

---

AI translation · View original & related papers at  
[chinaxiv.org/items/chinaxiv-202302.00109](https://chinaxiv.org/items/chinaxiv-202302.00109)

---

## The Effect of Social Norm Types on Persuasive Health Information Adoption Intention

**Authors:** Qian Minghui, Zhao Mengchun, Zhao Mengchun

**Date:** 2023-02-14T00:00:00+00:00

### Abstract

**Purpose/Significance** This study examines the effects of descriptive and injunctive social norms on promoting individuals' willingness to adopt persuasive health information, introduces social belonging needs and perceived risk to explain the underlying mechanisms of this process, and discusses the moderating role of social distance. It aims to provide health science communicators with strategies for optimizing information persuasion effectiveness while expanding localized research on social norm theory. **Methods/Process** I Based on social norm theory, research hypotheses were derived; experimental and questionnaire survey methods were employed to collect data; and the Bootstrap method was used to test mediating and moderating effects. **Results/Conclusions** I The findings reveal that in the Eastern cultural context, descriptive social norms exhibit superior persuasive effects compared to injunctive social norms; social belonging needs and perceived risk each play a partial mediating role in this process; and social distance can moderate the predictive effect of social norm information on willingness to adopt persuasive health information.

### Full Text

#### Preamble

#### Research on the Influence of Social Norm Types on Willingness to Adopt Persuasive Health Information

Qian Minghui<sup>1,2</sup>, Zhao Mengchun<sup>1</sup>

(1. School of Information Resource Management, Renmin University of China, Beijing, 100872;

2. Information Analysis Research Center, Renmin University of China, Beijing, 100872)

## Abstract

**[Purpose/Significance]** This study investigates the differential effects of descriptive and injunctive social norms on promoting individuals' willingness to adopt persuasive health information. It introduces social belonging needs and perceived risk to explain the underlying mechanisms of this process and examines the moderating role of social distance. The findings provide health science communicators with strategies to optimize message persuasiveness while expanding localized research on social norm theory. **[Methods/Process]** Based on social norm theory, research hypotheses were derived. Experimental and questionnaire methods were employed to collect data, with Bootstrap methods used to test mediating and moderating effects. **[Results/Conclusions]** The study reveals that in Eastern cultural contexts, descriptive social norms demonstrate superior persuasive effects compared to injunctive social norms. Social belonging needs and perceived risk each play partial mediating roles in this process, while social distance moderates the predictive effect of social norm information on willingness to adopt persuasive health information.

**Keywords:** descriptive social norms; injunctive social norms; persuasive health information; adoption intention

**Classification Number:** G203

## 1. Introduction

As living standards improve and health consciousness rises, the pursuit of healthy lifestyles has gained increasing traction, leading to more urgent demand for health information. In 2019, the State Council issued the "Opinions on Implementing the Healthy China Initiative," which prioritized health knowledge dissemination as its primary task. The 2022 "14th Five-Year Plan for National Health" further called for comprehensive interventions on health issues and influencing factors, establishing a multi-platform health science communication mechanism and strengthening health promotion education. The 20th Party Congress report also emphasized "advancing Healthy China construction and prioritizing people's health in development strategies." With strong policy support, numerous social media platforms and websites in health science communication have emerged, producing substantial high-quality health information. However, as public health literacy remains in need of continuous improvement, most individuals merely browse health information without substantive behavioral change. In other words, the persuasive effectiveness of much current health science communication is less than ideal. Additionally, rapid development of internet technology has enabled the public to independently access health information online to meet diverse needs, requiring continuous optimization of health information content and dissemination methods to serve the improvement of national health literacy.

Early health information was limited to disease diagnosis and treatment plans for patients. With increasingly complex health information users and diversified

information needs, current health information now encompasses comprehensive health-related content including disease prevention, nutrition, medical policies, and treatment consultations [1]. Research shows that persuasive messages can enhance the effectiveness of health information dissemination and influence individual health behavior decisions [2]. Unlike general health information primarily aimed at science popularization, persuasive health information emphasizes raising awareness of health issues during information transmission to change health perceptions and ultimately convince people to take health-promoting actions [3]. This study defines persuasive health information as health information that aims to improve public health knowledge while ultimately achieving health behavior change as its final goal. Therefore, how to design persuasive health information content and formats to effectively guide positive health actions and genuinely improve public health levels constitutes a critical issue affecting the success of the national Healthy China strategy.

Human social nature requires continuous interaction with other societal members, during which individuals inevitably accept others' viewpoints and influences. Social norms represent shared value criteria formed through social interaction that regulate behavior [4-5]. Norm Focus Theory posits that many positive behaviors occur not due to good conscience but because of social norm influence [6]. Western scholars first recognized in the 1970s that social norms could change individual attitudes and behaviors, as people often use others' behavior as guidance for their own actions and tend to conform to majority decisions [7]. A series of studies demonstrate that incorporating social norm cues in messages can effectively enhance information adoption willingness and guide people toward advocated behaviors [8-9]. In daily life, we frequently encounter health slogans such as "80% of young people have developed the habit of exercising 3 hours per week" versus "Young people are advised to exercise 3 hours per week." Do these different expressions produce varying persuasive effects? Which slogan more effectively convinces people to adopt health-promoting actions? To address this, this study examines the differential impacts of descriptive and injunctive social norms on willingness to adopt persuasive health information, introduces social belonging needs and perceived risk to explain the underlying mechanisms, and further discusses the moderating role of social distance. The findings will provide a simple and practical solution for enhancing health information persuasiveness while expanding the applicability of social norm theory in collectivist cultures.

