

Does Humanizing Chatbots Promote or Hinder Voice Shopping?

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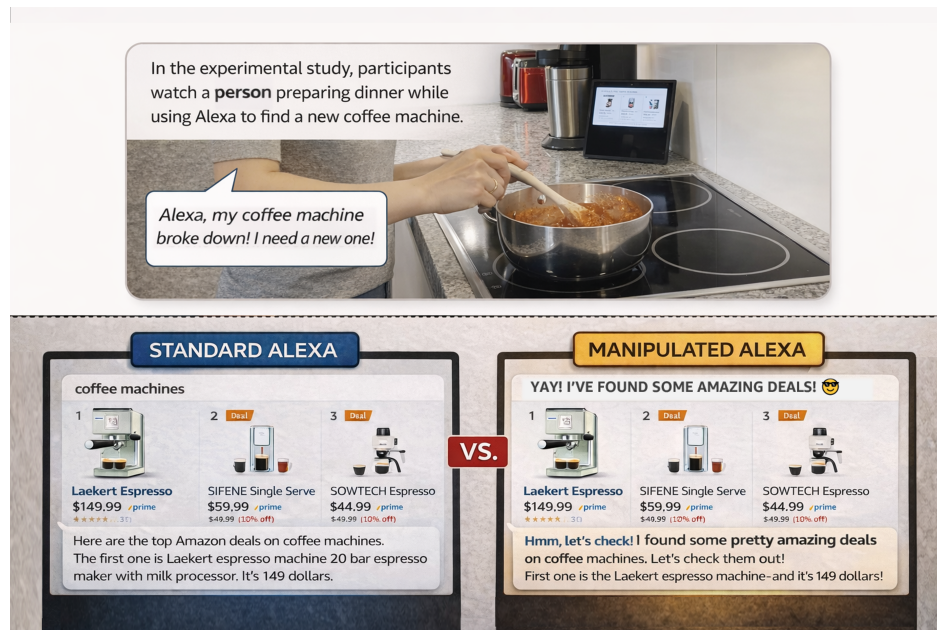


Figure 1: Excerpt from the voice shopping dialogue between a person and Alexa alongside exemplary screenshots of the standard and the humanized condition. Image edited with AI.



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Abstract

We rely on conversational agents (CAs) for obtaining a variety of information, but rarely for shopping. A primary design characteristic of CAs shaping user acceptance ever since their inception, is their anthropomorphic nature. They have become increasingly human-like, taking on human roles such as assistant, friend, or servant. While anthropomorphic features are often intended to foster engagement, voice shopping continues to lag behind market expectations. Could humanizing CAs undermine interaction quality rather than enhancing user experience through greater engagement? We investigated whether the effectiveness of humanized CAs depends on users' relational perceptions, specifically whether they view the CA like a servant, friend, or rational agent. In an online experiment ($N = 407$), participants viewed standard or humanized videos of voice shopping interactions. Results showed that humanized design negatively affects perceived attitudes toward voice shopping. Furthermore, humanized design decreased perceived benefits when the CA was perceived more like a servant. Findings question widespread design emphasis on humanization and inspire new designs for CAs.

Keywords

Conversational agents, Voice shopping, Humanized design, Relational models theory, Conversational user interfaces

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1 Introduction

“Alexa, my coffee machine broke down!” With a single voice command, conversational AI users can initiate the purchase of a new coffee machine (or other products) and arrange its delivery to their doorstep [39], thereby outsourcing shopping to an AI assistant [60]. *Voice shopping*, which allows users to purchase products through AI-based conversational agents (CAs) such as Amazon’s Alexa, is often promoted as offering increased convenience and efficiency.

However, adoption remains limited [50] despite strong projected market potential. A 2021 industry forecast (2021–2025, [41]) projected that CAs will process purchases of up to USD 145 billion by 2025 out of USD 290 billion in conversational commerce spending [6]. CAs deployments have also been projected to reduce contact center agent labor costs by USD 80 billion by 2026 [30]. While smart speakers are widely used for routine information seeking and household tasks, only a minority of users report having ever used voice shopping (e.g., 26.1% of smart speaker owners had used voice for shopping [44]).

