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A Trust Construction Model in Human-AI Social Interactions: A Dual-Path Analysis Based on Algorithmic Transparency and Emojis

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Abstract

In the context of the rapid development of social AI applications today, user trust has become a crucial prerequisite for their long-term adoption, yet the mechanisms underlying its formation still lack systematic research from an emotional perspective. To address this, this study proposes a dual-path model based on "algorithmic transparency and emojis," introducing social presence as a mediating variable to explore its influence mechanism on user trust. Employing empirical methods for research and analysis, the results demonstrate that both algorithmic transparency and emoji usage can significantly enhance users' trust in social AI, with social presence playing a mediating role between algorithmic transparency, emoji usage, and user trust. The findings of this study not only expand the theoretical perspectives on trust construction in social AI but also offer practical suggestions for algorithmic transparency design and interaction optimization.

Keywords

social AI, user trust, AI trust, social presence, algorithmic transparency, emojis

1. Introduction

"Social AI," as a representative product of human-machine interaction in the new era, can engage in "dialogue-based empathy" with users through text, tone, expressions, and other means, gradually evolving from a tool role into a "social companion" with social interaction attributes. In recent years, with the rapid development of artificial intelligence technology, AI is accelerating its penetration into various domains of human social life, learning, work, and beyond. The global AI market size is projected to exceed one trillion U.S. dollars by 2031, and over 6 billion global social media users are becoming participants in AI interactions. Beyond its basic tool attributes, it also plays the role of a "social exchange agent." According to a Statista survey on U.S. citizens' awareness of generative AI in social media, over 70% of respondents have heard of AI chatbots (such as ChatGPT), although only 30% use them in daily life, indicating that AI is shifting from being perceived as a "functional tool" to a "social companion." From AI customer service to chatbots, in the future, users will no longer view them merely as functional tools but will engage in "anthropomorphic" interactions in areas such as emotional expression, emotional exchange, opinion acceptance, trust construction, and even decision-making advice. From AI customer service and chatbots to companion-type social assistants, these systems not only perform tasks but also assume roles in emotional interaction.

Existing research has demonstrated that chatbots can enhance users' perceptions of their "humanization" and social interactivity through emotional expressions (such as text, emoticons, images, etc.) (Zhang et al., 2024), and positive user experiences also positively influence users' intentions for continued use. Humanized features indirectly promote users' acceptance of and willingness to interact with social AI by improving user experience (Sfar et al., 2025). However, these studies predominantly focus on the "rational dimension" within the technology acceptance model framework, often involving behavioral variables such as service satisfaction, product attitudes, and usage intentions, with insufficient exploration of the mechanisms underlying emotional trust construction manifested in users' interactions with social AI.

In the context of human-machine interaction, the construction of trust in AI relies not only on users' rational perceptions of the system's capabilities and reliability but also on the emotional connections and resonance established during interactions (Aquilino et al., 2025). Particularly in the ongoing interactions between users and social AI, "trust" is not solely built on functional performance but depends more on users' perceptions of its "social presence" and the sense of cognitive security derived from understanding its behavioral explanation mechanisms (algorithmic transparency). The formation paths of such emotional trust and their dynamic regulatory mechanisms still lack systematic construction. Therefore, building on existing research, this paper focuses on the paths of "trust construction under emotional mechanisms," proposes a dual-path model of "algorithmic transparency-emojis," and introduces "social presence" as a key mediating and moderating variable, thereby filling the theoretical gaps in existing research regarding emotional path mechanisms and trust construction.

2. Literature Review

2.1 Conceptual Definitions

Social AI typically refers to artificial intelligence systems capable of simulating, understanding, and participating in human social behaviors. Unlike early chatterbots that primarily focused on language interactions (Deryugina, 2010), Social AI emphasizes deeper social capabilities such as emotional recognition, personality shaping, and social presence. These systems not only recognize 21 human emotional states but also possess 9 personality traits, including bravery, calmness, resilience, and optimism (Li et al., 2019). They can construct interactive experiences with emotional resonance and trust, rather than merely serving as task-executing tool agents.

Furthermore, in recent years, the application of artificial intelligence in various high-impact scenarios has also intensified users' psychological vulnerabilities. In this context, establishing "benevolent predictability" has become a key mechanism for enhancing user trust (Riley and Dixon, 2024). Fogg and Tseng (1999) also pointed out that technology trustworthiness is essentially a subjective perception of the user, rather than an objective attribute. This perception often stems from a comprehensive judgment across two dimensions, one is trustworthiness, and the other is expertise. In other words, the credibility of technology can be viewed as users' integrated evaluation of whether the system is "worthy of trust" and whether it is "capable."

