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Trust Differentiation in Human-Computer Interaction: The Dual-Path Impact of AI Voice Assistant Role Types on Continuance and the Moderation of Self-Construal

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ABSTRACT:
Despite the rapid adoption of AI voice assistants, user retention remains generally low. Investigating how to enhance user trust and continuance intention is therefore of significant theoretical and practical importance. Grounded in role theory and the Stimulus-Organism-Response (SOR) framework, this study categorizes AI voice assistants into two role types: companion-type (emotion-oriented) and butler-type(task-oriented). We constructed a theoretical model positing: "role type → affective/cognitive trust →continuance intention " and introduced Self-construal as a moderator. Data collected via scenario-based experiments were analyzed using SPSS for regression and Bootstrap mediation tests. This approach systematically examines the differentiated mechanisms through which AI voice assistant roles influence trust and continuance intention. The results reveal that companion-type assistants significantly foster continuance intention by strengthening users' emotional trust. In contrast, while butler-type assistants establish cognitive trust, they suppress continuance intention by triggering privacy concerns and perceived loss of control. Furthermore, users with an interdependent self-construal exhibit stronger emotional trust and higher continuance intention toward companion-type assistants. However, an independent self-construal does not significant moderate the effect of butler-type assistants.

Keywords: AI voice assistant, continuance intention, companion-type assistant, butler-type assistant, trust, self-construal

1. Introduction

The continuance intention of users toward AI voice assistants directly influences product market penetration and brand loyalty, and is closely tied to corporate data accumulation, service optimization, and business model innovation (Maroufkhani et al., 2022). In practice, voice assistants have been widely adopted across diverse scenarios such as information retrieval (82%), entertainment consumption (67%), and customer service (36%) (Bigne et al., 2024). Compared to text-based interactions, voice interactions significantly enhance users' acceptance of AI recommendations (Chen et al., 2025), while trust in AI strengthens with increased usage frequency (Bach et al., 2022), further positively influencing continuance intention (Hernandez-Ortega & Ferreira, 2021). This study investigates users' continuance intention towards AI voice assistants, grounded in the Expectation-Confirmation Theory (ECT; Bhattacherjee, 2001). According to ECT, continuance behavior is primarily shaped by post-adoption evaluations such as satisfaction and perceived usefulness. However, in the context of AI voice assistants, where

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interactions are increasingly personalized and autonomous, the formation of user trust may play an equally critical role. Therefore, this study extends ECT by incorporating trust as a key determinant. To measure continuance intention, we adopted the scale developed by Venkatesh and Davis (2000), utilizing a seven-point Likert scale. Sample items include: "I intend to continue using this AI assistant in the future" and "Even when other options are available, I would prefer to use this voice assistant."

Although voice assistants play a notable role in building trust and promoting usage, mainstream products largely follow a standardized, "one-voice-fits-all" approach. Research reveals individual differences in user preferences; for instance, extroverted users tend to favor extroverted voice assistants (Snyder et al., 2023), and distinct role types (e.g., companion-type vs. butler-type assistants) exert varying effects on brand attitudes and continuance intention (Poushneh, 2021; Affandi et al., 2025). Therefore, uncovering the underlying psychological mechanisms through which different AI voice assistant roles influence continuance intention is critical. Such insights are essential for enhancing user experience and strengthening corporate competitiveness.

Existing research has predominantly applied the Technology Acceptance Model to demonstrate the driving effects of perceived ease of use and usefulness on the adoption of AI voice assistants (Venkatesh & Davis, 2000). Other studies have focused on usage motivations, contextual applicability (e.g., in hotels, retail, and healthcare), and industry-specific adaptation strategies (Calahorra-Candao & Martín-de, 2024; Choi & Drumwright, 2025). However, the current literature has yet to systematically reveal how different role types (e.g., companion-type vs. butler-type) of AI voice assistants shape users' long-term continuance intention through differentiated trust pathways. Furthermore, while self-construal has been shown to moderate psychological responses in human-machine interaction, its specific moderating role in the relationship between AI voice assistant types and continuance intention remains underexplored.

To address these gaps, this study integrates role theory and the SOR framework, classifying AI voice assistants into companion-type (emotion-oriented) and butler-type (task-oriented) categories (Qi et al., 2025). Using a scenario-based experiment, we construct a dual-path model of "role type → affective trust / cognitive trust → continuance intention" and introduce self-construal as a moderating variable. This design aims to elucidate the mechanism through which role type influences continuance intention via trust, as well as its boundary conditions.

This research contributes to the literature in three key aspects. First, theoretically, it constructs an integrated framework incorporating role type, dual-path trust, and self-construal, thereby deepening the understanding of the differentiated psychological mechanisms underlying AI voice assistant interactions. Second, methodologically, the experimental results validate that interdependent self-construal enhances affective trust toward companion-type assistants, while the moderating effect of independent self-construal for butler-type assistants is found to be non-significant. This provides empirical evidence for studying individual differences in human-computer interaction. Third, on a practical level, the study proposes a "role-scenario-user" fit strategy. It offers targeted guidance for improving affective computing in companion-type assistants (Luo et al., 2025) and advancing algorithm transparency design in butler-type assistants (Shin, 2021).

These insights can help companies mitigate user privacy concerns and perceived loss of control, thereby enhancing the sustainability of human-machine collaboration.