To explain this gap, one proposed barrier from a CUI design perspective is the perceived lack of warmth and authenticity in interactions with CAs, as users may prefer the trust and emotional connection typically fostered by human sales representatives [1, 87]. To address this, designers have increasingly incorporated anthropomorphic (i.e., humanized) design cues, such as emotional language, emojis, or informal address, to make conversational agents feel

more human-like [5, 7]. Such cues trigger anthropomorphism, defined as the attribution of human characteristics to non-human entities [25] and can enhance engagement for example in service-oriented contexts [1, 4, 22, 32]. Recent meta-analyses have shown that humanized design cues are associated with desirable outcomes like compliance or trustworthiness [9, 46, 76]. Yet, anthropomorphic cues also risk eliciting negative reactions, including perceptions of eeriness or insincerity [55, 85] with negative influence on acceptance. Furthermore, ethical concerns have been raised, as anthropomorphism may lead to unintended deception or unwarranted trust in unreliable systems [78, 92].

The ambivalence in anthropomorphism’s effects prompts a critical question: Under what conditions does humanized design improve or undermine user experience in voice shopping? Prior research suggests that users’ relational perceptions of conversational agents may play a key role [34, 42, 75]. Users who view conversational agents as servant-like tools may prefer straightforward, task-oriented interactions [16], while those who perceive them as peer-like companions or rational agents might respond differently expecting more than a command-and-execution interaction [90]. However, empirical evidence linking humanized design with differentiated relational perceptions, as well as voice shopping outcomes, remains limited.

To address this gap, we examined participants’ perceptions of their perceived relationships with CAs, using Tschopp et al. [89]’s human-AI relationship perception framework. Their model was adapted from Alan P. Fiske’s Relational Models Theory [29] which differentiates distinct universal modes through which humans understand their interpersonal relationships from a social cognition perspective. This theory was adapted to the human-AI context, where human-AI relationship perceptions differentiated three modes of relationship perception with CAs: a servant-like relationship with hierarchical elements, a friend-like relationship characterized by socio-emotional elements, and a rational-agent like mode, where the CA is perceived “on eye level”.

In our study, participants were randomly assigned to watch two videos of a user’s voice shopping interaction as illustrated in Figure 1: They either watched (1) a human shopping with a humanized CA (Alexa with additional socio-emotional cues) or (2) with a standard CA (the standard Alexa with no additional socio-emotional cues). They subsequently rated their perceptions of the assistant and voice shopping intentions. We found that humanized design reduced perceived benefits of voice shopping, but only for users who viewed the CA through a servant-like relational lens.

This experimental study directly contributes to ongoing discourse within the CUI community regarding how design choices in conversational AI shape user experience. The CUI literature and beyond has increasingly grappled with the ambivalent outcomes of anthropomorphism [58] and the gap between user expectations and system capabilities [17, 53]. By investigating how individual differences in relational perceptions moderate the effects of humanized conversational design, we address the CUI community’s call for more nuanced, person-centered approaches to interaction design that move beyond one-size-fits-all solutions. Our findings inform the design of future conversational shopping interfaces by demonstrating that the appropriateness of socio-emotional design

cues depends on the relational frame through which users interpret their interaction.

2 Theoretical Background and Hypotheses Development

2.1 User Experience in Voice Shopping

Talking to machines to control various aspects of our lives has become commonplace [96], extending beyond everyday tasks to the delegation of shopping decisions to CAs [39, 67]. To that end, new technologies are transforming the user shopping journey [38], and with the advent of CAs, many stages of this journey, from product search to financial transactions, could potentially be influenced by CAs [56]. Moreover, these agents can act as perceived partners in consumer-relationship management, essentially becoming the relationship itself.

Voice shopping, also known as voice commerce or conversational commerce, is a method of conducting transactions via a company's voice user interface, which can be voice only like Amazon's Echo Dot, or include screen control via voice (e.g., voice assistants like Amazon's Alexa Echo Show or the Google Nest). Voice shopping presents an alternative to traditional browsing and clicking, allowing users to interact with the platform solely through voice commands while engaging in other daily activities at home, like cooking or cleaning. Previous research identifies this new mode of interaction as a new source of gratification [15]. This hands-free interaction, enhanced with visual cues on the screen, may reduce the cognitive and physical effort associated with traditional online shopping methods [56], where users scroll and click options, streamlining the purchasing process [33, 39, 45].