## 2.1 Connotation and Types of Social Norms

The concept of social norms originated from the Theory of Reasoned Action (TRA), representing behavioral criteria, rules and regulations, customs, laws, and ethical value standards that gradually form based on social culture for society, groups, and their members [10]. Social norms are thus considered effective means of guiding individual behavior: when individual behavior aligns with norms, individuals receive social approval; when behavior deviates from socially

recognized norms, individuals face social criticism and exclusion [11]. R. Cialdini et al.'s Focus Theory of Normative Conduct categorizes social norms into descriptive and injunctive social norms [12].

Descriptive social norms represent what most people do—the “is” aspect of social norms—following the principle “most people do it, so I will too,” similar to conformity behavior (e.g., “90% of people brush their teeth twice daily”). Injunctive social norms refer to behavioral standards that most people approve or disapprove of—the “ought” aspect of social norms (e.g., “People agree that smoking is harmful to health”) [13]. Based on the Heuristic-Systematic Model, Zhang et al. propose that descriptive social norms describe most people's behavior, allowing individuals to make judgments directly based on external cues through “conformity psychology” without investing much time or effort, thus activating heuristic information processing. In contrast, injunctive norms present group opinions of approval or disapproval, requiring individuals to mobilize their own value judgments and engage in appropriate deliberation, resulting in slower processing and activating systematic information processing [14].

Focus Theory of Normative Conduct suggests that descriptive and injunctive social norms only take effect when attention is drawn to normative information [15]. Typically, people prioritize noticing descriptive norms and use them as focal information to guide their behavior, making descriptive norms more easily activated than injunctive norms [16]. However, in many scenarios, although people generally know what constitutes health-beneficial behavior, inconsistencies between words and actions frequently occur. For example, people agree that “smoking is harmful to health” (injunctive social norm), yet many still smoke (descriptive social norm). This indicates that the effects of descriptive and injunctive social norms are not always consistent, producing different outcomes when influencing decision-making. Therefore, this study examines descriptive and injunctive social norms as research objects, investigating their respective effects and underlying mechanisms.

## 2.2 Influence of Social Norms on Behavioral Decision-Making

Social norms, as a social psychological theory explaining behavioral decision-making, have garnered widespread research attention. Studies find that descriptive and injunctive social norm information can intervene in behavioral decision-making, thereby guiding positive group activities, preventing or reducing undesirable behaviors, and improving social governance.

R. Cialdini et al. discovered through experiments that when conveying congruent information, combining both norm types is more effective than using either alone [17]. However, when positive injunctive norms and negative descriptive norm information coexist—for instance, when people observe others littering (descriptive norm) alongside reminders prohibiting littering (injunctive norm)—the tendency to first observe others' behavior makes descriptive norms the focus

of attention, thereby weakening the positive guiding effect of injunctive norms and resulting in continued littering [18]. Guo et al. found that under consistent normative directions, descriptive and injunctive norms mutually moderate to promote farmers' pro-environmental behaviors, but when the two types of social norm information conflict, injunctive norms may have insignificant effects, suggesting descriptive norms exert more robust influence than injunctive norms [19].

Foreign scholars have explored social norm effects in health behavior contexts. J. Burger et al. found that descriptive norm information could guide people to choose stairs over elevators more frequently, and that this behavior persisted after removing descriptive norm information, indicating descriptive norms facilitate healthy habit formation [20]. C. Ben et al. argue that designing effective health intervention strategies can correct or transform negative injunctive norms and guide people toward proper health concepts [21]. However, few studies have examined differential effects of the two norm types on health behaviors, and exploration of these mechanisms remains unclear.

Since social norms depend on specific contexts to function and require attentional focus as a prerequisite for effectiveness, current research conclusions on descriptive versus injunctive norm effects vary, with limited attention to how social norm cues in health information guide health behavior decisions. Based on this, this study uses health information adoption willingness as the dependent variable to investigate differential impacts of the two norm types, aiming to enrich theoretical foundations of social norm research and expand localized studies of social norm theory in health informatics.

### **2.3 Research on Factors Influencing Persuasive Health Information Adoption Willingness**

According to persuasion communication theory, persuasive information refers to message forms that induce corresponding psychological changes in persuasion targets during information transmission to achieve attitude acceptance and even behavioral change [22]. The ultimate goal of health information dissemination is persuading audiences to change original concepts and adopt health-beneficial actions. Therefore, unlike general health information primarily for science popularization, persuasive health information focuses on changing health attitudes and subsequent willingness to adopt recommendations, exerting more direct impacts on people's health status. Rising national health demands require health social media and website platform designers to optimize health information expression according to specific audiences and contexts to enhance persuasiveness for different population groups [23]. Social norm information persuades people to take action by indicating "what behaviors are feasible in a specific environment," serving as an effective information cue for changing attitudes and behaviors and providing a simple information design strategy for enhancing health information persuasiveness.