In the process of users interacting with social AI, numerous factors influence user trust, including system controllability, adaptability, transparency, intelligence level, emotional intimacy, empathy capability, engagement, anthropomorphic features, security, brand image, organizational reputation, risk perception, personality traits, and professional competence (Becker and Fischer, 2024). Among these, algorithmic transparency and anthropomorphic social signals constitute two key paths that influence user trustworthiness (Ochmann et al., 2024). On one hand, the more users understand how AI systems process information and arrive at conclusions, the more likely they are to establish trust (Xu et al., 2023; Park and Yoon, 2024). On the other hand, further research has validated that emojis are important social cues for enhancing user trust. For example, an empirical study from 2024 found that adding emojis to chatbots significantly increases users' "perceived warmth," and this enhancement of warmth directly improves user satisfaction and system acceptance (Yu and Zhao, 2024).

In practice, algorithmic transparency and anthropomorphic social signals do not operate independently; they often jointly enhance users' "social presence" to improve interaction quality. Research indicates that higher social presence can strengthen users' emotional investment and trust levels (Oh et al., 2018). Of course,

social presence also plays a key mediating role between emotional expression and user perception, making it easier for users to view chatbots as interactive entities with "humanity" (Zhang et al., 2024). In this process, the performance of affective AI is particularly prominent. Casaló et al. (2025) pointed out that AI with emotional understanding and response capabilities can effectively enhance users' emotional resonance and social connections, making it the most promising type of AI for improving service experiences. Although affective AI has limited impact on users' monetary value perceptions, it significantly enhances users' perceptions of humanization and trust in services.

2.2 Mechanisms of User Trust Construction in Social AI Interactions

Historically, the development of artificial intelligence has not been smooth sailing. As early as the 1940s, American science fiction writer Isaac Asimov proposed the "Three Laws of Robotics" in his short story "Runaround," laying a certain philosophical foundation for subsequent discussions on human-machine relationships. In 1956, John McCarthy and others formally proposed the term "Artificial Intelligence" at the Dartmouth Conference, thereby establishing AI as a discipline. However, limited by early technological conditions and computing resources, AI research once entered a "winter period." It was not until the 21st century that AI regained widespread attention (Haenlein and Kaplan, 2019). With breakthroughs in big data, computing power, and deep learning technologies, artificial intelligence is no longer limited to executing logical tasks but has begun to possess human-like language, cognition, and social capabilities. Social-type AIs such as Microsoft's XiaoIce and Replika-social robots integrated with cognitive computing capabilities-have thus gradually emerged. According to UBS statistical analysis, since the launch of ChatGPT in November 2022, it attracted over 100 million monthly active users in just two months, far surpassing TikTok, Instagram, and Pinterest (Garfinkle, 2023).

However, alongside this explosive growth, there are also users' doubts regarding its "controllability," "transparency," and "credibility" (Choudhury and Shamszare, 2023). Especially in the absence of sufficient explanation mechanisms and ethical boundaries, public attitudes toward conversational systems like ChatGPT have become polarized: on one hand, showing high dependence (Haleem et al., 2022), and on the other, breeding unease and vigilance (Ratanond Koonchanok et al., 2024). Against this backdrop, the trust construction mechanisms of social AI have become a research focus, with a substantial body of literature examining trust construction mechanisms in broad AI systems (Muhammad Farrukh Shahzad et al., 2024; Huynh and Aichner, 2025; Sfar et al., 2025). These studies emphasize dimensions such as user cognition, system characteristics, feedback mechanisms, and user experience. However, these studies often rely on general generative AI or single application scenarios, overlooking the dynamic, interpersonal trust-building processes in social AI with emotional interaction capabilities. More notably, current literature tends to examine algorithmic transparency and social signals as isolated variables, lacking systematic research on how they synergistically influence user trust in interactions. This gap provides an entry point for this study:

RQ: In the interaction process with social AI, what key factors influence user trust levels?

2.3 The Relationship Between Algorithmic Transparency and User Trust

In recent years, although artificial intelligence and robotics technologies have demonstrated high accuracy and efficiency in multiple fields (Intahchomphoo et al., 2024), the system's performance advantages do not necessarily translate into user trust. Empirical research generally indicates that when users lack understanding of the system's decision-making processes, algorithmic transparency can effectively reduce "black box" anxiety, enhance understanding and control, and thereby increase trust. Even if model performance is excellent, outputs lacking explanations are often difficult to gain user trust; when clear and credible explanations are provided, users exhibit higher overall trust in the model (von Eschenbach, 2021; Papenmeier et al., 2019; Ngo, 2025; Park and Yoon, 2024). However, from philosophical and institutional perspectives, transparency is a necessary but not sufficient condition for trust construction; truly establishing trustworthy relationships also relies on broader socio-technical institutional systems (von Eschenbach, 2021). Additionally, research shows that the relationship between transparency and user trust is dynamic and context-dependent (Lee and Cha, 2024). The impact effects of transparency vary across different interaction stages and feedback mechanisms. Too little information can trigger suspicion, while too much can cause cognitive load, potentially weakening trust (Hu et al., 2024).