2. Literature Review and Hypotheses

2.1 Types of AI Voice Assistants and Users' Continuance Intention

Research on anthropomorphism suggests that the roles brands establish in communication imply specific types of relationships with consumers, among which "companion" and "servant" have received substantial academic attention (Fan et al., 2020; Shen et al., 2025). Extending this perspective, marketing research has examined how the role types of AI voice assistants shape user outcomes, including engagement, usage intention, satisfaction, and emotional attachment. Prior studies indicate that artificial intelligence can simultaneously function as a "technological tool" and a "social agent" (Sun et al., 2025). Consistent with the Computers Are Social Actors paradigm, users motivated by social interaction are more likely to perceive voice assistants as companions, whereas efficiency-oriented users tend to view them as functional tools (Choi & Drumwright, 2025). Building on this logic, Qi et al. (2025) proposed the concept of a "butler" role, which, together with the companion role, provides a role-based classification framework for AI voice assistants.

This study adopts the companion-type and butler-type AI voice assistant classification proposed by Qi et al. (2025). This framework extends the logic of anthropomorphism and role theory. It distinguishes between two basic interaction modes: emotion-oriented and task-oriented. This distinction offers a theoretical foundation for analyzing their different impact mechanisms in later research.

In human-computer interaction, anthropomorphism refers to the attribution of human-like traits, motivations, and emotions to non-human agents (Epley et al., 2007; Wang et al., 2023). A key manifestation of anthropomorphism in social interactions is empathy simulation, where intelligent agents exhibit perceptible comforting and encouraging behaviors (Xiao et al., 2016). For instance, companion-type AI voice assistants often employ friend-like tones to simulate empathy (Qi et al., 2025). Such anthropomorphic interactions can foster emotional bonds between humans and machines, leading to the formation of relational attachment (Bickmore et al., 2005).

Prior research suggests that perceived sincerity in these interactions boosts users' intrinsic motivation for continued use (Poushneh, 2021). Furthermore, both anthropomorphic interaction styles and the resulting emotional bonds drive continuance intentions (Affandi et al., 2025). Appropriate emotional responses from AI have also been shown to positively influence users' willingness to delegate tasks, seek decisions, and build trust (Mari et al., 2024). Therefore, for companion-type AI voice assistants, empathy simulation—as a form of anthropomorphic design—enhances emotional interaction and intrinsic motivation, thereby fostering relational attachment through the cultivation of emotional trust.

Based on the above discussion, the following hypothesis is proposed:

H1a: Companion-type AI voice assistants have a significant positive impact on users' continuance intention.

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In contrast, butler-type AI voice assistants may encounter challenges in sustaining users' long-term continuance intention. This decline can primarily be attributed to three key drivers: privacy and security concerns, limited perceived functional returns, and a lack of emotional connection. From a privacy perspective, users are concerned about the potential misuse or leakage of personal information, which directly reduces the perceived value of information disclosure (Vimalkumar et al., 2021; Zhang et al., 2025). Moreover, the high autonomy of voice assistants may heighten perceived intrusiveness, prompting users to reduce usage frequency or abandon the technology altogether (Longoni & Cian, 2022). In terms of functional benefits, when service personalization or functionality is inadequate, users may perceive an imbalance between their information disclosure and the benefits received, thereby weakening their motivation for continued use (Malodia et al., 2022; Fernandes & Oliveira, 2021). In addition, limited anthropomorphic interaction hinders emotional bonding, leaving users without emotional support to buffer privacy concerns and usage anxiety (Cherif & Lemoine, 2019; Kang et al., 2024).

Based on the above, the following hypothesis is proposed:

H1b: Butler-type AI voice assistants have a significant negative impact on users' continuance intention.

2.2 The Mediating Role of Trust

Many change projects go beyond organisational boundaries, for example when they concern sustainable value chain processes across companies, business process outsourcing (e.g. in the area of facility management) or other relationships between joint projects with partners. This is also the case for many secondary processes of hospitals (e.g. operation maintenance, laundry, cleaning or catering services) which are usually (partly) provided by hospital owned subsidiaries or external service providers (Schröter 2017).

Trust is commonly defined as a willingness to accept vulnerability ,arising from positive expectations about another party's future actions.(Mayer et al., 1995).This conceptualization has been extended beyond interpersonal contexts to inform trust in human–computer interaction (Glikson & Woolley, 2020).In technology adoption, trust is dynamic and experience-dependent, and adopting complex AI systems often requires a "leap of faith" (Hoff & Bashir, 2015).Bach et al. (2022) further emphasize the importance of human-centered design in AI-driven systems.

In the context of voice assistants, user trust is largely shaped by confidence in system recommendations, which is closely related to anthropomorphic characteristics (Liu et al., 2025).Prior research consistently shows that anthropomorphism enhances user trust (Lockey et al., 2021; Bach et al., 2022).Compared with text-based interfaces, voice interfaces are conducive to trust formation. They reduce cognitive load and enhance social presence.(Hasselwander et al., 2025).Human-like speech and emotional cues further strengthen trust and usage intention (Sreejesh et al., 2025).

Prior research distinguishes dual pathways of trust, whereby users rely more on cognitive trust in technical contexts and affective trust in social contexts (Glikson & Woolley, 2020)In functional task scenarios, AI primarily builds competence-based cognitive trust through efficiency and reliability, which may also entail higher perceived risk (Shin, 2021; Von Eschenbach, 2021).By contrast, social AI cultivates affective trust through social cues and emotional responsiveness.Accordingly, butler-type and

companion-type AI assistants rely on fundamentally different trust-building mechanisms (Sun et al., 2025).

Affective trust is rooted in emotional bonds, mutual care, and emotional investment (McAllister, 1995).Prior research suggests that emotional-level interactions with AI agents facilitate the development of affective trust (Zhou et al., 2025).System features such as vocal tone, interpersonal cues, and interaction style also contribute to the formation of affective trust (Hoff & Bashir, 2015).Notably, users sometimes exhibit even stronger affective trust in artificial intelligence than in humans (Glikson & Woolley, 2020).AI can engage users through emotional mimicry and empathetic interaction. These mechanisms foster positive emotions. In turn, such emotions enhance trust and influence continuance intention.Users may develop affective attachment to AI voice assistants through emotionally rich interactions (Hernandez-Ortega & Ferreira, 2021).Emotional resonance further encourages users to perceive AI voice assistants as long-term companions (Hernandez-Ortega & Ferreira, 2021).

