a joint project with Miho Iwakuma of Kyoto University and colleagues. He began from the technology's ambivalence. Conversational systems make scarce expertise available at negligible cost and allow users to raise questions that they might hesitate to put to a physician. At the same time, the advice they provide may be overgeneralised. Disclosure of personal health information raises privacy concerns, and the training corpora shaping their outputs remain largely opaque to the people who rely on them.

Rather than treating use as a single quantity, the study distinguished two modes. Information-seeking use begins with a specific need and ends when an answer is obtained. Playful use has no such terminus. Users explore the system, test its limits, and move back and forth in dialogue, thereby acquiring a working sense of what the technology can do. The model positioned negative health conditions as antecedents of both modes and trust in physicians as a moderator of these relationships. Trust in generative AI for health purposes was the outcome. Digital health literacy was expected to attenuate the path from use to trust because better-informed users might contextualise machine-generated information more critically and follow it more cautiously.

The comparative design paired Austria with Japan because the settings differ in technological climate and health-care systems. European publics tend to approach AI through the vocabulary of risk and regulation. Japanese public discourse has been more receptive, and the technology occupies a larger role in everyday life. Quota samples of 500 respondents were recruited in each country. The 642 respondents who reported using generative AI for health purposes were retained for a moderated-mediation analysis.

The Austrian results indicated that negative health conditions predicted information-seeking use regardless of trust in physicians. Both modes of use predicted higher trust in generative AI, and digital health literacy left these paths largely intact. The Japanese pattern was similar, with two additions. Negative health conditions also predicted playful use, and trust in physicians positively predicted both modes. These findings indicate that confidence in medical professionals may itself encourage engagement with the technology. Contrary to expectations, playful use raised trust more strongly among respondents with high digital health literacy. Matthes interpreted this pattern as a sign that experienced users obtain more usable material from exploratory interaction.

Matthes was explicit about the design's limits. The cross-sectional data could not support causal claims, the two use orientations were broad and would benefit from experimental validation, and the two-country comparison did not establish generalisability. His substantive conclusion was nevertheless consistent across settings. Generative AI is entering health information repertoires as an additional source rather than as a competing one. Its use did not

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erode trust in medical professionals. The survey evidence instead pointed to a complementary rather than substitutive relationship between the two.

Professor Rui suggested that the rationale for comparing Austria with Japan could be stated more fully. He also recommended controlling for respondents' prior medical knowledge and experience. Associate Professor Yang asked which generative AI systems respondents had in mind. He noted that domestic and US systems are used in noticeably different ways across the two settings. He further suggested that AI literacy might capture the relevant individual difference more precisely than the broader construct of digital health literacy.

Popularity cues, message framing and women's exercise intention

Xinchan Xiang of Wuhan University presented Psychological Mechanisms and Information Cues: The Influence of Popularity Cues on Women's Exercise Intention, written with Yiwei Qian and Chen Luo. The study began from a readily observable platform phenomenon. A search for fitness content on social media can display women's bodies, experiential accounts, and motivational text simultaneously. This raises two questions that point in opposite directions. How can social media effectively encourage women to exercise, and can content organised around appearance and body shape have adverse psychological consequences?

Female undergraduates were the population of interest. Rates of overweight and obesity in this group have continued to rise. Successive national policies, including the Healthy China 2030 Planning Outline and the National Fitness Plan, have made voluntary physical activity central to weight management. Young women may also attend more closely than other groups to appearance- and body-shape-related information. The idealised bodies repeatedly displayed in fitness content may therefore produce body dissatisfaction and appearance anxiety. They may also shift exercise motivation away from health.

The study used the MAIN model as its principal framework. The model distinguishes four classes of interface cues in digital media: modality, agency, interactivity, and navigability. Agency cues indicate a message's source and trigger heuristic judgements about credibility and expertise. The authors argued that popularity metrics, such as likes, saves, and comments, are forms of collective approval left by other users. They therefore function as indirect source warrants, placing them among agency cues and activating bandwagon heuristic processing. Upward social comparison and appearance anxiety were introduced as mediators. At the content level, message framing was divided into an outcome frame, which emphasised changes in body shape and physical condition, and a process frame, which emphasised the experience of exercising.

A 2 × 2 between-subjects online experiment was conducted. In the high-popularity condition, likes, saves, and comments were set in the tens of thousands. In the low-popularity condition, they were set in the tens. Stimulus texts differed by frame, and the accompanying images were produced with a generative tool and displayed in the interface style of the relevant platform. Measures were adapted from established scales for the Chinese context. Physical activity level was included among the control variables, and the reported reliability and validity tests were

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satisfactory. G*Power indicated a minimum sample of 171, and 346 valid responses were obtained. The analysis used Models 6 and 83 of the SPSS PROCESS macro.

The main effect of popularity on exercise intention was not significant. Popularity cues did not therefore act directly on intention. Their influence operated through psychological mediation and followed two paths of opposite sign. In one indirect path, high popularity strengthened upward social comparison, which raised exercise intention. In a serial path, appearance anxiety triggered by upward social comparison lowered intention. Message framing significantly moderated the process. The effect of high popularity on upward social comparison and both indirect paths were significant only under the outcome frame. The authors concluded that a promotional strategy based on traffic alone was ineffective. They further argued that popularity cues are double-edged, whereas a process frame can redirect attention away from body shape and reduce the likelihood of comparison and anxiety. The study extended the MAIN model to exercise promotion and offered practical guidance for university campaigns and independent content creators.

Professor Rui commended the methodological discipline shown in a study completed at the undergraduate level. He noted that, because the main effect was unsupported and the conclusions rested on indirect paths, multiplied coefficients reduce the size of the estimated effects and leave room for alternative mechanisms. He therefore advised caution in making causal claims. He also observed that outcome-frame stimuli emphasising improvements in physical and mental condition without acknowledging the effort involved might shape participants' responses. Associate Professor Yang raised two further points. First, because the two indirect paths point in opposite directions, the study offered no unambiguous practical implication. This made its theoretical contribution difficult to specify. He recommended collecting reflexive qualitative data, such as women's accounts of their reactions to heavily liked fitness posts, and reducing the number of mediating paths. Second, the stimuli differed in text length, appeal, and hashtags. These differences meant that any effects could not be attributed to framing alone. He suggested controlling for reading time and comprehension difficulty.

Puffery, engagement and expressed trust in short videos on traditional Chinese medicine

Wanqing Wang of the University of Macau then presented Heuristic-Systematic Dissociation in Digital Health: How Puffery in TCM Videos Shapes Engagement and Trust on Douyin, written with Angela Chang. The study began from a discrepancy that is readily observed but harder to explain. Viewers of short videos on traditional Chinese medicine often write in the comment section that they trust what they have watched, but they decline to like, share, or save the video. The distance between expressed trust and behavioural endorsement was the study's object.

The study was situated in a large and rapidly digitalising market. Traditional Chinese medicine is both a component of Chinese cultural life and a commercial sector of considerable scale. Its presence has shifted rapidly towards short-video platforms. In this environment, verifiable health knowledge circulates alongside claims that cannot presently be adjudicated. These include verbal promises, unqualified assertions, emotionally charged appeals, and absolute superlatives. Following the advertising literature, the study treated such claims as puffery. The

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consequences may fall unevenly because older viewers with lower digital literacy are the most exposed to them.

The heuristic-systematic model supplied the analytical frame. Heuristic processing is fast and low in cognitive cost. It relies on surface cues, such as apparent source credibility, and was linked to behavioural engagement, including the low-effort actions of liking, sharing, and saving. Systematic processing requires greater cognitive investment and yields more articulated judgements. It was linked to expressive engagement in the comment section, where viewers put their trust or distrust into words. The study therefore asked which types of puffery appear in these videos, how they are associated with behavioural and expressive engagement, and how additional cues condition that association.

The study adopted a mixed-methods design. In March 2025, 371 valid videos and approximately 4,800 comments were collected from Douyin. Optical character recognition was used to capture on-screen text. Coding followed a human-machine hybrid procedure on an AI-assisted platform. The machine generated an initial category framework and performed automated coding. Three human coders then revised the output through three rounds of definition refinement and pilot testing. A final reliability test confirmed strong agreement.

Three central findings emerged. First, puffery was prevalent and concentrated in commercially oriented content. It was most frequent in videos presenting traditional Chinese medicine knowledge, followed by practitioner introductions and cultural promotion and wellness concepts. Rates were lowest in videos about specific therapies. Verbal promises were the most common type, followed by assertions, emotional appeals, and absolute superlatives. Second, videos containing puffery received significantly fewer likes, shares, and saves. Yet they accounted for roughly 65% of comments expressing trust. Binary logistic regression showed that verbal promises and emotional appeals significantly increased the likelihood of such comments. Fewer clicks thus coexisted with more expressed trust. Third, cues signalling scientific support and expert endorsement moderated these patterns. They mitigated the negative association between puffery and behavioural engagement while weakening its positive association with expressed trust. After correction, 17 interaction terms remained statistically significant.