Overall, algorithmic transparency, as an important path for enhancing user understanding, reducing anxiety, and promoting trust, plays a key role in human-machine interaction scenarios. Based on existing theoretical and empirical research outcomes, combined with the core demands in social AI interactions for system comprehensibility and trust, this study proposes the following hypothesis:

H1: Increasing algorithmic transparency can significantly enhance user trust in social AI interactions.

2.4 The Relationship Between Emoji Usage and User Trust

In the process of interacting with social-type artificial intelligence systems, nonverbal social signals are widely regarded as one of the key factors in enhancing users' perceived trust and social presence (Zhang et al., 2021). Emojis, as a highly visual and emotional symbol system in digital environments, can effectively convey emotional states and social intentions, thereby reducing the technological distance and mechanical feel of the system (Yu and Zhao, 2024). Multiple studies point out that emojis often indirectly enhance users' acceptance and trust levels in social AI by evoking affinity and "warmth" perceptions. At the same time, anthropomorphic designs (such as human-like language styles and cute appearances) have been shown to improve users' social presence and perceived information quality under certain conditions, leading to more positive interaction experiences (Lv et al., 2022). Seeger et al. (2021) also noted that combining nonverbal anthropomorphic cues (such as avatars and emojis) with human-like language styles can significantly enhance the social presence and anthropomorphic cognition of chat agents, helping to increase users' trust and sense of connection, which has positive implications for trust building.

Although the above research indicates that nonverbal social signals (such as emojis) and anthropomorphic language styles can enhance user trust, existing literature largely focuses on macro variables like social presence, emotional connections, or user experience, with limited quantitative validation of the core mechanism of "trust," especially in interaction contexts where emojis serve as key cues. Moreover, systematic research is still lacking on how emojis influence users' trust perceptions in social AI and whether contextual moderating effects exist. Therefore, this paper proposes the following hypothesis and seeks to further explore the specific role mechanism of emojis in trust construction through empirical methods.

H2: Incorporating emoji usage can enhance user trust in interactions with social AI.

2.5 Algorithmic Transparency and Social Presence

Although chatbots may make errors in responses, the social presence and learning abilities they exhibit often evoke users' hope and pleasure, thereby prompting higher tolerance and continued usage intentions (Meng et al., 2025). As an important factor in enhancing interaction trust, social presence has been widely studied in fields such as online education, remote teaching, and social commerce. Cobb (2009) pointed out that social presence originates from the field of communication studies, referring to the degree to which an individual is perceived as "real" during mediated communication, which has significant impacts on participation, satisfaction, and success rates in online learning. Tu and McIsaac (2002) found that high levels of social presence can significantly enhance interactions between teachers and students as well as among peers, while Swan and Shih (2019) further validated its positive correlation with student satisfaction in online courses. Ngo (2025)'s experimental research discovered complex interaction effects between algorithmic transparency and social presence. However, few studies have systematically explored the role mechanisms of social presence in the context of social-type AI, especially its potential mediating role between anthropomorphic symbols and user trust. Based on this, the following hypothesis is proposed:

H3: Increasing algorithmic transparency can enhance users' social presence in social AI interactions.

2.6 Emoji Usage and Social Presence

Although computer-mediated communication (CMC) lacks nonverbal cues from face-to-face interactions, people can still effectively convey emotions because emojis can serve as tools for emotional expression, compensating for the emotional deficiencies in text-based exchanges (Derks et al., 2008). In interactions with social-type artificial intelligence, existing research indicates that social signals such as emojis and anthropomorphic language styles can shape users' social presence (Wang et al., 2024). The relational role of emojis is not only reflected in emotional expression but also in enhancing interaction intimacy by signaling attention and emotional

investment (Fogg and Tseng, 1999). Therefore, it can be understood that emojis indirectly enhance social presence by increasing users' sense of intimacy, which in turn positively affects trust or satisfaction. Supporting this view, Shen and Li (2025) found through two experiments that chatbots using emojis in interactions significantly increased users' intimacy and interaction satisfaction, with intimacy mediating the relationship between emoji usage and satisfaction. Based on existing research, this paper proposes the following research hypothesis:

H4: Incorporating emoji usage can enhance users' social presence in interactions with social AI.

2.7 Social Presence and User Trust

Toader et al. (2020) confirmed through experiments that anthropomorphic design enhances chatbots' social presence, further increasing users' trust and consumption satisfaction, supporting the role of social presence as a mechanism for enhancing interaction trust. Similarly, Jin and Youn (2023)'s study, through path analysis, found that chatbots' humanized features significantly enhance users' social presence. Although this study focused on "continued usage intention," it is closely related to "trust" in cognitive paths-when users sense the "presence" of social AI, they are more likely to build trust and thus be willing to continue interacting. From this, we propose the following hypotheses:

H5: Social presence can positively predict user trust in interactions with social AI.