Health information adoption refers to individual behavior where users analyze, judge, and evaluate health information based on personal health needs before making behavioral decisions. This concept emphasizes both users' internalization of health information and the actual behavioral impact following internalization [24]. Health information adoption directly affects health improvement and constitutes a critical link in health information dissemination. J. Jin et al. constructed a medical health information adoption model based on knowledge adoption theory, finding that information quality, emotional support, and information source credibility significantly and positively influence patients' likelihood of adopting health information, with information quality—i.e., the persuasiveness of information resources—having the greatest impact [25]. Wang Wei used grounded theory methods to discover that information expression style is a key information factor affecting elderly groups' perceived credibility of health information and health information adoption behavior [26]. Therefore, this study adopts an information factors perspective, using descriptive and injunctive social norms as persuasive information cues to explore differential effects of the two norm types on health information adoption willingness and explain underlying mechanisms and moderating factors.

### 3.1 Social Norms Influence Health Information Adoption Willingness

Social norm information serves as an effective nudge for changing behavioral decision-making, capable of intervening in health behaviors through low-cost, easily implemented methods. Research indicates that descriptive and injunctive social norms do not always produce consistent effects on behavioral decision-making but depend on specific contexts and require becoming the focus of attention to function [27]. According to the Heuristic-Systematic Model (HSM), descriptive social norms activate heuristic information processing mode, allowing direct judgment based on external cues. Under “conformity psychology,” people trust collective wisdom and simply observe most people's behavior to follow majority decisions. Injunctive social norms activate systematic information processing mode, requiring more cognitive effort for value judgment, slower processing, and more difficult activation compared to descriptive norms. The HSM model suggests people tend to invest less cognitive effort in information processing, typically activating heuristic processing first. Moreover, in Chinese contexts, Easterners have lived in groups for generations, deeply influenced by collectivist thought, making them more susceptible to group behavior influence [28]. Descriptive social norm information cues most people's practices, implying that majority choices are correct. Therefore, compared to injunctive social norms, descriptive social norms more significantly enhance health information adoption willingness. Based on this, this study proposes H1:

**Hypothesis H1:** Descriptive social norm information has a superior promotional effect on health information adoption willingness compared to injunctive social norm information.

### 3.2 Mediating Role of Social Belonging Needs Between Descriptive Social Norms and Health Information Adoption Willingness

Maslow first proposed the concept of belonging needs in his hierarchy of needs theory, suggesting that belongingness essentially involves establishing friendships, maintaining harmonious interpersonal relationships, and avoiding exclusion, representing the second most important need after basic physiological needs [29]. R. Baumeister et al.'s Social Belonging Needs (SBN) theory explains motivations behind many human behaviors—people desire social connections and intimate relationships. When belonging needs remain unmet, individuals' most direct response involves actively socializing to establish new connections or conforming to existing social norms to achieve acceptance [30].

Social norms represent collectively recognized behavioral standards. Descriptive social norm information includes others' practices, implying correct choices by the majority. Driven by social belonging needs and the desire to integrate into groups and maintain social connections, people tend to adopt behaviors advocated in descriptive social norms [31]. Based on this, this study proposes H2:

**Hypothesis H2:** Social belonging needs play a mediating role in the influence process of descriptive social norm information on health information adoption.

### 3.3 Mediating Role of Perceived Risk Between Injunctive Social Norms and Health Information Adoption Willingness

Perceived Risk (PR) refers to people's perception of uncertainty regarding decision outcomes and severity of consequences from wrong decisions [32]. Health information contains substantial medical terminology difficult for readers to understand, creating considerable uncertainty. Perceived risk arising from this uncertainty influences health behavior decision-making. Perceived risk is frequently assessed to determine likelihood of behavior change and represents a key factor in health behavior prediction, commonly appearing in many health decision model studies [33].

Perceived risk exhibits multidimensional structures across different contexts. Song Xueyan identified financial risk, performance risk, and time risk as the three most concerning risk dimensions in user information adoption behavior [34]. Sun Zhumei categorized perceived risk in social media health information adoption into financial risk, time risk, psychological risk, and health risk [35]. Synthesizing previous research, this study argues that risks considered during health information adoption comprise health risk, psychological risk, and financial risk: perceived health risk refers to potential health loss from avoiding information; perceived psychological risk refers to anticipated psychological pressure such as regret or worry from avoiding information; perceived financial risk refers

to potential future financial loss from avoiding information.

This study posits that injunctive social norm information reflects group-approved health concepts or behaviors. When encountering injunctive social norm information, people activate systematic information processing mode, investing more mental resources in deep thinking and more easily associating severe consequences of violating these norms, thereby stimulating perceived risk. Therefore, this study argues that injunctive social norm information may influence persuasive health information adoption willingness through perceived risk as a mediator. Based on this, this study proposes H3:

**Hypothesis H3:** Perceived risk plays a mediating role in the influence process of injunctive social norm information on health information adoption willingness.