Role-setting plays a critical role in affective trust formation, as clearly defined roles enhance users' trust and sense of social presence (Qiu & Benbasat, 2009).For companion-type AI voice assistants, trust is primarily cultivated through social presence.Such presence is generated through emotional cues and relational depth. These elements transcend pure functionality and foster sustained interaction. (Sun et al., 2025).Furthermore, as a medium for emotional expression, companion-type AI voice assistants convey affect through voice and strengthen users' emotional connection, thereby enhancing continuance intention (Luo et al., 2025). Consequently, users' decision-making increasingly relies on AI-provided social cues (Go & Sundar, 2019; Lee et al., 2021).

Based on the above, the following hypotheses are proposed:

H2a: Affective trust mediates the positive impact of companion-type AI voice assistants on users' continuance intention.

Cognitive trust is rooted in rational assessments of another's competence, professionalism, and reliability (McAllister, 1995).In AI contexts, cognitive trust is associated with transparency, dependability, and behavioral immediacy (Glikson & Woolley, 2020).Butler-type AI voice assistants are designed for task completion and management, exhibiting a technology-dominant, high task-control interaction style (Gombolay et al., 2015).Users typically develop competence-based cognitive trust in such AI based on its perceived reliability, efficiency, and professionalism in executing tasks (McAllister, 1995).Prior research shows that task-oriented AI can gain high levels of cognitive trust, this trust is primarily derived from its efficient performance(Gombolay et al., 2015).

However, high cognitive trust may reinforce an instrumental perception of butler-type AI, inhibiting emotional bond formation and weakening continuance intention (Longoni & Cian, 2022).Such functionality-oriented AI is often perceived as impersonal and overly technical (Mu & Zhang, 2025). Users may view standardized responses as programmed simulations, as a result, they may question the emotional authenticity of the AI(Zhao et al., 2025).Notably, users with high cognitive trust are more sensitive to emotional shortcomings and experience a "competence–emotion" gap (Zhao et al., 2025).

Based on the above, the following hypotheses are proposed:

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H2b: Cognitive trust mediates the negative impact of butler-type AI voice assistants on users' continuance intention.

2.3 The Moderating Role of Self-construal

Self-construal refers to an individual's cognitive framework regarding the relationship between the self and others, reflecting whether the self is perceived as independent or interdependent (Markus & Kitayama, 1991).,this psychological trait shapes individuals' interpretations of social interactions and guides their cognition and motivation. Those with an independent self-construal place greater emphasis on autonomy and personal choice, whereas those with an interdependent self-construal emphasize relational harmony and cooperation.

Self-construal has been widely applied in marketing and human–computer interaction research to explain individual differences in technology acceptance (Chang et al., 2023).Prior research suggests that technology trust is jointly shaped by user characteristics, technology attributes, and environmental context (Hoff & Bashir, 2015).Among user characteristics, self-construal orientation is particularly salient: independent individuals view technology as a goal-oriented tool, whereas interdependent individuals activate a relational self when evaluating technology (Chang et al., 2023).As AI sophistication increases, user-centered factors play an increasingly prominent role in trust formation (Glikson & Woolley, 2020; Bach et al., 2022).Accordingly, incorporating self-construal as a moderating variable enables a deeper examination of user heterogeneity. In particular, it helps explain differences in continuance intention toward AI voice assistants.

Individuals with an interdependent self-construal emphasize interpersonal connectedness and view the self as part of a relational network.Their motivations focus on maintaining relational harmony and fostering emotional bonds (Cross et al., 2011).In technology adoption, such individuals attend more to whether a technology facilitates interpersonal-like interaction and emotional support (Go & Sundar, 2019).Companion-type AI voice assistants are designed as relational partners characterized by empathy and interactivity.These traits closely align with the relational orientation valued by individuals with an interdependent self-construal (Cross et al., 2011). This alignment fosters a sense of social presence and meets users' relational needs, which in turn serves as a foundation for affective trust.When technology characteristics match an individual's accessible self-construal, deeper information processing is triggered.This perceived relational fit enhances willingness to sustain the interaction. Individuals with an interdependent self-construal are more likely to establish psychological identification with technology. Such identification is often fostered through emotional interaction(Chang et al., 2023).Emotional support and human-like interaction fulfill relational needs and strengthen continuance intention (Zhao et al., 2025).Emotionalized AI interactions exert stronger effects on relationally oriented individuals' usage intentions (Glikson & Woolley, 2020).Therefore, an interdependent self-construal may strengthen the positive influence of companion-type AI voice assistants. This effect is reflected in higher affective trust, thereby strengthening the indirect pathway to continuance intention.

Based on the above, the following hypotheses are proposed:

H3a: Interdependent self-construal strengthens the positive impact of companion-type AI voice assistants on affective trust.

H3b: Interdependent self-construal strengthens the positive impact of companion-type AI voice assistants on users' continuance intention.

Individuals with an independent self-construal define the self as autonomous and distinct from others, emphasizing self-determination, personal agency, and independent decision-making (Brewer & Gardner, 1996). In technology contexts, they are particularly sensitive to threats to decision autonomy. Consequently, they tend to resist technologies that are perceived as constraining choice or exerting control. (Cross et al., 2011).