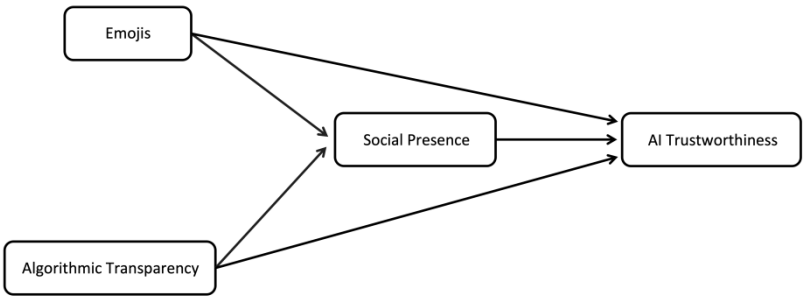
H6: Social presence has a mediating role in the path of algorithmic transparency's influence on user trust in social AI.

H7: Social presence has a mediating role in the path of emoji usage's influence on user trust in social AI.

2.8 Research Framework

In summary, from the perspective of human-social AI interactions, combining social presence theory and trust construction mechanism models as theoretical foundations, this study constructs a mediating model with "algorithmic transparency" and "emojis" as dual paths (see Figure 1). It focuses on examining the key psychological mechanisms influencing users' trust perceptions in AI social interactions. Specifically, this study aims to explore how algorithmic transparency and emoji usage respectively influence users' social presence perceptions, thereby predicting their trust levels in AI. This is intended to reveal how contextual design factors in AI interaction experiences (such as algorithmic explanations and emoji responses) affect users' social perceptions and trust evaluation mechanisms, providing empirical evidence for optimizing the interaction design of AI social systems and enriching the theoretical connotations of current artificial intelligence trust research.

Figure 1: Model Diagram



3. Research Design

3.1 Research Method Description

This study employs a questionnaire survey method to collect participants' subjective perceptions and behavioral tendencies in the process of "trust construction in human-AI social interactions." The measured variables include algorithmic transparency, emoji perception, social presence, and AI trustworthiness. All participants are adults aged 18 and above from mainland China, with the ability to complete the questionnaire fully. Participants were fully informed before completing the questionnaire, and submission is deemed consent to participate in the study. The research process strictly adheres to academic ethical norms, and all collected data are used solely for anonymous statistical analysis.

3.2 Sample Size Prediction

Prior to questionnaire distribution, the researchers used G*Power 3.1 software to conduct a predictive analysis of the minimum sample size. The selected test type was F-test (Linear multiple regression: Fixed model, R^2 deviation from zero), with the effect size set at a medium level ($f^2 = 0.15$), significance level $\alpha = 0.05$, test power = 0.80, and number of predictors = 4. The final prediction result indicated that the minimum effective sample size required for model analysis is 85.

3.3 Sample Acquisition and Distribution Strategy

Given that this study involves multiple latent variables and mediation path analyses, which impose high requirements on sample size and structure, a non-probability sampling approach was adopted. Questionnaires were widely distributed through social platforms, questionnaire platforms, and university communities. A total of approximately 400 questionnaires were distributed, with a target of recovering no fewer than 300 valid samples to ensure the statistical power and representativeness of latent variable structural modeling and path analysis.

3.4 Questionnaire Design

This study designed a structured questionnaire to measure four core variables: perceived transparency, technology trustworthiness, social presence, and emoji usage. First, screening questions for respondents were set (e.g., "Have you used social AI tools such as ChatGPT or DeepSeek?"), with those who have not used social AI considered invalid samples. Then, questions assessed emoji usage in interactions with social AI (e.g., "Have you noticed social AI using emojis in specific situations?" and "Did you actively use emojis during interactions with social AI?"). Furthermore, scales for perceived algorithmic transparency, social presence, and technology trustworthiness were used to evaluate respondents' perceptions of transparency, social presence, and trust during interactions with social AI. At the end of the questionnaire, demographic questions were added to gather information on respondents' gender, age, education level, and other details.

3.5 Measurement Tools

The items related to perceived algorithmic transparency were adapted from the perceived algorithmic transparency scale developed by Al-Natour et al. (2021), with appropriate modifications to fit the context of this study. The scale includes 9 items, using a 7-point Likert scale from "1" = strongly disagree to "7" = strongly agree. Scores for all items are summed, with higher total scores indicating higher perceived transparency of social AI algorithms among respondents. In this study, the Cronbach's α coefficient for the perceived transparency scale was 0.950, and the α coefficients after deleting each item were all below 0.950, indicating high reliability. Validity test results showed a KMO value of 0.964, a significant Bartlett's test ($p < 0.001$), cumulative variance contribution rate of 71.730%, and a minimum factor loading of 0.844, suggesting ideal structural validity.