### 3.4 Moderating Role of Social Distance in Social Norms' Effect on Health Information Adoption Willingness

Construal Level Theory (CLT) effectively explains behavioral decision-making differences, as individuals' construal levels depend on psychological distance from objects [36]. For psychologically close objects, people focus on concrete, superficial, peripheral features, activating low-level construal; conversely, for distant objects, people tend to focus on abstract, essential, core features, adopting high-level construal [37]. Psychological distance includes temporal distance, spatial distance, social distance, and hypothetical distance—four interrelated and mutually influential dimensions.

Social distance, as one manifestation of psychological distance, refers to inconsistencies between self and others in behavioral decision-making [38]. Research shows that social distance affects individuals' psychological distance from cognitive objects: when making decisions for oneself (close social distance scenario), people use low-level construal to attribute behavior to situational factors, prioritizing decision implementation feasibility; when making decisions for others (distant social distance scenario), people use high-level construal to attribute behavior to dispositional factors, prioritizing decision value [39]. This study argues that when making decisions for oneself (close social distance), people focus more on concrete information. Descriptive norm information typically includes specific values indicating group behavior universality, triggering attentional focus and making descriptive norms more easily activated. Most people's behavior is generally considered correct and feasible. Driven by social belonging needs, people hope to gain group acceptance by imitating others' behavior, thereby promoting individual adoption of persuasive health information recommendations. Therefore, different social distances may moderate the promoting effect of social belonging needs on health information adoption willingness. Compared to self-decisions, people making decisions for others (distant social distance scenario) focus more on essential information, tend to identify the most important dimension, emphasize core dimension optimization, adopt high-level construal for

deep and careful thinking, and make more rational judgments [40]. When making health behavior decisions for others, people prioritize others' health needs. To avoid health risks from others' failure to take timely action, people prefer "action" over "inaction," thereby strengthening willingness to adopt health information recommendations. Therefore, different social distances may also moderate the promoting effect of perceived risk on health information adoption willingness. Based on these inferences, this study proposes H4a and H4b:

**Hypothesis H4a:** Social distance moderates the effect of social belonging needs on health information adoption willingness.

**Hypothesis H4b:** Social distance moderates the effect of perceived risk on health information adoption willingness.

Integrating the above hypotheses, the research models are constructed as shown in Figure 1 [Figure 1: see original paper] and Figure 2 [Figure 2: see original paper]:

Figure 1 Research Model with Social Belonging Needs as Mediator

Figure 2 Research Model with Perceived Risk as Mediator

## 4.1 Experimental Design

This study employed a 2 (descriptive social norm group vs. injunctive social norm group)  $\times$  2 (close social distance vs. distant social distance) between-subjects factorial experiment, collecting experimental data through questionnaires. The survey comprised three parts:

The first part presented experimental materials. This study selected "LXD analysis examination" as a health examination item applicable to most people to exclude interference from specific diseases on health information familiarity among particular populations. Participants read a passage about LXD analysis examination health information, which introduced the examination's importance and function, with persuasive messages prominently highlighted in the title and conclusion encouraging people to schedule an LXD analysis examination. Drawing on W. Schultz et al.'s social norm activation methods [41], this study developed corresponding social norm messages. Specifically, the descriptive social norm  $\times$  close social distance persuasive message stated: "During a health science promotion activity, 80% of people scheduled an LXD analysis examination for themselves after learning about it." The descriptive social norm  $\times$  distant social distance message stated: "During a health science promotion activity, 80% of people scheduled an LXD analysis examination for their friends after learning about it." The injunctive social norm  $\times$  close social distance message stated: "During a health science promotion activity, after learning about LXD analysis examination, people strongly agreed on the importance of eye health and expressed that they should schedule an LXD analysis examination for themselves." The injunctive social norm  $\times$  distant social distance message stated: "During a health science promotion activity, after learning about LXD

analysis examination, people strongly agreed on the importance of eye health and expressed that they should schedule an LXD analysis examination for their friends.” After reading these materials, participants answered fill-in-the-blank questions related to the social norm content to deepen impression and provide a basis for excluding invalid questionnaires.

The second part involved manipulation checks. Drawing on Ge Wanda et al.’s manipulation check methods in research on social norms’ influence on green consumption [42], this study designed manipulation check items (7-point Likert scale, 1 = “strongly disagree,” 7 = “strongly agree”). The descriptive social norm group answered: “Does this material make you think about what other people are doing?” The injunctive social norm group answered: “Does this material make you think about what other people approve of?”

The third part measured experimental variables. The social belonging needs scale [43], perceived risk scale [44], and health information adoption willingness scale [45-46] were all adapted from established scales, with each variable measured by three 7-point Likert scale items. The social belonging needs scale included reverse-coded items. Additionally, control variables were measured, including participants’ perceived expertise, credibility, involvement, and familiarity with the health information. Finally, basic demographic information was collected, including gender, age, and education level.

Before formal experimentation, multiple experts with health informatics research backgrounds were invited for pre-testing to optimize questionnaire material design, layout structure, and language expression. Formal experiments began on August 25, 2022, lasting 14 days. The study recruited 240 participants through Wenjuanxing platform, randomly assigned to four groups. To ensure experimental quality, questionnaires did not support resumption after interruption, and only one response per IP address was allowed. After excluding invalid samples, this study obtained 223 valid samples (92.9% valid response rate), including 121 males and 102 females (male-to-female ratio 1.19:1). Participants aged 18-30 accounted for 50.5%, and over 59.1% held bachelor’s degrees or higher. Descriptive statistical analysis and sample size distribution across groups are shown in Table 1 and Table 2. Using G\*Power 3.1.9.7 for sample size estimation, a minimum of 210 participants was required for two-way ANOVA to achieve 95% statistical power ( $1-\beta$ ) at medium effect size  $f=0.25$  and significance level  $\alpha=0.05$ . This study’s valid sample size exceeded the minimum requirement.