Butler-type AI voice assistants are characterized by high instrumental dominance and algorithmic control, which may conflict with autonomy-oriented users' intrinsic needs (Longoni & Cian, 2022). When AI systems are perceived as intrusive or behavior-directive, users may experience autonomy threat and psychological discomfort (Lockey et al., 2021). Prior studies further indicate that even highly efficient AI recommendations can reduce cooperation when users feel "commanded" or deprived of autonomy (Gombolay et al., 2015), and authoritative AI interactions may produce counterproductive effects for autonomy-oriented users (Shuqair et al., 2024).

Moreover, autonomy-oriented individuals with high self-perceived competence are less willing to rely on AI, even when performance is superior (Glikson & Woolley, 2020). Importantly, for independent users, the effect of trust on usage intention is conditional (Hoff & Bashir, 2015). Thus, even when butler-type assistants might potentially enhance cognitive trust through task efficiency, continuance intention may still be weakened by perceived autonomy loss or resistance to control. Therefore, Independent self-construal is likely to strengthen the negative influence of butler-type AI voice assistants. This effect is reflected in lower cognitive trust and reduced continuance intention among users.

Based on the above, the following hypotheses are proposed:

H4a: Independent self-construal strengthens the negative impact of butler-type AI voice assistants on cognitive trust.

H4b: Independent self-construal strengthens the negative impact of butler-type AI voice assistants on users' continuance intention.

Based on the above hypotheses, the conceptual model is proposed as shown in Fig. 1.

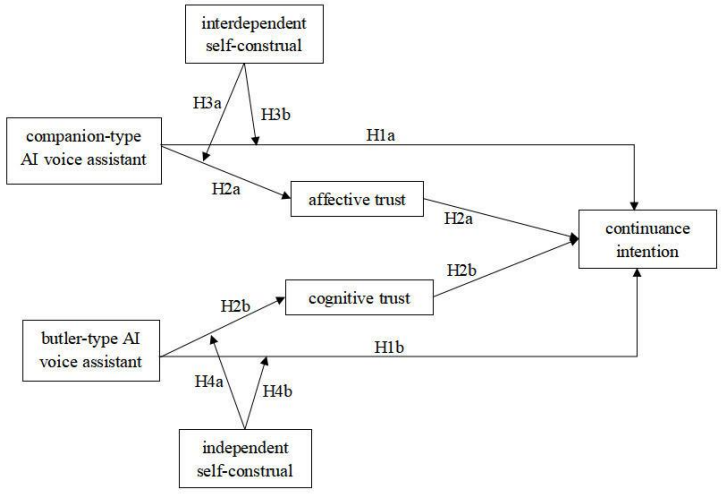

Fig.1 Conceptual Model

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3. Experiment and Hypothesis Testing

This study employed a scenario-based experimental approach, consisting of two sequential experiments. The primary objective of Experiment 1 was to examine the direct effect of different AI voice assistant types on users' continuance intention, to investigate the mediating role of trust in this relationship, and to simultaneously validate the impact of AI voice assistant type on trust. Building on these findings, Experiment 2 incorporated self-construal as a moderating variable. This design enabled a deeper examination of how AI voice assistants influence continuance intention through trust. It also revealed differences across self-construal types.

The study developed distinct stimulus materials to operationalize companion-type and butler-type AI voice assistants, which were subjected to manipulation checks. The survey instrument primarily comprised four validated scales: AI voice assistant type, trust, self-construal, and continuance intention. Specifically, the AI voice assistant type scale was adapted from Qi et al. (2025) and Fan et al. (2020); the trust scale drew on Ng and Chua (2006); the self-construal scale was based on Chang et al. (2023); and the continuance intention scale followed Venkatesh and Davis (2000). Final scale items were refined through discussions with domain experts to ensure contextual appropriateness. In addition to the core constructs, the questionnaire collected basic demographic information (e.g., gender, age, income, education level), as well as participants' prior experience with and general attitudes toward AI voice assistants. Attention-check questions were included to ensure data quality. All items, except for demographic variables, were measured using a 7-point Likert scale.

3.1. Preliminary Experiment

The preliminary experiment aimed to validate the manipulation of the two AI voice assistant types (companion-type vs. butler-type), assess the suitability of the designed stimulus materials, and finalize the experimental content for the main studies.Stimulus materials were developed to operationalize each assistant type. Participants were randomly assigned to review one type of material and subsequently completed the AI voice assistant type scale. Data were collected via the Credamo platform, yielding 75 initial responses. After removing invalid responses, 68 valid questionnaires were retained (34 for each type). The sample consisted of 35 males and 33 females; 22.06% were aged 25 or below, 63.24% were aged 26–35, 10.29% were aged 36–45, and 4.41% were aged 56 or above, with the majority concentrated in the 45 and below age group.

An independent samples t-test was conducted to verify the manipulation. Results confirmed that the scenarios were perceived as intended. In the companion-type scenario, ratings for the companion-type dimension ($M = 5.010$) were significantly higher than those for the butler-type dimension ($M = 4.059$), $t = 2.813$, $p = 0.006$. Conversely, in the butler-type scenario, ratings for the butler-type dimension ($M = 5.137$) were significantly higher than those for the companion-type dimension ($M = 4.206$), $t = 3.372$, $p = 0\ .001$. Reliability analysis was performed using SPSS 25.0. The Cronbach's alpha coefficients for all measured dimensions exceeded 0.7, indicating good scale reliability and stability of the measurement.

3.2. Experiment 1

Experiment 1 examined the direct effects of AI voice assistant type on users' continuance intention and tested the mediating role of trust. Specifically, this experiment tested H1a, H1b, H2a, and H2b.

3.2.1. Purpose

Experiment 1 examined the direct effects of AI voice assistant type on users' continuance intention and tested the mediating role of trust. Specifically, this experiment tested H1a, H1b, H2a, and H2b.