Wang interpreted the dissociation as the simultaneous operation of both processing routes. Upon detecting persuasive intent, viewers may withhold low-cost behavioural signals. Yet cultural resonance and emotional framing may still prompt them to voice endorsement. Wang identified a practical concern. Verbal trust may be especially legible to recommendation systems, allowing a sense of unverified authority to gain visibility even as behavioural endorsement declines. She also noted several limits. Positive comments do not uniformly express trust because some convey general cultural affirmation rather than a judgement about content. The study also covered a single platform and cultural context, and its sampling procedure favoured popular material.

Professor Rui concentrated on measurement. He recalled limiting his own outcome measure to likes because comments and shares can accumulate around content that audiences find objectionable as readily as around content that they endorse. He invited the authors to explain their rationale for using a composite set of indicators. He also suggested that the heuristic-systematic model could be integrated more substantively into the analysis. Associate Professor Yang raised an epistemological question. Judgements about exaggeration presuppose a standard, and categories within traditional Chinese medicine do not map neatly onto biomedical ones.

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Whether local medical knowledge is admitted as health knowledge therefore conditions the coding scheme. He added that emotional appeal would preserve analytical neutrality better than emotional manipulation. He also recommended bringing the case's epistemological particularity into the interpretation.

Temporally differentiated threat appeals and expectant fathers' support for breastfeeding

Jiaqi Liu of the University of California, Santa Barbara joined the session online to present Fear Appeals in Family Context: Temporal and Relational Processes in Child-Related Health Messages and Their Effects on Chinese Expectant Fathers' Support Intention, completed with collaborators at Tongji University and Tsinghua University. The study was situated in the Chinese breastfeeding context. China's breastfeeding rate is comparatively low by international standards, at about 29.2%. The consequences of breastfeeding extend well beyond infancy into adolescent health.

Fathers were selected as the target group because their role in breastfeeding is often overlooked. Their involvement can materially affect the choice and duration of feeding, and they can provide practical, informational, and emotional support. Under prevailing family structures and conventional gender roles, fathers are often absent from family health matters yet continue to exercise considerable authority over household decisions. This mismatch supplied the study's point of departure.

The study extended the extended parallel process model (EPPM) in two ways. The first extension concerned the temporal dimension of threat. Existing work has largely treated threat as a static whole, whereas the health consequences of breastfeeding can be both short- and long-term. Drawing on construal-level theory and research on temporal framing, the study separated short-term from long-term threat. The second extension addressed the family perspective. Family communication and family systems theory treat the family as an interacting whole rather than a collection of isolated individuals. The study therefore examined how a father, conventionally treated as a third party, enters a family health matter from a partner's standpoint.

A 2 × 2 × 2 between-subjects experiment was conducted with 354 Chinese expectant fathers recruited at obstetric hospitals in several provinces. Controls included the age of the respondent and partner, education, income, marital status, month of pregnancy, and the respondent's history of having been breastfed. Both short-term and long-term threat influenced fear and anxiety. Long-term threats produced the stronger effect, and the two combined aroused anxiety most strongly. In the subsequent path, only anxiety significantly predicted issue involvement. The corresponding path from fear was not significant, whereas issue involvement in turn raised support intention. The interaction between efficacy and threat was not significant, although efficacy directly predicted support intention.

The presentation yielded three implications. First, once a threat was differentiated temporally, long-term threat was more strongly associated with emotion than short-term threat. This pattern ran counter to the hypothesis but was consistent with a long-term orientation widely noted in the Chinese context. Second, for breastfeeding, fear did not appear sufficient to drive information seeking and action. Anxiety instead sustained a problem-oriented demand for information. Fear

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may produce a sense of powerlessness and lead to avoidance. Third, when a health-message recipient is not the person performing the behaviour, emotional arousal appeared to operate through issue involvement before becoming support. Fathers and mothers occupy different psychological distances from the same health matter. The presentation argued that this difference belongs in the analytical framework of persuasion research in family settings.

Professor Rui recommended a more parsimonious model. He noted that additional paths make the intervening mechanism harder to explain and that simpler models often carry greater explanatory force. He suggested that the rationale for placing issue involvement after fear and anxiety should be stated more fully. He also asked for fuller explanation of the mechanisms through which short-term and long-term threat predict the two emotions. Associate Professor Yang questioned the ordering of variables. The literature supports both emotion arousing involvement and involvement arousing emotion. He noted that data from a single experiment cannot settle the sequence and that the rationale for the proposed chain requires further theoretical argument.

Visual design of artificial intelligence doctor interfaces and older users' social perception

Wanting Zhang of South China Normal University presented Do I Prefer Cool and Simple Ones? The Dual-Path Effects of Visual Design on Older Adults' Perceptions of and Usage Intentions Towards AI-Doctor Interfaces, written with Yue Luo of Guangdong Polytechnic Normal University and Changcong Zeng of Guangzhou Academy of Fine Arts. The study approached health communication through visual communication. As AI medical platforms develop, users increasingly obtain health information and consultation through digital interfaces. Older users face particular challenges of operability and system intelligibility. Existing research has largely worked within the technology acceptance model and focused on instrumental factors, such as ease of use and satisfaction. It leaves open the question of how visual cues in an interface shape older users' social perceptions.

Two theoretical perspectives guided the study. The stereotype content model holds that social objects are evaluated along the dimensions of warmth and competence. In this health communication setting, these dimensions were represented by perceived empathy and perceived authority. Perceived empathy concerned whether users felt that the AI doctor understood and cared about them. Perceived authority concerned whether they regarded it as authoritative and professional. Social vision theory further holds that people form social judgements from an object's visual cues and that these judgements shape behavioural intention. Such judgements remain malleable and context-specific. Colour tone was treated as a basic, rapidly processed visual cue. Visual information complexity, defined by the number, density, and organisation of interface elements, was treated as a situational moderator.

A pilot study with 100 older participants showed that low-, medium-, and high-complexity interfaces were reliably distinguishable. The main experiment used a 2 × 3 between-subjects design. It crossed cool versus warm colour tones with three levels of complexity. A total of 308 participants were randomly assigned to one of six conditions. They reported perceived empathy, perceived authority, and usage intention. Manipulation checks were satisfactory.

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Colour tone significantly influenced usage intention and perceived empathy, with the effect attributable to warm tones. It had no independent effect on perceived authority. More importantly, tone and visual information complexity interacted significantly on all three outcomes. Warm interfaces outperformed cool ones only under high complexity. Under low and medium complexity, the effect of tone disappeared. Moderated-mediation analysis confirmed that, under high complexity, warm tones strengthened both perceived empathy and perceived authority. Each positively predicted usage intention.

The authors concluded that an effective AI-doctor interface should communicate emotional care and professional information simultaneously. The study extended the stereotype content model and social vision theory from interpersonal settings to intelligent health communication. It also identified an asymmetric pathway in social cognitive processing. Perceived empathy was elicited mainly by affective cues, whereas perceived authority required affective and informational cues in combination. In practical terms, the study recommended using warm tones in moderation to convey care alongside a deliberate configuration of informational complexity. The limitations included the restricted range of visual cues, because typography, icons, and avatars were not included. The relatively static stimuli also left genuinely interactive tasks untested, and the China-only sample invites cross-cultural comparison.

Professor Rui considered the study well developed and offered two suggestions for publication. Readers commonly assume that older people make little use of AI medical services. The paper would benefit from addressing that assumption directly. He also suggested explaining the cognitive and psychological characteristics of older users and their relevance to the chosen theoretical framework. He further recommended extending the work to interactive settings because judgements formed from a static interface may differ from those formed in use. Associate Professor Yang made a related point. Where the discussion only lightly considers older users' cognitive characteristics, the conclusions can read as applying to the general population. The group-specific contribution is thereby weakened. He added that behavioural cues might outweigh static visual design in genuine interaction and could even reverse the direction of the tone effect. This possibility should be acknowledged in the discussion.

Open discussion: from phenomenon-driven to theory-driven research

The formal commentary was followed by an open discussion on the problem of treating theory as an external template. A participant observed that quantitative research sometimes obtains data first and looks for a theory afterwards. Theory then becomes a wrapper rather than a source of the research question. The participant asked how such a design shortfall might be remedied at the writing stage.