**Table 1** Sample Descriptive Statistics

**Table 2** Sample Size Distribution Across Groups

### 4.2.1 Manipulation Check

This study first tested the manipulative effectiveness of experimental materials. The descriptive social norm group scored significantly higher ( $M = 5.036$ ) than the injunctive social norm group ( $M = 4.205$ ,  $t = 4.271$ ,  $p < 0.001$ ) on

the manipulation check item “Does this material make you think about what other people are doing?” Conversely, the injunctive social norm group scored significantly higher ( $M = 4.741$ ) than the descriptive social norm group ( $M = 4.036$ ,  $t = -3.303$ ,  $p = 0.001$ ) on the item “Does this material make you think about what other people approve of?” These results indicate that social norm information manipulation in the experimental materials was effective.

### 4.2.2 Reliability and Validity Tests

This study used Cronbach’s  $\alpha$  coefficient to test reliability of the social belonging needs, perceived risk, and health information adoption willingness scales. After reverse-coding and recoding items in the social belonging needs scale, all variables achieved Cronbach’s  $\alpha$  values greater than 0.7, indicating good consistency. For validity testing,  $KMO = 0.759 > 0.7$ , Bartlett’s test  $p = 0.000$ , and all variable factor loadings exceeded 0.6, demonstrating good overall questionnaire validity. Reliability and validity test results are shown in Table 3 .

**Table 3** Reliability and Validity Tests of Variable Measures

### 4.2.3 ANOVA

This study conducted a  $2 \times 2$  two-way ANOVA with social norms and social distance as independent variables,  $F(1,212) = 21.547$ ,  $p < 0.001$ ,  $\eta^2 = 0.092$ . Health information adoption willingness under descriptive norms ( $M = 5.831$ ,  $SD = 1.048$ ) was significantly higher than under injunctive norms ( $M = 5.271$ ,  $SD = 0.938$ ), supporting Hypothesis H1. The main effect of social distance was not significant ( $F(1,212) = 0.737$ ,  $p = 0.392$ ), and a significant interaction existed between social norms and social distance on health information adoption willingness ( $F(1,212) = 21.638$ ,  $p < 0.001$ ,  $\eta^2 = 0.093$ ).

Simple effects analysis results (Figure 3 [Figure 3: see original paper]) revealed: (1) Under descriptive social norms, health information adoption willingness at close social distance ( $M = 6.223$ ,  $SD = 0.135$ ) was significantly higher than at distant social distance ( $M = 5.473$ ,  $SD = 0.135$ ),  $F(1,212) = 14.320$ ,  $p < 0.001$ , indicating that when using descriptive social norm information, self-decisions produce higher adoption willingness than other-decisions. (2) Under injunctive social norms, health information adoption willingness at close social distance ( $M = 4.975$ ,  $SD = 0.133$ ) was significantly lower than at distant social distance ( $M = 5.496$ ,  $SD = 0.127$ ),  $F(1,212) = 8.104$ ,  $p = 0.005$ , indicating that when using injunctive social norm information, other-decisions produce higher adoption willingness than self-decisions.

**Figure 3** ANOVA Results

### 4.2.3 Mediation Analysis

This study used Hayes’ (2013) Bootstrap method to test mediating effects of social belonging needs and perceived risk. Using SPSS 23.0 Process plugin with

Model 4, 5000 bootstrap samples were drawn at 95% confidence intervals. Controlling for participants' perceived expertise, credibility, involvement, familiarity with health information, and demographics, the independent variable was set as a categorical variable with social belonging needs and perceived risk as mediators and health information adoption willingness as the dependent variable.

Results (Table 4) showed: (1) In the path from descriptive social norms through social belonging needs to health information adoption willingness, the indirect effect' s 95% confidence interval was (0.055, 0.294), excluding 0, indicating significant indirect effect; the direct effect' s 95% confidence interval was (0.317, 0.860), also excluding 0, indicating significant direct effect. Therefore, social belonging needs partially mediates the relationship between descriptive social norms and health information adoption willingness, supporting Hypothesis H2. (2) In the path from injunctive social norms through perceived risk to health information adoption willingness, the indirect effect' s 95% confidence interval was (0.022, 0.376), excluding 0, indicating significant indirect effect; the direct effect' s 95% confidence interval was (-0.860, -0.317), also excluding 0, indicating significant direct effect. Therefore, perceived risk partially mediates the relationship between injunctive social norms and health information adoption willingness, supporting Hypothesis H3.