The items related to social AI trustworthiness were developed based on *Trustworthy Artificial Intelligence White Paper* issued by the China Academy of Information and Communications Technology (2021), incorporating trustworthy features such as "reliable and controllable" and "clear responsibility," with a focus

on measuring users' subjective trust perceptions of AI system stability, controllability, and accountability. The scale includes 5 items, using a 5-point Likert scale from "1" = strongly disagree to "5" = strongly agree. Scores for all items are summed, with higher total scores indicating higher trustworthiness of social AI among respondents. In this study, the Cronbach's α coefficient for the technology trustworthiness scale was 0.914, and the α coefficients after deleting each item were all less than 0.914, indicating good internal consistency. In terms of validity, the overall KMO value was 0.896, the Bartlett's sphericity test was significant ($p < 0.001$), one principal component was extracted after rotation, with a cumulative variance contribution rate of 74.733% and a minimum loading item of 0.844, indicating good structural validity for the scale.

The items related to social presence were adapted from the social presence scale compiled by Wang Xia et al. (2025), covering three dimensions: co-presence, intimacy, and immediacy, with appropriate modifications to fit the context of this study. The scale includes 10 items, using a 7-point Likert scale from "1" = strongly disagree to "7" = strongly agree. Scores for all items are summed, with higher total scores indicating stronger social presence in respondents' interactions with social AI. In this study, the Cronbach's α coefficient for the social presence scale was 0.951, and the α coefficients after deleting each item were all less than 0.951, showing good reliability. Validity test results indicated a KMO value of 0.968, a significant Bartlett's test ($p < 0.001$), one principal component extracted after rotation, a cumulative variance contribution rate of 69.831%, and a minimum loading item of 0.812, suggesting strong internal structural consistency.

4. Data Analysis and Hypothesis Test

4.1 Demographic Analysis

A total of 480 questionnaires were distributed in this study, with 480 recovered, of which 474 were valid (N=474), yielding an effective rate of 98.75%. In terms of gender distribution, there were 265 males (55.91%) and 209 females (44.09%) in the sample.

Regarding education level, the sample included 46 individuals (9.70%) with junior high school or below, 94 (19.83%) with high school or vocational education, 127 (26.79%) with junior college, 185 (39.03%) with undergraduate degrees, and 22 (4.64%) with graduate degrees or above.

In terms of city tier of residence, the sample included 80 individuals (16.8%) living in first-tier cities, 73 (15.4%) in second-tier cities, 152 (32%) in third-tier cities, 112 (32.6%) in fourth-tier cities, and 57 (12.00%) in fifth-tier cities.

For age distribution, the sample's average age was 30.46 years (M=30.46), with a standard deviation of 9.034 (SD=9.034), a maximum of 55 (MAX=55), and a minimum of 18 (MIN=18).

Regarding income level, the sample's average monthly income was 3993.54 yuan (M=3993.54), with a standard deviation of 1401.04 (SD=1401.04), ranging from 500 (MIN=500) to 10000 (MAX=10000) yuan.

In terms of emoji usage, 420 individuals (88.6%) noticed social AI using emojis in specific situations, while 54 (11.3%) did not; 419 (88.3%) indicated they would actively use emojis during interactions with social AI, while 55 (11.6%) said they would not.

4.2 Variance Testing

To further examine differences in trustworthiness, social presence, and perceived transparency among users under the conditions of "whether they noticed AI using emojis" and "whether they actively used emojis to communicate with AI," this study employed one-way analysis of variance (One-way ANOVA) for testing. The data results are shown in Table 1.

For social AI trustworthiness, whether users noticed AI using emojis did not have a significant impact on trustworthiness ($p=0.462$, $\eta^2=0.001$); however, users who actively used emojis to communicate with AI scored significantly higher on trustworthiness ($p=0.005$, $\eta^2=0.016$), though the effect size indicates a weak influence.

For social presence, there was no significant difference based on whether users noticed AI using emojis ($p=0.130$, $\eta^2=0.005$); in contrast, users who actively used emojis reported significantly stronger social presence ($p=0.009$, $\eta^2=0.014$), but this also represents a weak effect.

For perceived algorithmic transparency, noticing AI using emojis had no significant effect (p=0.565, η^2=0.001); however, there was a significant difference in perceived transparency between users who actively used emojis to communicate with AI (p=0.016, η^2=0.012), with the effect size also being small.

Overall, whether users noticed AI using emojis did not significantly affect trustworthiness, social presence, or perceived transparency; in comparison, users who actively used emojis to communicate with AI showed significant effects across all three dimensions.