Professor Rui replied that the difficulty concerns research design rather than writing. A study should begin with a problem internal to a theory. Decisions about which variables to add, remove, or adjust should follow from that problem rather than from a post hoc search for an explanatory frame. He also suggested asking whether the problem is worth solving. When hypotheses are unsupported, recovery remains possible. Post hoc analysis can sometimes yield an account more

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persuasive than the original model, making the discussion a site of theoretical work. As review standards become more exacting, a second study can test the explanation advanced in the first.

Associate Professor Yang added that writing becomes considerably easier when a study begins with a theoretical problem rather than a phenomenon. A study that sets out to revise a theory can then identify a suitable phenomenon for examination, allowing the discussion to follow naturally. A study that begins from a phenomenon must find a theory later and may stall during writing. He acknowledged that this approach presupposes wide theoretical reading, which can be a real constraint for researchers early in their training.

The discussion then shifted to the pace of doctoral research and the pressures of institutional assessment. Both discussants argued that theoretical sensitivity should be cultivated alongside data-driven work. Difficulties of interpretation encountered during writing should be treated as occasions for that training, and the aim should be a body of representative work able to withstand scrutiny. The conversation also addressed the construction of an independent Chinese knowledge system. The discussants noted that international journals have become increasingly cautious of studies that use China merely as a case for testing the applicability of existing theory. They argued that a more promising direction is to advance propositions grounded in Chinese experience that can nonetheless enter dialogue with the wider scholarly community.

Conclusion

Taken together, the five studies mapped several sites at which mediatization reorganises health communication. They considered conversational AI as an addition to health information repertoires, platform metrics as a source of psychologically opposed exercise-motivation pathways, and promotional language as a source of dissociation between behavioural endorsement and expressed trust. They also examined message design directed at a family member who is not the actor and interface features that carry social meaning for older users. Methodologically, the panel leaned towards experimental and computational designs.

The commentary also converged on three recurring concerns. First, it emphasised parsimony. As mediation paths multiply, estimated indirect effects diminish and the mechanism becomes harder to defend. A simpler model may therefore offer greater explanatory force. Second, the discussants stressed precision in measurement and stimulus construction. This included the choice of engagement indicators and the control of confounds across experimental materials. Third, they returned to the relationship between case and theory. When the chosen context does not enter the explanatory framework, a study may describe an effect that could have occurred elsewhere. Its case-specific contribution then remains underdeveloped. The discussants treated the theoretical significance of context, rather than its use as a setting, as a central standard. This principle frames a wider question for the field concerning the alignment of locally grounded knowledge production with international scholarly dialogue. The paper by Xinchan Xiang, Yiwei Qian, and Chen Luo of Wuhan University received the session's Outstanding Paper Award.

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Competing interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Notes

This report is based on the audio record of the session and on the presenters' own summaries of their work. Figures and results reported here are those stated by presenters during the session, and several of the studies were presented as work in progress. Readers wishing to cite any of the studies described should contact the respective authors directly.

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The 9th "Medicine,Humanity and Media"Health Communication International Conference and PhD SymposiumSuccessfully Held

Yixin Bai

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Abstract

On July 18, 2026, the 9th International Symposium on "Medicine, Humanity and Media" (MHM) on Health Communication and Doctoral Forum was successfully hosted by the School of Journalism and Communication, Peking University. The conference was supported by the 2026 "Graduate Education Innovation Program" of Peking University.

On July 18,2026,the 9th "Medicine,Humanity and Media"Health Communication International Conference and PhD Symposium was successfully hosted by the School of Journalism and Communication,Peking University.The conference was supported by the 2026 "Graduate Education Innovation Program"of Peking University.

In the midsummer of Yanyuan,distinguished guests gathered from home and abroad.Invited guests from the University of California,Santa Barbara(USA),Royal Roads University (Canada),University of Vienna(Austria),National University of Singapore,City University of Hong Kong,as well as the Chinese Center for Disease Control and Prevention,South China University of Technology,Zhejiang University,Shanghai Jiao Tong University,Shanghai University,Wuhan University,Xi'an Jiaotong University,Fujian Polytechnic Normal University, Tianjin University of Traditional Chinese Medicine,Chengdu University of Traditional Chinese Medicine,and Fudan University Shanghai Medical College,joined nearly 100 young scholars, doctoral students and master's students from universities,research institutions,CDC centers and related hospitals worldwide.Ce ntering on the theme International Experiences and Local Pathways in Constructing the Knowledge System of Health Communication,they carried out international and interdisciplinary exchanges through keynote speeches,paper presentations, thematic workshops and high-level forums,to jointly build a new ecosystem for health communication research.

The opening ceremony was presided over by Xu Jing,Professor at the School of Journalism and Communication,Peking University and Director of the Health Communication Program.Chu Xiaobo,Member of the Standing Committee of the CPC Committee and Vice President ofPeking University, and Chen Kaihe, Vice Dean of the School of Journalism and Communication, Peking University, delivered speeches successively.

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In his address, Chu Xiaobo noted that health communication serves as a bridge linking medical science and the public, undertaking the vital mission of supporting the "Healthy China" strategy in the new era. He reviewed the profound legacy of Peking University's School of Journalism and Communication in journalism education, which has remained at the forefront of disciplinary development for over a century. To meet the demands of disciplinary progress and international dialogue, the School has continuously developed the "Medicine, Humanity and Media" (MHM) International Symposium platform. After eight years of dedicated efforts, the initiative has borne rich fruit. This year's conference, co-organized with the International Doctoral Forum on Health Communication, not only carries forward the tradition of academic exchange, but also actively fosters young academic talents and doctoral cohorts. He encouraged participating scholars to learn from each other, inspire new insights, and jointly advance the thriving development of health communication.

In his remarks, Chen Kaihe stated that after a decade of in-depth development, health communication at Peking University has delivered fruitful outcomes in talent cultivation, theoretical innovation and social service. As a flagship academic event of the School, the "Medicine, Humanity and Media" International Symposium has become a key platform for Sino-foreign dialogue on health communication. The theme of this conference closely addresses core disciplinary issues, with both theoretical value and practical significance. He expressed the hope that scholars at home and abroad would engage in thorough exchanges and accumulate valuable academic achievements for building China's health communication knowledge system.

Right after the opening ceremony, the keynote speech session began. The first speaker was Shaunak Sastry, Professor at the University of California, Santa Barbara and First Vice President of the National Communication Association (NCA). His speech, titled Humans as the Closed Loop: Cultural Insights, Structural Critique and the Future of Critical Health Communication, was grounded in the critical health communication framework and put forward three core propositions: health communication should be emancipatory rather than managerial; research needs to integrate structural factors across macro, meso and micro levels; and disciplinary studies should be rooted in local life experiences, stay alert to power imbalances caused by AI technology, and advocate examining intelligent communication beyond techno-centrism.

The second speaker was Jörg Matthes, Chair Professor at the University of Vienna, ICA Fellow of the International Communication Association, and Editor-in-Chief of the leading international journal Communication Theory. His speech, titled Advancing Health Communication Theory in the Age of Artificial Intelligence, outlined three mainstream research directions of health communication in the current AI landscape: treating AI as a communication agent, as an auxiliary tool for medical decision-making, and as a macro social system. Meanwhile, Professor Matthes proposed pathways for theoretical innovation, calling for abandoning outdated concepts and variables to explore new theoretical mechanisms of AI-enabled health communication.

The third speaker was Dr. Lance Rodewald, Senior Advisor to the Immunization Program of the Chinese CDC and recipient of the Chinese Government Friendship Award. His speech, titled Vaccine Confidence: Challenges and Opportunities, reviewed the remarkable achievements of China's immunization program over the past 50 years, pointed out that vaccine hesitancy is a normal psychological response among the public, systematically explained the "3C Theory", and

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proposed multi-stakeholder collaboration to build a national vaccine trust system and integrate immunization into basic public social services.

Subsequently, Jiang Li, Associate Professor at the Department of Media and Communication, City University of Hong Kong, Jiang Shaohai, Associate Professor at the Department of Communications and New Media, National University of Singapore, and Rui Jian, Professor at the School of Journalism and Communication, South China University of Technology, also delivered keynote speeches. Their topics were Supported or Indulged? Reconstruction of Social Support Mechanisms in the AI Era and Its Implications for Health Communication, Bridging the Gap or Widening the Divide? — Digital Health and Health Inequity Among Older Adults, and Intelligent Health Communication Models from the Perspective of Technological Change respectively.

In the following roundtable for leading young scholars, nine young researchers from Peking University, Toronto Metropolitan University (Canada), Zhejiang University, Wuhan University, Shanghai Jiao Tong University, Xi'an Jiaotong University, Shanghai University, Tianjin University of Traditional Chinese Medicine and Fujian Polytechnic Normal University introduced their research focuses, and exchanged views with doctoral and master's students on academic development and mentorship. The conference adopted and innovated the Mentor- Mentee Program commonly seen in international academic events such as ICA and IAMCR, to support young students' academic growth, paper publication and research translation in diverse forms.