**Table 4** Mediation Effect Test Results

#### 4.2.4 Moderation Analysis

This study further tested social distance' s moderating effects using SPSS 23.0 Process plugin. Initially, Model 59 (assuming all paths in the mediation model are moderated) was selected with 5000 bootstrap samples at 95% confidence intervals. Controlling for participants' perceived expertise, credibility, involvement, familiarity with health information, and demographics, with social distance as the moderator and social belonging needs and perceived risk as mediators, results showed that the product term of social norms and social distance did not significantly predict social belonging needs or perceived risk. Therefore, the model was changed to Model 15 (assuming only the second half of mediation paths are moderated) for further testing.

Results (Table 5, Figure 4 [Figure 4: see original paper]) showed that when social belonging needs served as the mediator, social distance' s moderating effect was significant ( $\beta = 0.160$ , 95% CI = [0.041, 0.299]). Specifically, the interaction between social belonging needs and social distance significantly and positively predicted health information adoption willingness, and the interaction between social norms and social distance significantly and positively predicted health information adoption willingness, indicating social distance moderates the effects of both social belonging needs and social norms on health information adoption willingness. Simple slope analysis (Figure 5 [Figure 5: see original paper]) revealed that as social distance increased from close to distant, the positive predictive effect of social belonging needs on health information adoption

willingness gradually strengthened, supporting Hypothesis H4a.

**Table 5** Moderation Effect Test Results with Social Belonging Needs as Mediator

**Figure 4** Moderation Effect Test Results with Social Belonging Needs as Mediator

**Figure 5** Simple Slope Analysis Results with Social Belonging Needs as Mediator

Results (Table 6, Figure 6 [Figure 6: see original paper]) showed that when perceived risk served as the mediator, social distance's moderating effect was significant ( $\beta = 0.301$ , 95% CI = [0.065, 0.666]). Specifically, the interaction between perceived risk and social distance significantly and positively predicted health information adoption willingness, and the interaction between social norms and social distance significantly and positively predicted health information adoption willingness, indicating social distance moderates the effects of both perceived risk and social norms on health information adoption willingness. Simple slope analysis (Figure 7 [Figure 7: see original paper]) revealed that as social distance increased from close to distant, the positive predictive effect of perceived risk on health information adoption willingness gradually strengthened, supporting Hypothesis H4b.

**Table 6** Moderation Effect Test Results with Perceived Risk as Mediator

**Figure 6** Moderation Effect Test Results with Perceived Risk as Mediator

**Figure 7** Simple Slope Analysis Results with Perceived Risk as Mediator

## 5.1 Research Conclusions

Based on social norm theory, this study explored the effects of using descriptive and injunctive social norms in persuasive health information on health information adoption willingness and explained the underlying mechanisms. Findings reveal:

- (1) Using social norm information in persuasive health information can significantly enhance willingness to adopt health information recommendations, with descriptive social norm information proving more effective than injunctive social norm information. This occurs because descriptive social norm information emphasizes most people's practices and typically provides specific numbers describing universality, requiring minimal cognitive effort for decision-making. Additionally, due to Easterners' long history of group living and deep collectivist influence, they tend to imitate others' behavior to integrate into groups when facing decisions, making them more susceptible to descriptive social norm influence.
- (2) Social belonging needs mediate the effect of descriptive social norm information on health information adoption willingness. During social interaction, to satisfy social belonging needs, people typically imitate group members' behavior to gain group acceptance. Since descriptive social norms

in health information describe most group members' behavior, people use this as a behavioral decision cue, making them more likely to adopt health information recommendations.

- (3) Perceived risk mediates the effect of injunctive social norm information on health information adoption willingness. Injunctive social norm information emphasizes group consensus on health information recommendations. When processing injunctive social norm information, people activate systematic information processing mode, investing more mental resources in deep thinking and more easily associating severe consequences of not adopting health information recommendations, thereby promoting health information adoption willingness.
- (4) Social distance moderates the effect of social norms on health information adoption willingness. Social distance refers to the closeness of social relationships in social interaction—self-decisions represent close social relationships, while other-decisions represent distant relationships. This study compared differences in persuasive health information adoption willingness between self-decisions and other-decisions. Results show that for self-decisions, descriptive social norm information triggers the need to integrate into groups, thereby enhancing health information adoption willingness. For other-decisions, people engage in more rational and careful thinking. Out of concern for others' health and to avoid health risks from others' failure to take timely action, people show stronger willingness to adopt health information recommendations.

## 5.2 Research Implications

Theoretically, this study applies social norm theory to health informatics, enriching the theory' s application scope. Building on previous conclusions about descriptive and injunctive social norms, this study considers Eastern collectivist thought' s influence on people' s mindset, introducing social belonging needs to explain mechanisms underlying social norms' effect on health information adoption willingness. While validating previous conclusions, this expands social norm theory' s universality across Eastern and Western cultures, making valuable contributions to localized social norm theory research in health informatics.

Practically, findings offer insights for promoting health information dissemination effectiveness: (1) Health science websites, public accounts, and other social media platforms should emphasize improving health information dissemination effectiveness and strive to design more persuasive health information. According to this study' s conclusions, adding social norm descriptions to persuasive health information—using others' practices or viewpoints as persuasive evidence—can effectively enhance health information adoption willingness. (2) In Eastern cultural contexts, descriptive social norms demonstrate stronger persuasive effects than injunctive social norms. Therefore, descriptive social norm information should be fully utilized, such as adding real-time descriptive norm reminders on

information pages or displaying images/videos of others taking action to continuously awaken group belonging consciousness, making healthy lifestyles become social customs and promoting national health action. (3) Since distant social distance scenarios significantly enhance injunctive social norms' persuasive effects, emphasizing concern for family or friends' health issues in common health slogans or information titles will better attract attention to health information and help improve health science communication persuasiveness.