Table 1: One-way ANOVA Data Results

Variable	Group	M	SD	F	df	p	η^2 (partial eta squared)
Social AI Trustworthiness	Did not notice emojis	17.102	5.383	0.543	1	0.462	0.001
	Noticed emojis	17.667	4.560				
Social AI Trustworthiness	Did not actively use emojis	16.921	5.324	7.871	1	0.005	0.016
	Actively used emojis	19.036	4.702				
Social Presence	Did not notice emojis	39.950	12.806	2.301	1	0.130	0.005
	Noticed emojis	42.722	11.269				
Social Presence	Did not actively use emojis	39.718	12.622	6.835	1	0.009	0.014
	Actively used emojis	44.436	12.271				
Perceived Algorithmic Transparency	Did not notice emojis	43.102	13.985	0.331	1	0.565	0.001
	Noticed emojis	44.259	13.299				
Perceived Algorithmic Transparency	Did not actively use emojis	42.680	13.939	5.794	1	0.016	0.012
	Actively used emojis	47.455	12.960				

4.3 Correlation Analysis

This study employed bivariate correlation analysis to examine the correlation degrees between perceived algorithmic transparency, social presence, and social AI trustworthiness. The results showed a significant positive correlation between perceived algorithmic transparency and social AI trustworthiness (r=0.926, df=474, p=0.001), indicating that improvements in algorithmic transparency are synchronous with enhancements in user trustworthiness.

Additionally, perceived algorithmic transparency and social presence exhibited a significant positive correlation (r=0.942, df=474, p=0.001), suggesting that increases in transparency levels are consistent with trends in enhanced user presence experiences.

Furthermore, there was also a significant positive correlation between social presence and social AI trustworthiness (r=0.919, df=474, p=0.001), implying that presence plays an important role in the process of users forming technological trust.

4.4 Regression Testing and Hypothesis Analysis

To further verify the predictive effects between the main variables, this section, based on the one-way variance test results, retained only “active emoji usage” and “perceived algorithmic transparency” as independent variables in the regression model. The results (see Tables 2 and 3) showed:

Model 1, with social presence as the dependent variable, demonstrated a significant predictive effect of active emoji usage on it (β=0.110, t=2.407, p=0.016, R^2=0.012). This supports Hypothesis H4.

Model 2, with social AI trustworthiness as the dependent variable, showed a similarly significant predictive effect of active emoji usage (β=0.128, t=2.806, p=0.005, R^2=0.016). This supports Hypothesis H2.

Model 3, with social AI trustworthiness as the dependent variable, indicated a significant predictive effect of social presence with high explanatory power (β=0.919, t=50.492, p<0.001, R^2=0.844). This supports Hypothesis H5.

Table 2: Regression Analysis Results 1

	Social Presence	Social AI Trustworthiness	Social AI Trustworthiness	Perceived Transparency

	Beta	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*
Active Emoji Usage	0.110	2.407	0.016	0.128	2.806	0.005	\			\		
Social Presence	\			\			0.919	50.492	<0.001	\		
R^2	0.012			0.016			0.844			\		
F	0.016			0.005			2549.403			\		

Model 4, with social presence as the dependent variable, revealed a significant predictive effect of perceived algorithmic transparency (β=0.942, t=60.753, p<0.001, R^2=0.887), supporting Hypothesis H3.

Model 5, with social AI trustworthiness as the dependent variable, demonstrated a significant predictive effect of perceived algorithmic transparency (β=0.926, t=53.473, p<0.001, R^2=0.858), supporting Hypothesis H1.

Table 3: Regression Analysis Results 2

	Social Presence			Social AI Trustworthiness			Technology Trustworthiness			Perceived Transparency		
	Beta	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*
Perceived Algorithmic Transparency	0.942	60.753	0.001	0.926	53.473	0.001	\			\		
Social Presence	\			\			\			\		
R^2	0.887			0.858			\			\		
F	3690.941			2859.360			\			\		

As shown in Table 4, Multiple Regression Model 1 indicated that when perceived algorithmic transparency and social presence were simultaneously entered into the regression equation (R^2=0.887), the predictive effect of perceived algorithmic transparency on social AI trustworthiness was significant (β=0.227, t=0.020, p=0.001), and the predictive effect of social presence on social AI trustworthiness was also significant (β=0.155, t=8.500, p=0.001).

Table 4: Multiple Regression Analysis Results 1

	Social Presence			Technology Trustworthiness			Technology Trustworthiness			Technology Trustworthiness		
	Beta	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*
Perceived Algorithmic Transparency	\			\			\			0.227	0.020	0.001
Social Presence	\			\			\			0.155	8.500	0.001
R^2	\			\			\			0.887		
F	\			\			\			1681.631		

As shown in Table 5, Multiple Regression Model 2 indicated that when active emoji usage and social presence were simultaneously entered into the regression equation (R^2=0.845), the predictive effect of active emoji usage on social AI trustworthiness was not significant (β=0.450, t=1.491, p=0.137), while the predictive effect of social presence on social AI trustworthiness was significant (β=0.349, t=50.085, p=0.001).