The main conference spanned two days, featuring 12 sub-forums and 72 paper presentations. Special sessions included the "Stroke Health Promotion Workshop", the "Research Publication Workshop", and the forum on International Communication of Traditional Chinese Medicine Culture from the Perspective of Global Health Governance co-hosted with Chengdu University of Traditional Chinese Medicine. Following the main conference, there were also a high-level forum co-organized with the Wuhan Institute of Artificial Intelligence, Peking University — The Future is Here: AI-Driven Regional Health Governance, the "2026 Aging Communication Forum" co-hosted with the Aging Communication Branch of the Chinese Gerontology and Geriatrics Society, and a five-day Peking University summer school course Health Communication Research: Theories and Methods.

The 9th "Medicine, Humanity and Media" Health Communication International Conference and PhD Symposium examines local realities through international dialogue and consolidates disciplinary foundations through youth cultivation. It will inject lasting academic momentum into building a health communication knowledge system with both local characteristics and global vision, and contribute academic strength to the implementation of the "Healthy China" strategy.

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Doctor–Patient Communication in the Age of Intelligent Media: A Review of Panel1 at MHM2026

Xiwen Niu

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Abstract

On the afternoon of July 18,2026,Panel 1 Doctor Patient Communication in the Era of Intelligent Media of the 9th "Medicine,Humanity and Media"Health Communication International Conference and PhD Symposium was held at the School of Journalism and Communication,Peking University.Grounded in local healthcare communication contexts,these papers explore cutting edge issues of human machine interaction and online doctor patient communication under intelligent media.Reviewers put forward suggestions for improvement regarding sample limitations,research design and variable settings,and affirmed that these findings provide valuable theoretical and practical references for human centered doctor patient communication and human machine health communication in the digital intelligence era.

Keywords: doctor patient communication; health communication; digital media

On the afternoon of July 18,2026,Panel1 doctor Patient Communication in the Era of Intelligent Media of the 9th "Medicine,Humanity and Media"Health Communication International Conference and PhD Symposium was held in Room 347,School of Journalism and Communication,Peking University.This session was chaired and commented by Jiang Shaohai,Associate Professor at the Department of Communications and New Media, National University of Singapore,and Liu Zikun,Distinguished Associate Research Fellow at the School of Journalism and Communication,Wuhan University.Six paper authors delivered presentations in sequence: Zhou Yan from Guangxi University,Liang Qian from Renmin University of China,Zhang Runzi from Xiamen University,Niu Wenxi from Shenzhen University,Hao Antai from Huazhong University of Science and Technology,and Xie Qingqing from Shenzhen University.

Zhou Yan's paper When AI Becomes a Digital Confidant: The "Emotional" and "Rational" Mechanisms Underlying Dependence on Generative AI Chatbots focuses on dependence on generative-AI chatbots and explores the formation mechanisms of user dependence through emotional and rational pathways. Drawing on questionnaire data, the study constructs a theoretical model with serial mediation and moderation effects. It verifies that the lack of perceived emotional support gives rise to AI dependence via the serial transmission of mental-health help-seeking stigma and loneliness. Combined with local sociocultural contexts, it discusses why the public turn to AI for emotional venting, offering theoretical references for the governance of intelligent mental-health services.

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During the comment session, the commending experts praised the well-structured theoretical model and its engagement with the topical issue of AI-powered emotional compensation. Meanwhile, they pointed out that the sample consisted mainly of cross-sectional data from young adults without differentiating various types of AI products. It was suggested that qualitative interviews and intervention experiments be added to further clarify discrepancies in users ' perceptions of AI's pseudo-empathy.

Liang Qian's paper Healing the Body Starts with Healing the Mind? Predictors of Online TCM Consultation Communication Patterns and Patient Satisfaction Based on the RIAS Framework adapts the RIAS doctor-patient communication framework to online traditional Chinese medicine consultations. Based on coding and regression analysis of online consultation dialogues, the paper identifies the "high-participation, light-consultation" interactive features of online TCM visits. It tests how communication behaviors such as small talk, emotional expression, and professional syndrome differentiation predict patient satisfaction, and clarifies performance differences among communication strategies in text-based online consultations.

In the comment session, experts acknowledged the localized adaptation of the RIAS theory to online TCM practice. They also noted the relatively single data source and simplistic categorization of satisfaction. Recommendations included adding an offline consultation control group, as well as drawing fine-grained comparisons between formulaic consolation and personalized emotional support.

Zhang Runzi's paper Authoritative or Approachable? The Influence of AI Communication Styles on Perceived Credibility in Health Consultation — Mediated by Automated Social Presence and Moderated by Personal Traits adopts between-subject controlled experiments to investigate how authoritative versus approachable AI tones shape perceived credibility of health information. Taking perceived competence and perceived warmth of automated social presence as dual mediators, and health anxiety and need for cognitive closure as moderators, the study reveals divergent persuasive pathways of the two communication styles and provides empirical evidence for health-AI wording design.

Commentators commended the rigorous experimental manipulation and innovative dual-mediator model. They observed the absence of a neutral-tone control condition and noted that experimental stimuli were static texts, which diverge from real-world dynamic human-AI interactions. Suggestions included expanding to diverse disease scenarios and conducting long-term follow-up studies.

Niu Wenxi and Wang Tongchen's paper How Relational Communication Empowers Users: Functions, Boundaries and Stigma-Context Differences of Patient-Centered Communication in AI-Powered Health Consultations employs a mixed-methods design combining questionnaires and in-depth interviews. It extends patient-centered communication theory to human-machine health consultation settings, with patient empowerment as the core mediator. Comparing the functional boundaries of AI communication acrosshealth-related stigma contexts, the study finds that the constraining effect of AI hallucination risks only holds for low-stigma topics; in high-stigma contexts, the non-judgmental nature of AI communication is hard to substitute.

In the comment segment, experts highlighted the innovative quantitative design and stratified perspective of stigma contexts. They suggested separating quantitative and qualitative components into independent manuscripts, further manipulating the severity of AI hallucinations,

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refining source-preference distinctions, and conducting cross-sample validations to test model generalizability.

Hao Antai's paper How Resource Investment Mitigates Turnover Intention: A Serial-Mediation Study Based on the JD-R Model draws on the Job Demands-Resources (JD-R) model and surveys medical staff in public hospitals. It examines the serial-mediation mechanism linking organizational resource investment to turnover intention, analyzes the mediating roles of occupational-risk perception and job satisfaction, and tests the moderating effect of permanent staffing status. The research enriches health-communication scholarship from the practitioner perspective.

Commentators remarked that the study fills the research gap concerning healthcare workers within health communication and carries practical implications. Limitations included geographically constrained sampling and exclusive reliance on self-reported data. It was advised to disaggregate participant subgroups and complement analyses with objective personnel records.

Xie Qingqing's paper Fostering Trust in AI Medical Advisors: An Experimental Study of Design Nudges and User Adoption conducts experiments on trust-building for AI medical advisors. It explores how design nudges affect user adoption intentions, and examines how subtle interface and wording interventions shape public trust in and usage of AI medical tools, delivering practical insights for interaction optimization of intelligent health products.

Reviewers appreciated the complete research design and solid empirical work, noting its close alignment with real-world AI-medical product deployment and practically-relevant experimental outcomes. They pointed out the lack of moderation analyses on individual variables such as health literacy and age, and recommended subgroup-specific experiments and continuous tracking of long-term user behavioral changes.

Centered on two core themes-human-machine interaction and online doctor-patient communication in intelligent-media contexts-this session presented research covering cutting-edge topics including generative-AI dependence, AI communication styles, online TCM consultations, and healthcare professionals ' career development. Employing diverse methodologies such as controlled experiments, questionnaire-based modeling, mixed methods, and dialogue textual analysis, these papers are grounded in local Chinese healthcare-communication scenarios. They offer new perspectives and empirical support for optimizing intelligent medical-communication platforms, governing AI-enabled health services, and safeguarding healthcare-workforce wellbeing. The outputs bear notable academic and practical value for building human-AI health trust and deploying digital-health services under stigmatized conditions. The two commenting supervisors highly affirmed the research topics and innovative attempts across the six presentations, concluding that this body of work provides solid theoretical foundations and practical references for humanistic-oriented doctor-patient communication and human-machine health-communication research in the digital-intelligence era.