This study deeply explored the role of two types of social norm information in promoting health information adoption willingness, validating expected hypotheses. However, further exploration remains possible: First, social norms have evolved to derive new connotations such as dynamic descriptive social norms and positive/negative social norms. Existing research found that positive injunctive norms and negative descriptive norms do not increase positive injunctive norm effects [47]. Future research could further investigate effects of different social norm forms in health informatics. Additionally, this study focused on exploring social distance' s moderating effects from an information content perspective without discussing whether different populations or individual personality differences produce varying attitudes toward social norm information. For example, interdependent personalities may be more susceptible to others' behavior influence than independent personalities. Future research could explore additional factors influencing social norm effectiveness from more perspectives.

- [1] Xu Lulu, Du Jian, Ye Ying. Research trends in medical informatics since the 21st century and its turn toward health informatics[J]. *Journal of the China Society for Scientific and Technical Information*, 2020, 39(07):777-786.
- [2] CHRISTIAN M. Campaigning for the greater good? -how persuasive messages affect the evaluation of contact tracing apps[J]. *Journal of decision system*, 2021, 31(39):1-18.
- [3] Zhou Jinlian, Wu Ye, Han Yi, et al. Research on the persuasive effect of social media information exposure on individual health behavior—taking HPV vaccine adoption as an example[J]. *Journalism Research*, 2022(02):1-16+117.
- [4] CIALDINI R, TROST M. Social influence: social norms, conformity and compliance[J]. *Handbook of social psychology*, 1998, 4(2):151-192.
- [5] Wei Qingwang, Sun Jianmin. Psychological interpretation of environmental protection behavior—review of norm focus theory[J]. *Advances in Psychological Science*, 2013, 21(04):751-760.
- [6] GIULIA A, EVA V. A research agenda for the study of social norm change[J]. *Philosophical transactions of the royal society a mathematical physical and engineering sciences*, 2022, 380(2227).
- [7] NOLAN J, SCHULTZ P, CIALDINI R, et al. Normative social influence is underdetected[J]. *Personality and social psychology bulletin*, 2008, 34(7):913-923.
- [8] STAUB E. Instigation to goodness: the role of social norms and interpersonal influence[J]. *Journal of social issues*, 2010, 28(3):131-150.
- [9] SMITH J, LOUIS W. Do as we say and as we do: the interplay of descriptive

- and injunctive group norms in the attitude-behaviour relationship[J]. *British journal of social psychology*, 2008, 47(4):647-666.
- [10] Ling Wenquan, Zheng Xiaoming, Fang Liluo. Cross-cultural comparison of social norms[J]. *Acta Psychologica Sinica*, 2003(02):246-254.
- [11] Ruan Qingsong, Huang Xianghui. Review of foreign research on social norms and group rules affecting social welfare[J]. *Economic Review*, 2005(04):77-79.
- [12] CIALDINI R, RENO R, KALLGREN C. A focus theory of normative conduct: recycling the concept of norms to reduce littering in public places[J]. *Journal of personality and social Psychology*, 1990, 58(6):1015-1026.
- [13] Cui Chi, An Lulu, Dai Ming. Research on the influence mechanism of social norms on cooperation—analysis based on internalization effect and social identity effect[J]. *China Journal of Economics*, 2022, 9(4):1-36.
- [14] Zhang Guangling, Huang Na. Research on the influence mechanism of social norm information on customer behavior[J]. *LuoJia Management Review*, 2016(02):83-93.
- [15] RENO R, CIALDINI R, KALLGREN C. The transsituational influence of social norms[J]. *Journal of personality and social psychology*, 1993, 64(1):104-112.
- [16] Chen Sijing, Pu Xueli, Zhu Yue, et al. The influence of normative illusions on food waste in dining out: psychological mechanisms and coping strategies[J]. *Acta Psychologica Sinica*, 2021, 53(08):904-918.
- [17] CIALDINI R, KENRICK D, BAUMANN D. Effects of mood on prosocial behavior in children and Adults[J]. *The development of prosocial behavior*, 1982:339-359.
- [18] KALLGREN C, RENO R, CIALDINI R. A focus theory of normative conduct: when norms do and do not affect behavior[J]. *Personality and social psychology bulletin*, 2000, 26:1002-1012.
- [19] Guo Qinghui, Li Shiping, Li Hao. The influence of descriptive and injunctive social norms on farmers' pro-environmental behavior[J]. *Journal of China Agricultural University*, 2022, 27(1):13.
- [20] BURGER J, SHELTON M. Changing everyday health behaviors through descriptive norm manipulations[J]. *Social influence*, 2011, 6(2):69-77.
- [21] BEN C, ALAN D. The evolution of social norms interventions for health promotion: distinguishing norms correction and norms transformation[J]. *Journal of global health*, 2021, 7(11):3065.
- [22] Qituotuo, Liu Qian, Wang Tianmei, et al. Research on the persuasive effect of knowledge payment product description language style—moderating effect of knowledge producer reputation[J]. *Nankai Business Review*, 2020, 23(05):159-170.
- [23] Chen Liang, Tan Xinying, Lei Lingwen. Risk intervention based on persuasive information design: development of theoretical and empirical research[J]. *Art & Design*, 2022(08):40-46.
- [24] SUN Y, WANG N, SHEN X, et al. Bias effects, synergistic effects, and information contingency effects: developing and testing an extended information adoption model in social Q&A[J]. *Journal of the association for information*