3.2.2. Design and Sample

A between-subjects experimental design was employed, in which participants were randomly assigned to either a companion-type or a butler-type AI voice assistant condition. The dependent variable was users' continuance intention. Data were collected via the Credamo online platform. A total of 161 questionnaires were obtained, of which 150 were retained after excluding invalid responses (companion-type: n = 76; butler-type: n = 74). The final sample consisted of 90 males and 60 females. Regarding age, 29.3% of participants were aged 25 or below, 59.3% were aged 26-35, 6.7% were aged 36-45, 4.0% were aged 46-55, and 0.7% were aged 56 or above. Most participants (96%) reported prior experience using AI voice assistants.

3.2.3. Materials and Procedure

Participants were randomly assigned to one of two scenario-based descriptions depicting either a companion-type or a butler-type AI voice assistant. They were instructed to carefully read the scenario and to imagine themselves interacting with the described assistant. After reading the assigned scenario, participants completed measures assessing their perceptions of the AI voice assistant, followed by scales measuring trust and continuance intention. Finally, demographic information was collected. Participants received monetary compensation upon completion of the experiment.

3.2.4. Data Analysis and Hypothesis Testing

(1) Reliability Analysis

Reliability analysis was conducted using SPSS 25.0. As shown in Table 1, the Cronbach's alpha coefficients for all measured constructs exceeded 0.8, indicating high internal consistency and confirming the scales' reliability for subsequent analysis.

Table 1 Reliability Analysis of Measurement Scales

Construct	Dimension	Number of Items	Cronbach's α
AI voice assistant	Companion-type	3	0.839
	Butler-type	3	0.823
Trust	Affective trust	3	0.861
	Cognitive trust	3	0.900
Continuance intention	--	4	0.963

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(2) Manipulation Check

To assess the effectiveness of the experimental manipulation, an independent-samples t-test was conducted on the independent variable scores across the two role conditions (companion-type vs. butler-type). As shown in Table 2, the mean score for the companion-type condition ($M = 4.255$, $SD = 1.445$) was significantly lower than that for the butler-type condition ($M = 4.734$, $SD = 1.178$), $t = -2.348$, $p < 0.05$. This result confirms that the two role types were successfully manipulated and perceived as distinct by participants, supporting the validity of the experimental procedure.

Table 2 Results of Manipulation Check

	Classification (mean ± SD)		t	p
	Companion-type	Butler-type		
Independent Variable	4.225±1.445	4.734±1.178	-2.348	0.020**

Note：*p<0.1，**p<0.05，***p<0.01

(3) Main Effect Testing

A regression analysis was performed using SPSS 25.0 to test the main effect of AI voice assistant type on users' continuance intention. The analysis treated AI voice assistant type as the independent variable and continuance intention as the dependent variable. The results of the main effect test are summarized in Table 3.

Table 3 Main Effect of AI Voice Assistant Types

		Mean	SD	Continuance intention
Group A	Companion-type	4.502	1.254	0.369***
	Continuance intention	4.891	1.393	—
Group B	Butler-type	4.480	1.233	-0.497***
	Continuance intention	3.524	1.851	—

Note：*p<0.1，**p<0.05，***p<0.01

The results are summarized in Table 3. For users of companion-type AI voice assistants, the mean score for continuance intention is 4.891 ($SD = 1.393$), indicating a moderately high level of willingness to continue use, with relatively limited individual variation. The mean score for the perceived companion-type traits is 4.502 ($SD = 1.254$), suggesting that user perceptions in this condition are similarly consistent. Correlation analysis reveals a significant positive relationship of moderate strength between companion-type perception and continuance intention ($r = 0.369$, $p < 0.01$). This supports H1a, confirming that stronger perceptions of companion-type traits are associated with higher continuance intention. According to UTAUT2, users' perception of fun and enjoyment from using a technology can enhance their attitude toward continued use (Venkatesh et al., 2003). A companion-type AI voice assistant offers friend-like

interactions. This brings users a positive emotional experience. It therefore positively promotes their intention to continue using it.

In contrast, users of butler-type AI voice assistants report a lower mean continuance intention score of 3.524 (SD = 1.851). This score is significantly lower than that of the companion-type group, and the larger standard deviation reflects greater individual differences in responses. Overall, continuance intention in this group is at a moderately low level. Interestingly, the mean perception score for butler-type traits is 4.480 (SD = 1.233), which is statistically comparable to the perception score for companion-type traits in the other group. This indicates that while both assistant types were perceived clearly by users, these perceptions did not translate equally into continuance intention. Correlation results show a significant strong negative relationship between butler-type perception and continuance intention ($r = –0.497$, $p < 0.01$), meaning that a stronger perception of butler-type traits corresponds to a lower willingness to continue use. These findings support H1b, indicating a clear inverse relationship for butler-type assistants. According to TAM and perceived risk theory, Featherman & Pavlou (2003) noted that consumer concerns about risks, such as privacy and performance, negatively affect technology adoption. Specifically, a butler-type assistant often handles tasks like schedule management and home control. This triggers users' deep consideration of the technology's reliability. They may become more acutely aware of its limitations. For example, they might face risks of privacy leakage or task failure. These concerns about risk then weaken their intention to continue using it.

(4) Mediation Effect Testing

The mediating role of trust was examined using Model 4 in the PROCESS macro for SPSS. A bootstrap analysis with 5,000 resamples and a 95% confidence interval was conducted. AI voice assistant type was specified as the independent variable, continuance intention as the dependent variable, and the two dimensions of trust (affective and cognitive) as parallel mediators. The results are presented in Tables 4 and 5.