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Embodied Experience and Health Communication among Vulnerable Populations: Insights from MHM 2026

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Abstract

This conference report provides an analytical synthesis of five studies presented in Panel 3, "Bodily Experiences and Health Communication among Vulnerable Populations: From Qualitative to Quantitative Approaches (Part I)," at the 9th "Medicine, Humanity and Media" (MHM 2026) Health Communication International Conference and PhD Symposium. The five studies examined health communication across diverse populations and contexts, including AI-mediated intergenerational communication, online social support among people with eating disorders, social media health practices among migrant workers with pneumoconiosis, cancer-prevention self-efficacy in resource-scarce settings, and caregiver-mediated communication of autistic embodied experience. Although differing in theoretical perspectives and methodological approaches, the studies collectively drew attention to several interconnected issues: the articulation and mediation of bodily experience, the role of digital technologies and social relationships in shaping health communication, the structural conditions that enable or constrain health-related action, and the representation and agency of vulnerable populations. The panel discussion further highlighted shared theoretical, methodological, and ethical challenges, particularly those concerning conceptual clarity, theory–method alignment, research design, sampling, use of empirical materials, and the representation of vulnerable groups. Taken together, the studies demonstrate the value of examining health communication not solely as the transmission of information, but as a socially and structurally embedded process involving embodiment, mediation, support, representation, and agency.

Keywords: vulnerable populations; bodily experience; health communication; digital media; social support

Introduction

Health communication among vulnerable populations involves more than the dissemination and reception of health information. Experiences of illness, disability, aging, and health risk are embodied and socially situated, while the capacity to understand, articulate, and respond to these experiences is shaped by interpersonal relationships, digital technologies, access to resources, and broader structural conditions. The growing involvement of social media, online communities, and artificial intelligence in health-related communication has further complicated these processes, creating new possibilities for self-expression, social support, and public participation while also raising questions concerning inequality, representation, privacy, and communicative agency.

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These concerns formed the central focus of Panel 3, "Bodily Experiences and Health Communication among Vulnerable Populations: From Qualitative to Quantitative Approaches (Part I)," at the 9th "Medicine, Humanity and Media" (MHM 2026) Health Communication International Conference and PhD Symposium. Held at the School of Journalism and Communication at Peking University, the panel brought together five studies that approached bodily experience and health communication from distinct theoretical and methodological perspectives. Yidan Yang, an associate professor at Tianjin University of Traditional Chinese Medicine, and Qijun He,an associate professor at Shanghai University, served as discussants for this panel. Their comments provided further reflections on the conceptual, methodological, and ethical issues raised by the studies.

The five studies addressed different populations and health contexts. Xuanlin Hu of Shenzhen University examined AI-generated aging images and intergenerational prosocial behavior; Fangxin Huang of Nanjing University investigated how people with eating disorders sought and obtained online social support across social media platforms, private online communities, and large language models; Yihang Ding and Jiayi Li explored the social media health practices of migrant workers with pneumoconiosis; Yina Ding of Zhejiang Cancer Hospital examined the construction of cancer-prevention self-efficacy in resource-scarce settings; and Junchen Chen, Mingxi Hang, and Yidi Zhang investigated how caregivers interpret and communicate the embodied experiences of autistic individuals. Methodologically, the studies ranged from between-subjects experiments and questionnaire surveys to digital ethnography, in-depth interviews, grounded theory, structural equation modeling, and computational text analysis.

Digital Mediation of Embodied Experience and Social Support

Digital technologies emerged across the panel not simply as channels for delivering health information, but as environments in which individuals perceive themselves and others, seek emotional support, negotiate stigma, and establish or maintain social relationships. This dimension was particularly evident in the studies by Xuanlin Hu and Fangxin Huang, which approached digital mediation from different but complementary perspectives.

Xuanlin Hu's study, Seeing the Future Self: How AI-Generated Aging Images Promote Prosocial Behavior Across the Intergenerational Communication Divide, examined whether AI-generated aging images could enhance young people's understanding of older adults and encourage prosocial behavior across generations. Drawing on perspective-taking theory, the empathy–altruism hypothesis, and cognitive appraisal theory, the study employed two between-subjects experiments to examine how the temporal framing of the aging images, the person depicted, and the valence of the depicted content shaped participants' emotional responses, attitudes toward helping older adults, and related behavioral intentions.

The findings showed that viewing a future aging image, compared with viewing a current-state image, significantly increased personal distress, empathic concern, supportive attitudes toward older adults, and willingness to engage in related helping behaviors. Personal distress and empathic concern mediated these effects. Emotional arousal was particularly pronounced when

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the aging image depicted the participant rather than another person, while negative aging scenarios generated stronger effects than positive scenarios, although positive representations also produced favorable responses. Hu's findings therefore suggest that highly self-relevant AI-based aging visualizations may reduce psychological distance between younger and older people through emotional arousal and self-referential processing.

The study also illustrates the theoretical and ethical questions that accompany the use of generative AI in health and intergenerational communication research. Professor Yang and professor He recognized the originality of using AI-generated aging images to address an established problem in intergenerational communication, while emphasizing that technological novelty should remain clearly connected to the underlying theoretical question. They also drew attention to privacy, data security, and related ethical concerns associated with the use of AI-generated facial images. From a methodological perspective, the discussants suggested that a more integrated factorial design, such as a $2 \times 2 \times 2$ experiment, could enable simultaneous examination of main and interaction effects and clarify the relationship between the two experiments.

A related but distinct form of digital mediation appeared in Fangxin Huang's study, Digital and AI-Mediated Healing: A Triple-Flow Mechanism of Online Social Support among People with Eating Disorders. Huang examined how people with eating disorders seek and receive social support across public social media platforms, private online communities, and large language models (LLMs). The study adopted a mixed-methods design combining content analysis, digital ethnography, and structural equation modeling to investigate platform content, peer-support communities, and patterns of LLM use.

The study identified different affordances and limitations across these three communicative environments. On public platforms, individuals sought support by documenting symptoms, recounting treatment experiences, and using metaphorical forms of expression, but also encountered problems such as disillusionment with the promise of platform anonymity. Private online communities enabled deeper empathy, experiential sharing, and companionship, while potentially producing closed emotional loops, delayed responses, and limitations in the transferability of peer experience. LLMs offered immediate responses, information integration, and nonjudgmental interaction, but remained limited in their ability to connect users with offline resources.

On this basis, Huang proposed a "platform–community–LLM" triple-flow mechanism. Rather than treating the three domains as separate communication spaces, the study described them as permeable environments among which users strategically move according to perceived stigma, the timeliness of support, and specific resource needs. The model thus shifts attention from the characteristics of individual platforms toward the ways users assemble different sources of support across digital environments.

The discussants recognized the study's engagement with an important real-world problem while also identifying several issues requiring further clarification. Professor He noted that the relationships among the research questions, methods, and conclusions needed to be more closely aligned and that the organizing logic of the mixed-methods design remained insufficiently clear. The survey sample also appeared limited for a structural equation model incorporating a relatively large number of variables. Professor Yang further advised caution in using the concept of "digital and AI-mediated healing" and encouraged clarification of whether the proposed

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platform–community–LLM mechanism should be understood primarily as a descriptive account of observed support-seeking practices or as a model capable of informing intervention design.

Taken together, Hu's and Huang's studies demonstrate two different ways in which digital technologies are becoming embedded in experiences of vulnerability. In the former, AI-generated representations of the future self shape emotional and intergenerational responses through self-referential processes. In the latter, digital platforms, online communities, and LLMs constitute a changing support environment that users navigate strategically. Both studies therefore suggest that digital technologies should be examined not only as information channels but also as mediating environments that shape perception, emotion, social connection, and access to support.

Structural Vulnerability and Health Agency

A second recurring concern across the panel involved the relationship between health communication and structural conditions. The studies by Yihang Ding and Jiayi Li and by Yina Ding both challenge explanations that locate health communication outcomes primarily in individual knowledge, attitudes, or motivation. Instead, they draw attention to the medical, economic, geographic, familial, and communicative conditions within which health-related agency becomes possible or constrained.

Yihang Ding and Jiayi Li's study, Social Media Health Practices among Migrant Workers with Pneumoconiosis: A Culture-Centered Approach, examined health-related content production and social interaction among migrant workers with pneumoconiosis on short-video platforms such as Douyin and Kuaishou. Combining netnography, in-depth interviews, and grounded theory, the study employed the culture-centered approach to examine the interaction among structure, agency, and culture in the formation of health rationalities within this population.

The findings indicated that participants' health practices were shaped by structural conditions including access to medical resources, economic constraints, and family responsibilities. At the same time, patients were not represented simply as passive recipients of these constraints. They sought possibilities for self-help through traditional Chinese medicine, reflections on life and illness, and online appeals for assistance, while gradually forming networks of mutual support through digital interaction. Some patients and family members also transformed personal illness narratives into forms of public health communication by warning others about occupational risks, sharing treatment experience, and disseminating legal knowledge. The study therefore described a movement from self-narration and self-help toward collective mutual aid and proposed an altruistically oriented form of health rationality.