Table 5: Multiple Regression Analysis Results 2

	Social Presence			Technology Trustworthiness			Technology Trustworthiness			Technology Trustworthiness		
	Beta	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*	*Beta*	*t*	*p*
Emoji	\			\			\			0.450	1.491	0.137
Social Presence	\			\			\			0.349	50.085	0.001
R^2	\			\			\			0.845		
F	\			\			\			1279.114		

The Process plugin Model 4 was used to test the mediating effect. The results, as shown in Table 6, indicated that in the path of perceived algorithmic transparency's influence on social AI trustworthiness, social presence plays a partial mediating role. Specifically, the Bootstrap results showed that the 95% CI for the mediating effect did not include 0, indicating a significant mediating effect. Meanwhile, the 95% CI for the direct effect

[0.188, 0.266] also did not include 0, indicating a significant direct effect. Thus, Hypothesis H6 is supported.

Table 6: Mediation Effect Test Results 1

	Effect Size	BootSE	BootLLCI	BootULCI	Effect Proportion
Direct Effect	0.227	0.020	0.188	0.266	58.5%
Indirect Effect	0.161	0.023	0.116	0.206	41.5%
Total Effect	0.388	0.007	0.373	0.401	100.00%

In the path of active emoji usage's influence on social AI trustworthiness, social presence has a complete mediating role. Table 7 shows that the Bootstrap 95% CI for the mediating effect did not include 0, indicating a significant mediating effect. The Bootstrap 95% CI for the direct effect included 0, indicating that the direct effect is not significant. Therefore, Hypothesis H7 is supported.

Table 7: Mediation Effect Test Results 2

	Effect Size	BootSE	BootLLCI	BootULCI	Effect Proportion
Direct Effect	0.450	0.302	-0.143	1.043	21.3%
Indirect Effect	1.665	0.657	0.310	2.914	78.7%
Total Effect	2.115	0.754	0.634	3.597	100.00%

5. Results and Discussion

5.1 Research Findings

Through questionnaires and empirical analysis, this study explored the impact of emoji usage on technology trustworthiness and the influence of varying levels of algorithmic transparency on technology trustworthiness. The results showed that merely noticing AI using emojis had no significant effect, whereas users who actively used emojis scored significantly higher on social presence and social AI trustworthiness. Perceived algorithmic transparency and social presence were not only highly correlated with social AI trustworthiness but also had significant predictive effects on it. Social presence played a complete mediating role in the path from active emoji usage to social AI trustworthiness and a partial mediating role in the path from perceived algorithmic transparency to social AI trustworthiness. The study reveals the mechanisms by which emoji usage and algorithmic transparency influence the formation of technology trustworthiness, holding certain theoretical and practical significance for human-machine interaction research and AI design optimization.

5.2 Discussion on the Impact of Algorithmic Transparency on User Trust and Social Presence

This study found that in social AI scenarios, increasing algorithmic transparency can significantly enhance users' trust levels. This result aligns with the views of Zerilli et al. (2022), who emphasized that transparency is a core prerequisite for AI trust formation, capable of reducing users' uncertainty and perceived risk, thereby strengthening trust in the system. Similarly, Park and Yoon (2025) indicated that even when most users hold generally negative attitudes toward AI, transparency can still alleviate such distrust through a "knowledge transmission pipeline" model, thereby promoting trust establishment. The findings of this study not only further validate the key role of transparency in technology trust formation but also demonstrate its positive effects in addressing users' inherent distrust.

The results of this study indicate that increasing algorithmic transparency not only enhances user trust but also improves their social presence. From the perspective of social presence, transparency helps users better understand the operational logic and intentions of AI, thereby perceiving a higher "authenticity" in interactions, supporting Hypothesis 3. At the same time, the conclusions of this study are consistent with those of Xu et al. (2023), who pointed out that in social chatbot scenarios, providing transparent algorithmic explanations can enhance users' sense of closeness and social intelligence toward the robot, reduce its "uncanny" feeling, and thereby elevate social presence.

From the perspective of technology acceptance, transparency can also be viewed as an external variable in the Technology Acceptance Model (TAM), indirectly promoting positive attitudes and usage intentions toward social AI by enhancing perceived usefulness and perceived ease of use. Therefore, this study not only

empirically supports the hypotheses that "transparency enhances AI trust" (H1) and "transparency enhances AI social presence" (H3) but also theoretically extends the applicability of transparency within the TAM framework, revealing its unique value in social AI interactions.

5.3 Discussion on the Impact of Emoji Usage on User Trust and Social Presence

The empirical results showed that users who actively used emojis during interactions could significantly enhance their technology trustworthiness and social presence toward AI, while passively noticing AI using emojis did not produce significant effects. This finding partially supports Hypotheses 2 and 4, indicating that users' active participation is a key factor in the effectiveness of emojis.