Table 4 Mediation Analysis for Affective Trust

		Path	Effect	SE	t	p	LLCI	ULCI
Group A	Direct Effect	Companion-type→Continuance intention	0.255	0.120	2.128	0.037	0.162	0.494
	Indirect Effect Process	Companion-type→Affective trust	0.387	0.115	3.373	0.001	0.159	0.616
		Affective trust→Continuance intention	0.400	0.113	3.540	0.007	0.175	0.626
	Total Effect	Companion-type→Continuance intention	0.410	0.120	3.417	0.001	0.171	0.650

Note: LLCI = Lower limit of the 95% confidence interval for the estimate; ULCI = Upper limit of the 95% confidence interval for the estimate.

As shown in Table 4, in the companion-type condition, the AI voice assistant exhibits a positive direct effect on continuance intention ($\beta = 0.255$, $SE = 0.120$, $t = 2.128$, $p = 0.037$, 95% CI [0.162, 0.494]). Although the confidence interval approaches

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zero, it does not fully contain it, suggesting that the direct positive effect of the companion-type assistant on continuance intention is marginally significant. In the indirect pathway, the companion-type assistant shows a significant positive effect on affective trust (β = 0.387, SE = 0.115, t = 3.373, p = 0.001, 95% CI [0.159, 0.616]), indicating that a stronger perception of companion-type traits significantly enhances users' affective trust. Affective trust, in turn, positively influences continuance intention (β = 0.400, SE = 0.113, t = 3.540, p = 0.007, 95% CI [0.175, 0.626]), confirming that increased affective trust effectively promotes continuance intention. Together, these results support a significant indirect path: companion-type → affective trust → continuance intention. Regarding the total effect, the companion-type assistant has a total effect of 0.410 on continuance intention (SE = 0.120, t = 3.417, p = 0.001, 95% CI [0.171, 0.650]), which is larger than the direct effect by 0.155. This difference represents the size of the mediation effect through affective trust, further confirming that affective trust plays a significant partial mediating role between companion-type AI voice assistants and continuance intention. Therefore, Hypothesis H2a is supported.

Table 5 Mediation Analysis for Cognitive Trust

		Path	Effect	SE	t	p	LLCI	ULCI
Group B	Direct Effect	Butler-type→Continuance intention	-0.505	0.152	-3.330	0.001	-0.808	-0.203
	Indirect Effect Process	Butler-type→Cognitive trust	0.483	0.133	3.631	0.001	0.218	0.749
		Cognitive trust→Continuance intention	-0.497	0.123	-4.030	0.000	-0.744	-0.251
	Total Effect	Butler-type→Continuance intention	-0.746	0.154	-4.857	0.000	-1.052	-0.440

Note: LLCI = Lower limit of the 95% confidence interval for the estimate; ULCI = Upper limit of the 95% confidence interval for the estimate.

As shown in Table 5, in the butler-type condition, the AI voice assistant demonstrates a significant direct negative effect on continuance intention (β = -0.505, SE = 0.152, t = -3.330, p = 0.001, 95% CI [-0.808, -0.203]). Since the confidence interval does not include zero, this confirms that the butler-type assistant directly and significantly suppresses users' continuance intention. In the indirect pathway, the butler-type assistant shows a significant positive effect on cognitive trust (β = 0.483, SE = 0.133, t = 3.631, p = 0.001, 95% CI [0.218, 0.749]), indicating that a stronger perception of butler-type traits enhances users' cognitive trust. However, cognitive trust exerts a significant negative effect on continuance intention (β = -0.497, SE = 0.123, t = -4.030, p < 0.001, 95% CI [-0.744, -0.251]), suggesting that increased cognitive trust further inhibits users' willingness to continue use. Together, these results support a significant mediating path: butler-type → cognitive trust → continuance intention. Regarding the total effect, the butler-type assistant has a total negative effect of -0.746 on continuance

intention (SE = 0.154, t = -4.857, $p < 0.001$, 95% CI [-1.052, -0.440]). The absolute value of the total effect exceeds that of the direct effect by 0.241, which represents the size of the mediation effect via cognitive trust. This further confirms that cognitive trust plays a significant partial mediating role between the butler-type assistant and continuance intention. Specifically, the butler-type AI voice assistant not only directly reduces continuance intention but also reinforces this suppression indirectly by enhancing cognitive trust. Therefore, Hypothesis H2b is supported.

3.3. Experiment 2

3.3.1. Purpose

Experiment 2 aimed to examine the moderating role of self-construal in the relationship between AI voice assistant type, trust, and users'continuance intention. Specifically, this experiment tested H3a, H3b, H4a, and H4b.

3.3.2. Design and Sample

A 2 (AI voice assistant type: companion-type vs. butler-type) × 2 (self-construal: interdependent vs. independent) between-subjects design was employed. Self-construal was measured using an established scale. Following prior research, participants were categorized into interdependent or independent self-construal groups using a median split for subsequent analysis. Data were collected via the Credamo online platform. A total of 315 questionnaires were obtained, of which 303 were retained after excluding invalid responses. The final sample consisted of 150 males and 153 females. Regarding age, 21.8% of participants were aged 25 or below, 52.8% were aged 26-35, 18.2% were aged 36-45, 5.6% were aged 46-55, and 1.7% were aged 56 or above. Most participants reported prior experience using AI voice assistants.

3.3.3. Materials and Procedure

Participants were randomly assigned to one of the two AI voice assistant conditions. The experimental procedure consisted of four steps. First, participants completed the self-construal scale based on their general tendencies. Second, they read a scenario describing either a companion-type or a butler-type AI voice assistant and were instructed to imagine themselves interacting with the assistant. Third, participants completed measures assessing their perceptions of the AI voice assistant, followed by the trust and continuance intention scales. Finally, demographic information was collected. Participants received monetary compensation upon completion of the experiment.