The discussants nevertheless emphasized the need to examine carefully whose experiences become visible through social media research. Yang noted that research based on short-video bloggers should consider both the authenticity of participants' identities and the performative dimensions of mediated self-presentation. Importantly, she also encouraged the researchers to consider patients with pneumoconiosis who are unable or unwilling to speak publicly online and to broaden recruitment through offline settings such as hospitals. He similarly suggested making fuller analytical use of the existing material and defining concepts such as "health rationality"

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more precisely. Rather than treating online community formation in general terms, she encouraged closer attention to how patients present themselves, respond to doubt or criticism, seek social recognition, and expand the public visibility of pneumoconiosis.

Structural constraints were approached from another direction in Yina Ding's study, The "Distance" in Health Communication: Challenges in Building Self-Efficacy for Cancer Prevention and Control among Residents of Resource-Scarce Areas. Drawing primarily on self-efficacy within social cognitive theory and incorporating the Health Belief Model, Ding surveyed 116 residents in Xiaoshan District and Kaihua County, Zhejiang Province, to examine the gap between the dissemination of cancer-prevention information, public awareness, and the adoption of preventive behaviors.

Respondents demonstrated relatively good knowledge of some basic issues, including the association between smoked foods and gastric cancer and the purposes of cancer screening, but showed weaker understanding of cancer preventability and early symptoms. Nearly half reported that they never actively sought information about cancer prevention and control, while overall risk perception remained low. Based on these findings, the study proposed four forms of "distance": cognitive distance, belief distance, efficacy distance, and action distance. It argued that inadequate health communication outcomes cannot be attributed solely to individual deficiencies in knowledge or competence, but should instead be understood in relation to interacting geographic, economic, medical, cultural, and psychological conditions.

The discussion of this study centered on both conceptual distinctiveness and empirical comparison. Yang recommended clarifying how the proposed concept of "distance" differs from established concepts such as the knowledge gap and why an additional conceptual framework is necessary. She also suggested strengthening the measurement of self-efficacy. He observed that the available sample and comparison criteria were insufficient to establish the magnitude of health communication disparities in resource-scarce areas and therefore recommended incorporating either a comparison group from less resource-constrained settings or appropriate baseline data.

Considered together, these two studies highlight a common limitation of information-centered explanations of health behavior. Knowing about a health risk does not necessarily translate into the ability to act on that knowledge. For migrant workers with pneumoconiosis, health practices are embedded within economic pressures, family responsibilities, occupational histories, and unequal access to medical resources. For residents in resource-scarce areas, knowledge of cancer prevention must similarly be considered alongside perceived efficacy, resource availability, and broader geographic and social circumstances. Health communication, from this perspective, involves not only improving information provision but also understanding the structural conditions under which individuals can convert information into meaningful action.

Representation, Caregiving, and the Communication of Embodied Experience

The relationship between embodied experience and representation became especially visible in Junchen Chen, Mingxi Hang, and Yidi Zhang's study, When the Body Cannot Speak for Itself:

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Proxy Embodied Communication and Caregiver Translation of Autistic Experience. The study addressed a fundamental communicative problem: how bodily experience is interpreted and communicated when individuals may have difficulty consistently articulating that experience through verbal or nonverbal means.

Combining in-depth interviews with computational text analysis, the authors examined materials from caregivers of autistic individuals, relevant professionals, and mainstream media coverage. The findings suggested that long-term everyday interaction enables caregivers to interpret difficult-to-verbalize experiences through changes in behavior, emotion, and bodily condition and to translate these private experiences into narratives that can be understood in family, clinical, and public communication contexts.

The study proposed the concept of "proxy embodied communication" and distinguished three forms of practice: defensive proxy communication, interpretive proxy communication, and advocacy-oriented proxy communication. Importantly, caregiver translation was not conceptualized simply as speaking in place of autistic individuals. Rather, the study emphasized an ongoing negotiation among communicating lived experience, preserving individual subjectivity, and facilitating broader social understanding.

Media representation added another dimension to this process. Although mainstream media can enhance the public visibility of autism, particular reporting frames may simplify or obscure the complexity of autistic embodied experience. The question is therefore not merely whether autism becomes visible in public discourse, but which experiences become visible, through whose interpretation, and in what form.

The discussants strongly recognized the clarity and social relevance of the research question while noting the analytical difficulty of simultaneously incorporating autistic individuals' embodied experiences, caregivers' interpretations, and media representations as distinct units of analysis. They recommended centering the analysis more clearly on caregiver translation and public media representation and specifying the comparative logic between these two forms of material. In particular, examining which experiences are accurately translated, over-translated, or obscured could make the process of "translation" more analytically visible.

The discussion also raised a broader problem of representational selectivity. Public communication about autism may emphasize narratives of social assistance or a relatively small number of exceptional "genius" cases while providing less visibility to the everyday embodied experiences of many autistic individuals. Comparing caregiver interviews with media texts may therefore offer a way to examine both the possibilities and limitations of mediated representation.

This study extends the panel's discussion of vulnerability beyond access to information and resources toward the broader questions of representation and ethics. When health or bodily experience is communicated through another person, communicative support and representational authority become closely intertwined. The resulting challenge is not simply how to make vulnerable populations more visible, but how to communicate their experiences without reducing their complexity or displacing their subjectivity.

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Cross-Cutting Theoretical, Methodological, and Ethical Reflections

Although the five studies differed substantially in their populations, theoretical frameworks, and methods, the discussion led by Professor Yang and Professor He revealed several recurring concerns of broader relevance to health communication research.

The first concerns conceptual clarity and theoretical contribution. Across studies involving AI-generated aging, digitally mediated support, health rationality, communicative "distance," and proxy embodied communication, the discussants repeatedly emphasized the importance of specifying what a new concept adds to existing theoretical explanations. Emerging technologies or novel empirical settings do not necessarily constitute theoretical innovation in themselves. Their analytical value depends on whether the relationships among concepts, mechanisms, and established theoretical questions are made explicit.

The second concerns the alignment of research questions, methods, and evidence. The panel included experimental research, mixed-methods designs, surveys, digital ethnography, interviews, grounded theory, structural equation modeling, and computational text analysis. This methodological plurality expands the possibilities for studying vulnerable populations, but it also increases the need for coherence between the question being asked and the evidence used to answer it. Concerns raised during the discussion—including factorial experimental design, sample size for structural equation modeling, comparison groups in survey research, the use of multiple units of analysis, and the fuller use of qualitative materials—point to a shared need for methodological choices to remain proportionate to the claims being made.

A third concern involves sampling, visibility, and representation. Research conducted through social media or other digital settings may make certain vulnerable populations more accessible to researchers while simultaneously excluding those who are less digitally visible. The pneumoconiosis study, for example, raised the question of patients who do not or cannot speak publicly online, while the autism study highlighted the possibility that media narratives may selectively represent particular experiences. These issues suggest that visibility in mediated environments should not automatically be treated as representative of the broader population.

Finally, several studies raised ethical questions associated with emerging forms of mediation. AI-generated facial images involve privacy and data-security considerations, while research on eating disorders, occupational disease, and autism requires careful attention to stigma, vulnerability, and the consequences of representation. In studies involving proxy communication, ethical attention is also required to the relationship between making an experience communicable and preserving the subjectivity of the person whose experience is being represented.

Taken together, these concerns suggest that methodological innovation in health communication research needs to be accompanied by equally careful conceptual and ethical reasoning. New technologies and new forms of data expand what researchers can observe and analyze, but they also make questions of interpretation, representation, and research responsibility increasingly important.

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Conclusion

The five studies presented in Panel 3 of MHM 2026 approached bodily experience and health communication among vulnerable populations from markedly different empirical and methodological perspectives. Yet considered together, they reveal a set of closely connected concerns. Bodily and health experiences are mediated through technologies, interpersonal relationships, social institutions, and public representations; access to health-related information does not necessarily translate into the capacity to act; and greater communicative visibility does not automatically ensure accurate or equitable representation.

The studies also demonstrate the value of methodological plurality. Experimental approaches illuminate psychological and emotional mechanisms, surveys identify patterns in knowledge, efficacy, and behavior, while ethnographic, interview-based, and textual approaches reveal how vulnerability is experienced and negotiated within specific social and communicative contexts. At the same time, the panel discussion underscored that methodological diversity must be accompanied by conceptual precision, coherent research design, adequate empirical support, and careful attention to ethical and representational concerns.