- science and technology, 2019, 70(12):1368-1382.
- [25] JIN J, YAN X, LI Y, et al. How users adopt healthcare information: an empirical study of an online Q&A community[J]. *International journal of medical informatics*, 2015, 86:91-103.
- [26] Wang Wei. Research on health information adoption behavior of elderly WeChat users[J]. *Chinese Journal of Journalism & Communication*, 2020, 42(03):91-107.
- [27] SCHULTZ P, NOLAN J, CIALDINI R, et al. The constructive, destructive, and reconstructive power of social norms[J]. *Psychological science*, 2007, 18(5):429-434.
- [28] Liu Ruping, Ma Qin Hai, Fan Guangwei. Social norm signs and customer social norm behavior intention and service satisfaction[J]. *Management Science*, 2010, 23(03):53-59.
- [29] DECI E, VALLERAND R, PELLETIER L, et al. Motivation and education: the self-determination perspective[J]. *Educational psychologist*, 1991, 26(3&4):325-346.
- [30] BAUMEISTER R, LEARY M. The need to belong: desire for interpersonal attachments as a fundamental human motivation[J]. *Psychological bulletin*, 1995, 117(3):497-529.
- [31] Chen Weiyang, Xie Tian. The dynamic process of social norms[J]. *Advances in Psychological Science*, 2018, 26(07):1284-1293.
- [32] MITRA K, REISS M C, CAPELLA L M. An examination of perceived risk, information search and behavioral intentions in search, experience and credence services[J]. *Journal of services marketing*, 1999, 13(3):208-228.
- [33] Wu Jiang, Li Shanshan. Research on online health community users' information service usage intention[J]. *Information Science*, 2017, 35(04):119-125.
- [34] Song Xueyan, Wang Ping. Review of user information behavior research[J]. *Information Science*, 2010, 28(04):625-629+636.
- [35] Sun Zhumei, Hua Weina, Wang Zhibing. Research on health information adoption prediction of WeChat public accounts—based on information characteristics and support vector machine[J]. *Information Studies: Theory & Application*, 2018, 41(07):72-77.
- [36] LIBERMAN N, TROPE Y. Temporal construal theory of intertemporal judgment and decision[J]. *Psychological review*, 2003, 110(3):403.
- [37] Huang Jun, Li Ye, Zhang Hongwei. Application and development of construal level theory[J]. *Advances in Psychological Science*, 2015, 23(01):110-119.
- [38] Zhang Yinling, Yu Zhen, Mai Xiaoqin. The influence of social value orientation on self-other risk decision-making and its mechanism[J]. *Acta Psychologica Sinica*, 2020, 52(07):895-908.
- [39] Xu Jingzhe, Xie Xiaofei. Self-other decision-making differences from the perspective of construal level[J]. *Acta Psychologica Sinica*, 2011, 43(01):11-20.
- [40] Liu Cuicui, Chen Bin, Liu Leixin, et al. The bystander is clearer than the player? Rational differences between self-other decision-making and their mechanisms[J]. *Advances in Psychological Science*, 2013, 21(05):879-885.
- [41] SCHULTZ W, KHAZIAN A, ZALESKI A. Using normative social influence to promote conservation among hotel guests[J]. *Social influence*, 2008, 3(1):4-23.

- [42] Ge Wanda, Sheng Guanghua. The influence and mechanism of social norms on green consumption[J]. Commercial Research, 2020(01):26-34.
- [43] LEARY M, KELLY K, COTTRELL C, et al. Construct validity of the need to belong scale: mapping the nomological network[J]. Journal of personality assessment, 2013, 95(6):610-624.
- [44] SUSSMAN S, SIEGAL W. Informational influence in organizations: an integrated approach to knowledge adoption[J]. Information systems research, 2003, 14(1):47-65.
- [45] RABJOHN N, CHEUNG C, LEE M. Examining the perceived credibility of online opinions: information adoption in the online environment[C] 41st Hawaii international conference on systems science, IEEE Computer Society, 2008:156.
- [46] Tang Xuli, Zhang Bin, Zhang Yan. Research on online health community users' information adoption willingness—based on health literacy and trust perspective[J]. Journal of Information Resources Management, 2018, 8(03):102-112.
- [47] Wang Liangyan, Han Bing, Ye Zi. Research on cross-cultural differences in social norms based on self-construal[J]. Journal of Systems & Management, 2016, 25(03):395-404.

**Author Contributions:**

Qian Minghui: Designed research framework, developed research ideas, revised and proofread manuscript.

Zhao Mengchun: Reviewed literature, collected and processed data, drafted manuscript.

*Note: Figure translations are in progress. See original paper for figures.*

*Source: ChinaXiv –Machine translation. Verify with original.*