3.3.4. Data Analysis and Hypothesis Testing

(1)Reliability of the Moderator Variable

Since the reliability of the AI voice assistant type, trust, and continuance intention scales was established in Experiment 1, only the self-construal scale was evaluated in this experiment. As shown in Table 6, all dimensions demonstrated Cronbach's α values above 0.8, confirming high internal consistency and reliability. The scale was therefore deemed suitable for subsequent analysis.

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Table 6 Reliability Analysis of the Self-construal Scale

Construct	Dimension	Number of Items	Cronbach's α
Self-construal	Interdependent self-construal	5	0.908
	Independent self-construal	5	0.885

(2) Manipulation Check

An independent-samples t-test was conducted to verify the effectiveness of the role-type manipulation. The mean score for the companion-type group (M = 5.064, SD = 1.305) was significantly higher than that for the butler-type group (M = 4.588, SD = 1.316), t = 3.166, p = 0.002. This indicates that participants in the two conditions perceived the AI voice assistants in distinctly different ways, confirming that the experimental manipulation was successful.

(3) Moderating Effect Testing

The moderating role of self-construal was tested using Model 8 of the PROCESS macro in SPSS . Bootstrapping with 5,000 resamples and a 95% confidence interval was employed to assess the conditional indirect effects. In the model, AI voice assistant type was specified as the independent variable, continuance intention as the dependent variable, trust as the mediator, and self-construal (independent vs. interdependent) as the moderator. The results of the moderated mediation analysis are presented in Tables 7 and 8.

Table 7 Moderating Effect of Interdependent Self-construal

Companion-type	Continuance intention				Affective trust			
	β	SE	t-value	P-value	β	SE	t-value	P-value
Constant	6.656	2.087	3.188	0.002***	6.244	2.163	2.887	0.004***
Companion-type	-0.440	0.408	-1.078	0.283	-0.287	0.434	-0.663	0.509
Interdependent self-construal	-1.009	0.360	-2.806	0.006***	-0.599	0.380	-1.576	0.117
Companion-type*interdependent self-construal	0.188	0.072	2.609	0.010**	0.128	0.076	1.683	0.094*
Affective trust	0.190	0.077	2.465	0.015**				
Sample size	152				152			
R^2	0.378				0.157			
Adjusted R^2	0.357				0.134			
F-value	22.374***				9.191***			

Note : *p<0.1, **p<0.05, ***p<0.01

As shown in Table 7, interdependent self-construal significantly strengthens the positive influence of companion-type AI voice assistants on both affective trust and continuance intention.

Regarding overall model fit, the regression model examining the effects of the companion-type assistant, interdependent self-construal, and their interaction on continuance intention yielded $R^2=0.378$, adjusted $R^2=0.357$, $F=22.374$, $p<0.001$, indicating strong explanatory power.The model for affective trust showed $R^2=0.157$, adjusted $R^2=0.134$, $F=9.191$, $p<0.01$, effectively identifying the predictors of affective trust. Concerning specific effects, when the moderator was excluded, the main effect of the companion-type assistant on continuance intention was non-significant ($\beta=-0.440$, $SE=0.408$, $t=-1.078$, $p=0.283$), as was its effect on affective trust ($\beta=-0.287$, $SE=0.434$, $t=-0.663$, $p=0.509$). In contrast, interdependent self-construal showed a significant negative main effect on continuance intention ($\beta=-1.009$, $SE=0.360$, $t=-2.806$, $p=0.006$) and a marginal negative effect on affective trust ($\beta=-0.599$, $SE=0.380$, $t=-1.576$, $p=0.117$).The interaction between the companion-type assistant and interdependent self-construal was significantly positive. In the continuance intention model, the interaction term was significant ($\beta=0.188$, $SE=0.072$, $t=2.609$, $p=0.010$), indicating that interdependent self-construal amplifies the positive impact of the companion-type assistant. In the affective trust model, the interaction was marginally significant ($\beta=0.128$, $SE=0.076$, $t=1.683$, $p=0.094$), suggesting a strengthening effect on the path to trust. When affective trust was included in the model, it exerted a significant positive effect on continuance intention ($\beta=0.190$, $SE=0.077$, $t=2.465$, $p=0.015$), further clarifying the mediated pathway: companion-type → moderated by interdependent self-construal → affective trust → continuance intention.

In summary, for individuals with an interdependent self-construal, companion-type AI voice assistants significantly enhance both affective trust and continuance intention. Therefore, Hypotheses H3a and H3b are supported.

Table 8 Moderating Effect of Independent Self-construal

Butler-type	Continuance intention				Cognitive trust			
	β	SE	t-value	P-value	β	SE	t-value	P-value
Constant	7.056	2.020	3.494	0.001***	0.793	1.319	0.601	0.548
Butler-type	-0.216	0.406	-0.532	0.596	0.577	0.261	2.213	0.028**
Independent self-construal	0.286	0.481	0.596	0.552	0.530	0.311	1.705	0.090*
Butler-type*independent self-construal	-0.048	0.091	-0.525	0.600	-0.060	0.059	-1.013	0.313
Cognitive trust	-0.398	0.126	-3.155	0.002***				
Sample size	151				151			
R^2	0.211				0.210			

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Butler-type	Continuance intention				Cognitive trust			
	β	SE	t-value	P-value	β	SE	t-value	P-value
Adjusted R^2	0.184				0.188			
F-value	9.780***				13.025***			

Note : *p<0.1, **p<0.05, ***p<0.01

As shown in Table 8, independent self-construal does not significantly amplify the negative impact of butler-type AI voice assistants on either cognitive trust or continuance intention.