According to Media Richness Theory (MRT), in ambiguous or complex interaction contexts, richer media can reduce information uncertainty and ambiguity (Daft and Lengel, 1986). In other words, emojis, as nonverbal, multimodal social cues, can enrich the expressive forms of text communication, enhance immediate feedback and emotional transmission, and thereby improve information clarity and impact.

Based on social presence theory, users' perceived presence in mediated interactions is influenced by media characteristics (Fox et al., 2009). Combined with the findings of this study, it also supports the view of Aldunate and González-Ibáñez (2017) that "in computer-mediated communication, emojis help reduce information ambiguity, compensate for the lack of emotional and social information in text exchanges, and thereby enhance presence experiences."

In summary, this study not only supports the role of emojis in enhancing technology trust and social presence but also extends existing research on nonverbal cues in computer-mediated communication.

5.4 Other Related Discussions on Social Presence

First, when users face new technological environments, the direct tendency to trust technology is not sufficient to significantly enhance satisfaction; rather, it operates through mediating trust beliefs. Although Al-Oraini (2025) pointed out that "social-oriented communication methods and perceptions of affinity can significantly enhance customer satisfaction." Similarly, "in algorithmic interaction contexts, increasing social context/presence can alleviate users' distrust of algorithms" (Liefooghe et al., 2023). However, Liefooghe et al. (2024) found that anthropomorphism or enhanced social presence sometimes only increases liking or closeness without necessarily translating into trust. This difference may stem from variations in research contexts and trust dimensions; in high-risk tasks, users focus more on the system's capabilities and reliability rather than the emotional connections brought by social presence.

Second, Park and Young Yoon (2025) found through experiments that high transparency often enhances users' trust in organizations or systems and noted that transparency can serve as a signal, indirectly influencing perceptions (such as predictability, control, and approachability). This study further supports this view, emphasizing that in paths aimed at enhancing social AI's impact on user trust through increased algorithmic transparency, attention should also be paid to the perspective of Lee et al. (2019) that "if transparency is disconnected from users' sense of power (control/voice), it can backfire."

Finally, this study also found that emojis indirectly enhance users' trust in social AI by improving social presence. This result aligns with the views of Yu and Zhao (2024), who stated that emojis are effective tools for communication and emotional expression in chatbots, capable of enhancing users' perceptions of warmth (i.e., social presence). However, emoji usage is not always positive. In certain contexts, excessive or inappropriate use of emojis can undermine professionalism and trustworthiness (Zhang, Ding, et al., 2021). In other words, the effect of emojis in enhancing trust also depends on the context and frequency of usage.

5.5 Implications and Recommendations

This study takes social AI as its research object, aligning with its real-world evolution from a "functional tool" to a "social companion." Compared to previous studies that predominantly relied on the technology acceptance model and emphasized rational dimensions, this paper focuses more on exploring the role of emotional mechanisms in trust construction. By introducing "social presence" as a core mediating and moderating variable, combined with a dual-path model of "algorithmic transparency" and "emoji usage," this

study systematically reveals the trust construction process under emotional mechanisms. The research not only supplements the deficiencies in existing literature regarding emotional trust mechanisms but also provides a new explanatory perspective for understanding interactions between users and social AI.

At the policy level, regulatory authorities, when promoting AI applications, should not only emphasize algorithmic compliance and transparency but also focus on users' perceptual experiences and trust building. Encourage enterprises to provide interpretable decision explanations and appeal feedback channels to prevent "transparent yet powerless" phenomena from leading to trust backlash. From a technical perspective, for developers, it is necessary to avoid excessive anthropomorphism or inappropriate symbol usage. Moreover, algorithmic transparency design should not be limited to "result explanations" but should incorporate interactive control mechanisms, granting users certain rights to choice and feedback, thereby truly transforming transparency into trust. At the industry practice level, for enterprises and platforms, the results of this study suggest balancing efficiency and emotional experience in product strategies. In response to different business scenarios, design differentiated interactions. For example, in high-risk, serious scenarios (such as medical or financial decisions), maintain professional and controllable levels of anthropomorphism; in companionship or entertainment scenarios, emphasize emotional expression and affinity more.

5.6 Limitations

Although this study verified the paths by which algorithmic transparency and emoji usage influence user trust through social presence, it still has some limitations. First, the study used self-reported questionnaires for data collection, where subsequent items may be subject to priming effects from preceding items, potentially affecting the independence of responses. Second, variations in respondents' information literacy and technology usage experience may interfere with their social presence and trust perceptions. Finally, the research context is limited to the online environment and cultural context of Chinese users, and the conclusions require further validation in other cultural backgrounds or intergenerational groups.

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