Viewed as a whole, Panel 3 suggests that health communication involving vulnerable populations is best understood not simply as the transmission of information, but as a process through which embodied experiences are interpreted, mediated, supported, constrained, and represented. Future research in this area may therefore benefit from bringing individual-level psychological processes into closer dialogue with digital environments, social relationships, structural inequalities, and questions of communicative agency. Such an approach can provide a more comprehensive understanding of how vulnerable populations encounter health information and, more importantly, how they are able to interpret, communicate, and act upon it.

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The Importance of Long-term Confidence in Vaccines and Immunization Programs: A Conversation with Dr. Lance Rodewald

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Abstract

How can health communication sustain public vaccine confidence and adapt global frameworks to local social realities? On July 18, 2026, during the MHM2026 conference at Peking University, we interviewed Dr. Lance Rodewald, Senior Advisor for National Immunization Programs at China CDC. Drawing on decades of experience at the U.S. CDC, WHO China Office and China's national immunization program, Dr. Rodewald identifies confidence as the core of the 3C model and holds that two-way listening outweighs one-way advocacy in effective health communication. In this exclusive interview, he discusses China's immunization communication strengths, non-program vaccine uptake, misinformation responses, and research advice for young scholars.

Keywords: vaccine confidence; health communication; 3C model; national immunization program; vaccine hesitancy; social listening

Introduction

"Vaccines don't save lives. Vaccinations save lives." This quote comes from the first supervisor of Dr. Lance Rodewald at the U.S. Centers for Disease Control and Prevention, Dr. Walter Orenstein, who often goes on to say, "a vaccine that stays inside a vial has zero effectiveness" (Orenstein, 2019).

The 9th Medicine, Humanity and Media International Conference on Health Communication (MHM2026) opened on July 18 at the School of Journalism and Communication, Peking University. Dr. Lance Rodewald[1], Senior Advisor for National Immunization Programs at the Chinese Center for Disease Control and Prevention, delivered a keynote speech titled Vaccine Confidence: Challenges and Opportunities. He previously served as Director of the Immunization Services Division at the U.S. CDC and Team Lead of the Expanded Programme on Immunization at the WHO China Office. He has advised China's national immunization programme since 2018 and received the Chinese Government Friendship Award in 2023.

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Following his keynote address, we conducted a nearly 40-minute dialogue with Dr. Rodewald[2]. We raised questions collected from ourselves and conference attendees. He highlighted China's remarkable achievement of high and equitable immunization coverage. He explained why he prioritizes confidence over hesitancy within the 3C model. He also discussed why fear-based communication rarely works and shared the origin of the statement that a vaccine in a bottle has no effectiveness. His advice for early-career researchers is straightforward. Communication works both ways. Listening is often more important than speaking.

Strengths, Enduring Challenges, and 3C Model Application in China's Vaccine Communication

Q1: You've worked in immunization communication across US CDC, WHO, and China CDC for decades. From your perspective, what are the most unique strengths of China's local vaccine communication work, and what is the biggest ongoing challenge?

A: From my perspective, the signature achievement of China's immunization program is its ability to maintain very high and relatively uniform coverage for vaccines included in the national program. That is more than a communication success. Communication matters, of course, but what really stands out is that the program itself works to make vaccines convenient, accessible, and available to the public. Because of that, coverage has remained relatively even across both wealthier and poorer regions. To me, that is one of the most important achievements of the program.

At the same time, the ongoing challenge is how to maintain public confidence — confidence in the vaccines, confidence in the program, and confidence in the way the system operates. If you look at vaccines outside the program, coverage is much lower and varies more by socioeconomic conditions. Although I have always felt that hesitancy matters, but hesitancy is often temporary, while confidence has to be maintained for all time.

Q2: I once heard Director Lixin Hao say that China uses social listening and the 3C model to address vaccine hesitancy. How well do these two tools work in real domestic practice?

A: I think the 3C model absolutely applies in China. The three Cs are Confidence, Convenience, and Complacency. Confidence is very important because you want people to be confident in the vaccines themselves, in the program, and in the way vaccines are delivered and monitored. Convenience matters as well, because parents have to invest a great deal of time and effort to bring their children for vaccination, especially during infancy when there are so many visits. Then there is complacency, which comes in when people begin to think, "I've never seen measles, I've never seen polio, so why does my child still need these vaccines?"

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These three factors interact and shape parents' decisions. But if you ask which one I focus on most, it is confidence, because hesitancy may be short-term, while confidence has to be sustained over time. As for social listening, I think effective communication is not simply about telling people that vaccines are safe and effective and that they should go get vaccinated. It is much better to listen first, to understand what parents are thinking and what they are worried about, and then address any questions that they raise with accurate answers. Communication is never just talking; it is also very much about listening.

Local Adaptation of Global Health Communication Frameworks and Public Attitudes Toward Non-National Immunization Program Vaccines

Q3: This conference focuses on localizing international health communication experience. When we adapt mature overseas communication frameworks to China, what is the hardest part to match with our local social context?

A: I think the hardest part is not translating a framework or importing a method in the abstract sense. The hardest part is that social context, public perceptions, institutional arrangements, and vaccination attitudes can differ from country to country. Perceptions of vaccination vary a great deal, and they are deeply local. Programs operate differently in different countries, and sometimes even the vaccines used are different, so local information is extremely important.

Immunization programs are national programs, which means communication has to fit the realities of the society in which the program operates. If a country wants the program to work well, it has to engage with society, engage with stakeholders, and especially engage with parents in thinking through what the program should look like, what it should do, what it should protect against, and how convenient it should be. What really matters is not forcing an international framework onto a local setting, but making sure the communication approach truly fits the local social context.

Q4: Many popular parenting influencers online recommend only free program vaccines and advise parents against optional self-paid vaccines. What is your opinion on this trend?

A: I would say this is not just a communication issue. Program vaccines have much more behind them than simply being free. They come with government recommendations, financing support, and a complete public health delivery system. They are officially recommended, free, and readily available, so naturally they achieve much higher coverage. Non-program vaccines are different. Parents are not necessarily uninterested in them; rather, these vaccines often require out-of-pocket payment, are not usually covered by insurance, and are more affected by cost and convenience.

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This kind of hesitancy is often tied to practical realities such as payment and convenience, rather than attitude alone. That is also why, in China, one of the most effective ways to raise coverage for a vaccine is to bring it into the national program. China is already moving in that direction step by step through its national advisory mechanisms, using evidence on safety, effectiveness, burden of disease, cost-effectiveness, and supply security to decide which vaccines should be added to the national program.

Long-Term Risk Perception and Making Macro Numbers Meaningful

Q5: You mentioned in your speech that "immunization will be important forever". As new pathogens keep emerging, how can health communication help the public build long-term, rational views on health risks? How do we strike a good balance between reminding people of risks and avoiding unnecessary public panic?

A: I do think immunization will be important forever — because these pathogens aren't going away, and new ones will keep emerging. One of the keys is maintaining public confidence: confidence in the vaccines themselves, in the immunization program, and in the evidence-based recommendations that determine which vaccines are included. People need to understand that this is a program that is fundamentally good for children's health.

I like to compare it to universal education. In China, for example, there are nine years of compulsory schooling. People may debate whether the curriculum has too much science or math, or whether it should include more of this or that — but no one seriously argues that children don't need to be educated. Immunization is very similar.

These diseases aren't disappearing; we'll likely need to vaccinate indefinitely. The goal is for people to understand why vaccines matter, what they can and cannot do, and what could happen if children aren't vaccinated. Fundamentally, we want families to understand why vaccination is good — not just for their own child, but for all children. Communication plays a central role here.

Education systems are also part of that communication. Schools reach students from a young age and can teach them, over time, why immunization matters, so that by the time they become adults, this understanding is second nature.

Another crucial form of communication is engaging society more broadly: talking with parents and all key stakeholders about what the program should look like, which vaccines are most important, and how to prioritize them. Long-term, sustainable programs depend on ongoing dialogue with the people they serve.

At the same time, a fair amount of research suggests that fear-based messaging rarely works. Take COVID-19: at the beginning, we simply didn't know enough to give precise risk estimates. With familiar diseases — like influenza, measles, or polio — we have decades of data and can

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speak more confidently about likely outcomes. But scaring parents is almost never an effective strategy. People respond better to realistic, balanced information.

For example, many people in my generation had measles as children and survived. But the reality is that today, about 1 in 1,000 children who get measles will die from it(Centers for Disease Control and Prevention, 2025). We shouldn't tell parents "your child might die," but we should be honest: measles can lead to pneumonia or other serious complications. Most children recover, but we can't predict who will have the worst outcome. That's exactly why understanding the stakes — and acting on them — is so important.

Q6: You've shared the huge public health gains of China's 50-year Expanded Programme on Immunization — it prevented hundreds of millions of illnesses and millions of deaths. How can we turn these big macro statistics into relatable stories and values that ordinary families can truly understand?