In terms of overall model fit, the regression model examining the effects of the butler-type assistant, independent self-construal, and their interaction on continuance intention yielded R^2=0.211, adjusted R^2=0.184, F=9.780, p<0.001, demonstrating basic explanatory power. The model for cognitive trust showed R^2=0.210, adjusted R^2=0.188, F=13.025, p<0.001, effectively capturing its core predictors.Regarding specific effects, in the cognitive trust model, the butler-type assistant exhibited a significant positive main effect (β=0.577, SE=0.261, t=2.213, p=0.028). Independent self-construal showed a marginally positive main effect (β=0.530, SE=0.311, t=1.705, p=0.090). However, the interaction between the two was not significant (β=−0.060, SE=0.059, t=−1.013, p=0.313), failing to show the hypothesized negative moderation that would strengthen the effect on cognitive trust. In the continuance intention model, the main effects of the butler-type assistant (β=−0.216, SE=0.406, t=−0.532, p=0.596) and independent self-construal (β=0.286, SE=0.481, t=0.596, p=0.552) were both non-significant. Their interaction was also non-significant (β=−0.048, SE=0.091, t=−0.525, p=0.600), providing no evidence for the predicted amplification of the negative impact on continuance intention. Notably, cognitive trust retained a significant negative effect on continuance intention (β=−0.398, SE=0.126, t=−3.155, p=0.002).

In summary, the analysis does not support a moderating role for independent self-construal in the relationship between butler-type AI voice assistants and the outcome variables. Therefore, Hypotheses H4a and H4b are not supported.

4. Conclusions and Discussion

4.1 Conclusions

This study examines how AI voice assistant role types influence users' continuance intention through distinct trust pathways. Grounded in role theory and the SOR framework, we constructed a dual-path model of "role type → affective trust / cognitive trust → continuance intention" and systematically tested it through scenario-based experiments. The main findings are as follows:

Role type exerts a differential impact on continuance intention. Companion-type assistants enhance continuance intention by strengthening affective trust and social presence, whereas butler-type assistants, despite fostering cognitive trust through functional competence, are associated with lower long-term usage intention due to privacy

concerns, perceived loss of control, and limited emotional connection.,thereby validating the differentiated impact mechanisms proposed in the literature review.

Bansal et al. (2015) used the Elaboration Likelihood Model (ELM) as a theoretical framework. They argued that emotional involvement can only temporarily reduce users' perception of privacy risks through the affect heuristic. This leads to short-term behavioral compromises. This is because privacy concerns consistently drive users to focus on core privacy risks, and the positive feelings generated by emotion cannot continuously offset users' inherent worries about the disclosure and misuse of personal information(Gerber & Volkamer, 2018). As a result, emotional engagement fails to alter the stability and cognitive nature of privacy concerns (Gerber & Volkamer, 2018). Therefore, emotional engagement cannot offset privacy concerns in the long term.

Trust operates through divergent mechanisms. affective trust facilitates continuance intention, while cognitive trust may inhibit it in task-dominant AI contexts, highlighting that trust is not uniformly beneficial.

The moderating role of self-construal is partially supported. Interdependent self-construal amplifies the positive effects of companion-type assistants on affective trust and continuance intention. However, the hypothesized negative moderating effect of independent self-construal on the butler-type assistant's impact was not supported by the data. This finding indicates that functional reliability may partially mitigate autonomy-related resistance among users with varying levels of independent self-construal.

4.2 Theoretical contributions

This study proposes and validates an integrated "Role–Trust–Continuance Intention" framework. By distinguishing between companion-type and butler-type AI assistants, it elucidates the psychological mechanisms through which role orientations shape users' post-adoption behavior via affective and cognitive trust, extending the application of role theory to human–computer interaction.

The findings highlight the functional differentiation of trust in AI contexts. Contrary to the conventional view of trust as a universal facilitator, cognitive trust in butler-type assistants functions primarily as a risk buffer rather than a relationship bond, offering a theoretical explanation for why highly efficient AI systems may fail to sustain long-term engagement.

This study refines the boundary conditions of self-construal in technology acceptance. While interdependent self-construal enhances responses to emotionally oriented AI, the moderating effect of independent self-construal was not significant. This finding indicates that the negative effects associated with instrumental dominance and privacy concerns in butler-type AI may be robust across users with different traits.

4.3 Practical implications

This study underscores the importance of aligning AI assistant roles with usage scenarios and user characteristics. Companion-type assistants should prioritize emotional responsiveness and social presence in relational contexts, whereas butler-type assistants should emphasize transparency, privacy protection, and user control in task-oriented applications. Moreover, incorporating self-construal–sensitive interaction designs—such

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as offering users a choice between more relational or more transactional interaction modes — may further enhance user experience and retention.

4.4 Limitations and future research

Sample limitations. This study was based on a situational experiment with Chinese participants, which may limit the generalizability of its conclusions. Future research could conduct cross-cultural studies to examine whether the proposed mechanisms hold across different cultural contexts.

Longitudinal research.This study relied on a static cross-sectional design. Consequently, it could not capture the dynamic development of emotional and cognitive trust in long-term human–computer interaction. It also did not examine whether emotional factors mitigate privacy concerns over extended use.

Investigation of dynamic mechanisms. Future research could examine hybrid AI assistants that integrate emotional interaction with task-oriented functions. Such assistants may dynamically switch between "companion-type" and "butler-type" roles based on users' scenarios or needs. An important question is how this dynamic role switching influences users' trust in AI. On the one hand, switching roles may weaken trust if it creates confusion in role expectations. On the other hand, it may enhance trust by providing more comprehensive functionality. In addition, future research could examine whether self-construal moderates this process. Longitudinal experimental designs would be particularly useful for investigating the interaction effects between dynamic role switching and user personality on continuance intention.

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