A: That's a great question — and very much a communication challenge. How do you make enormous numbers meaningful?

Some examples are relatively easy to explain. Take measles: before the vaccine, essentially every child got measles. Today, almost no one does. That contrast is straightforward.

Hepatitis B is another compelling case. For decades, around 10% of the population here had chronic hepatitis B infection(Cui et al., 2017). When the vaccine was introduced in the early 1990s — with a strong focus on the birth dose to prevent mother-to-child transmission — everything changed(Cui et al., 2017). Among children under five, chronic hepatitis B prevalence has dropped to about 0.3%. That's a 97% reduction, and protection lasts decades, likely a lifetime(Zheng et al., 2024, of which Dr. Rodewald is a co-author). That's a story people can grasp.

On the other hand, concepts like "millions of disability-adjusted life years saved" are harder to convey. Economists understand DALYs, and you can explain what they mean — but it's difficult for most people to truly feel what that represents. In contrast, "seven million vaccine-preventable child deaths averted" (Wang et al., 2025)is something parents can relate to much more directly. Big numbers only become powerful when they're anchored in human experiences.

Why "Vaccines Don't Save Lives, Vaccinations Do" Resonates

Q7: Why do you think the line "Vaccines don't save lives. Vaccinations save lives." carries such powerful communication impact?

A: That line — "Vaccines don't save lives. Vaccinations save lives." — was coined by Walter Orenstein, who was my first boss at the U.S. CDC. I've always loved it.

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Those of us working in immunization tend to say, “Vaccines save lives,” almost reflexively. But Dr. Orenstein corrected that. He pointed out: if a vaccine just sits in the vial, it saves no one. A vaccine in the bottle has zero effectiveness. The real impact only happens when it actually gets into people's arms.

The power of the phrasing comes from the surprise factor. The first sentence catches you off guard; the second makes immediate sense. It's clever, memorable, and it reframes the conversation — from the product itself to the act of vaccination. That's why it sticks.

Talking with Hesitant Parents and Countering Online Misinformation

Q8: You pointed out vaccine hesitancy is uncertainty, not just outright refusal. How should health communication adjust its mindset to better connect with hesitant parents?

A: Vaccine hesitancy isn't just outright refusal — it's a state of uncertainty. It's normal for parents to have questions, but we don't want that hesitation to delay or prevent vaccination altogether.

Hesitancy often stems from gaps in understanding: parents may not know how serious the disease is, whether the vaccine is well-managed, what side effects might occur, or even whether the vaccine is necessary in the first place.

Overcoming hesitancy means having real conversations — with parents, with patients. Ask: “What questions do you have about this vaccine?” Acknowledge their concerns: “I understand you're worried about vaccinating your child.” Then listen, and provide clear, factual information in response.

Simply saying “all vaccines are safe and effective, just do it” doesn't work nearly as well as listening first, understanding what people are thinking, and addressing their specific worries.

Q9: Vaccine-related online discussion has grown far more complicated in the social media era. Why do unproven false messages spread so fast online, and what should health communicators do to respond?

A: There's a lot of good information online — and a lot of misinformation. Even for experts, it can be hard to tell the difference in real time.

One essential step is for trustworthy institutions — the immunization program itself, among others — to consistently provide accurate, accessible information, so the public has a reliable benchmark for what's real.

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In the longer term, integrating vaccine science into school curricula should help. If people grow up understanding how vaccines work, they're better equipped to distinguish credible information from falsehoods later in life.

I'm also encouraged by the concept of "prebunking"(Roozenbeek et al., 2022) — getting ahead of misinformation by proactively sharing the facts before a false narrative spreads. The challenge, of course, is that this often turns into a tug-of-war between those spreading misinformation and those defending the truth.

My sense is, first, that you want to be on the right side of the argument — in other words, you want to be on the side of truth and accuracy when you communicate. Second, some people are better at communicating than others, and trusted sources are very helpful. Survey after survey shows that doctors and nurses remain the most trusted sources of vaccine information (Vaccine Administration Law, 2019) — far more than celebrities or influencers. People trust clinicians because they're seen as knowledgeable and acting in patients' best interests.

From Institutional Reform to Trust People Can Feel

Q10: Past vaccine incidents pushed China to launch major institutional reforms, including expert advisory panels and full vaccine regulatory laws. How can these improved systems translate into real public trust that people can feel?

A: When something goes wrong — such as the earlier vaccine incident, where vaccines were illegally purchased and improperly stored — the priority is to acknowledge it, investigate it, and change systems so it doesn't happen again. Whenever an event occurs that shouldn't have, the key is to identify it and then do something to make sure it doesn't recur.

I think that led to the development of the 2019 Vaccine Administration Law(Vaccine Administration Law of the People's Republic of China, 2019).

What's notable about that law is how it was developed: through extensive public engagement. Over more than a year, policymakers listened to parents, older adults, regulators, manufacturers, program managers, doctors, nurses — everyone. They asked: "What do you want this law to achieve? How should the system work?"

The resulting law is comprehensive. It covers the entire lifecycle of a vaccine: from research and clinical trials, to testing, manufacturing, regulation, approval, recommendation, distribution, administration, and post-marketing monitoring. It clearly defines responsibilities — for government, for manufacturers, for health workers, and for parents.

One powerful provision is traceability: every vaccine can now be tracked from the manufacturer all the way to a child's arm. Each batch is tested by regulators before release and carries a unique lot number. That traceability builds confidence — you know the cold chain was maintained, and that what's in the vial is exactly what it's supposed to be.

It also enables digital immunization registries, which support safety monitoring and effectiveness studies. During COVID-19, this digitization accelerated dramatically — many

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people accessed their vaccination records via their phones, and that system has remained in place. Today, big-data systems can link medical records with immunization data, allowing for proactive safety surveillance. These structural improvements are what strengthen the program.

Advice for Young Researchers and Future of Health Communication

Q11: For young students and researchers studying health communication today, which topics do you believe deserve our top research attention in the future?

A: The communication landscape is changing fast — especially with the rise of social media. One priority is figuring out how authoritative sources can effectively reach parents and the public amid all the noise.

We need more research on how to communicate accurate information in ways people will absorb. A long lecture on vaccine benefits may not work if people aren't motivated to listen. So: how do we sustain high levels of accurate knowledge in communities over time? That's a major challenge.

Countering misinformation is another unsolved problem. We're still learning how to do it well.

And then there's AI. At today's meeting, it felt like every presentation touched on artificial intelligence — I realized how much I have to catch up! But I do think developing authoritative, evidence-based AI tools could be transformative. If we can ensure those tools deliver accurate, trustworthy information, they could significantly boost public confidence. Understanding the role of AI in health communication is a task for the next generation of researchers — and it's a very promising one.

Q12: If you could leave one key piece of advice for young health communication researchers, what would it be?

A: My key piece of advice is simple: communication is a two-way street.

We need to listen to understand what people want to know, what they need to know, and what they care about. Only then can we help them make informed decisions that support a healthy, successful life.

It's not just about talking; it's about listening — often even more than talking. I love these conversations with you all. I enjoy listening during panel discussions or Q&A sessions, because the questions tell you what's really on people's minds.

Listening is a core part of communication, and it's what makes knowledge transfer truly effective.

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Closing Message for MHM2026

Q: What message would you like to share with the participants of MHM2026, and what are your hopes for the future of health communication?

A: A lot of this conference, I think, was about the science of communication and about improving communication. My own talk was about a program that needs good communication in order to be effective and to build confidence. So one of my messages for the people here and for everyone at the conference is that immunization would be a very good object of research and of communication — research into how to keep people confident, and what the best ways to do that are.

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Competing interests

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Notes

1. Dr. Lance E. Rodewald is Senior Advisor to the National Immunization Program at the Chinese Center for Disease Control and Prevention. Before joining China CDC, he worked for many years in immunization services at the U.S. Centers for Disease Control and Prevention, serving as Director of the Immunization Services Division from 2000 to 2012. From 2012 to 2017 he was Team Lead of the Expanded Programme on Immunization at the WHO Representative Office in China, and he has served as Senior Advisor to China's national immunization program since 2018. His work focuses on immunization service delivery,

evidence-informed immunization policy, vaccine confidence, and public health communication. He received the Chinese Government Friendship Award in 2023.

2. This article is based on an interview with Dr. Rodewald conducted on July 18, 2026, at Peking University, following his keynote address at the 9th "Medicine, Humanity and Media" International Conference on Health Communication (MHM2026), titled "Vaccine Confidence: Challenges and Opportunities." The transcript has been edited for length and clarity and was reviewed and approved by Dr. Rodewald.

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