While the potential of voice shopping is frequently highlighted in industry forecasts, scholarly understanding built on empirical evidence is still lacking [13, 14, 50]. To that end, it may be plausible that the psychological process involved in voice shopping differ from traditional online shopping, being closer to in-person shopping in a brick-and-mortar store [33, 90, 95]. Therefore, researchers might benefit from using approaches to investigate user behavior processes which are similar to interpersonal psychology [2, 33, 74, 95].

Various social cues in CUI design likely affect users' responses to CAs. Shopping via CAs is an important area where interactive technology and user behavior meet, shaped by advancements in AI and interface design that improve both usability and relatability. Since CAs are inherently artificial and lack human-like relatability, this study aims to explore how humanized design elements in CAs influence users' voice-shopping experiences with newly created *artificial sales agents*.

2.2 Humanizing Conversational Agents

Humans have a well-documented tendency to anthropomorphize, that is, to attribute human-like traits, intentions, and mental states to non-human agents such as machines [25]. This propensity extends to digital systems: individuals readily anthropomorphize computers [18, 25] and respond to them as social actors [62]. Early work further suggests that social responses to computers are amplified when systems are voice-enabled, as vocal cues activate interpersonal scripts typically reserved for human interaction according to Nass and Brave [63]. With recent advances in large language

models (LLMs), CAs can now generate increasingly natural, context-sensitive dialogue, further expanding opportunities to evoke anthropomorphic perceptions. Consequently, both researchers and practitioners have explored design strategies that intentionally humanize machines, understood as anthropomorphism [18], for instance, by humanizing the conversational style with filler words or emojis, giving the CA a typical human name, or using other embodied cues [32].

In the context of whether humanized design helps or hinders, voice shopping specifically, empirical findings on anthropomorphic and humanized design are mixed. For one, voice interaction differs from traditional graphical user interfaces in foregrounding language, tone, and conversational turn-taking, thereby increasing the salience of social cues. Yet prior research suggests that merely adding a voice interface is insufficient to ensure positive outcomes [31, 65]. Rather, the specific configuration of conversational design, how the agent speaks, expresses affect, and frames the interaction, may critically shape user perceptions and responses. This CUI design journey from machine-like to human-like is diverse and an ongoing topic of debate [31, 39].

Several studies report positive associations between perceived anthropomorphism and shopping experiences [34, 40, 42, 49]. For example, Han [34] found that higher perceived anthropomorphism positively influenced shopping intentions with CAs. Furthermore, Tschopp and Sassenberg [90] could show that a perceived friend-like relationship is associated with higher shopping intentions in voice shopping.

However, others have found that such design cues can also elicit unfavorable user responses under certain conditions [94]. For example, anthropomorphized agents have been shown to exacerbate negative reactions among angry customers [19], increase perceived unfairness among agency-oriented individuals [48], heighten perceived risk among low-power consumers [43], and trigger adverse reactions in contexts characterized by social crowding [71]. These findings indicate that anthropomorphism is a double-edged sword: while it can enhance warmth, social presence, and engagement, it may also increase expectations, perceived agency, and susceptibility to blame.

This tension is particularly salient in conversational commerce. Although designers frequently build on users' anthropomorphic tendencies by implementing emotionally responsive dialogue and human-like conversational styles [63], such efforts may also induce frustration, discomfort, or eeriness, phenomena related to the so-called *uncanny response* [61], a phenomenon that is not yet fully understood [27, 55, 85].

However, much of this work relies on users' subjective perceptions of anthropomorphism. Perceptual measures (e.g., perceived human-likeness or more specific role perceptions like friend-likeness) do not necessarily map directly onto design features of the system. CUI research and practice might benefit from a better understanding of the nuances of differential psychological processes underlying the user experience.

Taken together, the literature reveals a critical gap: users readily anthropomorphize voice-enabled systems and such perceptions can meaningfully shape favorable outcomes [76]. Given the mixed findings of humanized CAs, we wonder if the reason is because different users view the role of CAs differently, while some think

of them as servants, others may view them as companions. The key to unlocking conflicting findings lies in individual differences in the perception of the relationship between CA and user. An understanding of these differences can vastly aid designers on how to frame CAs for different audiences, what kind of interface cues to provide about its role to which kinds of audiences.

2.3 A Relationship-Design Fit Perspective on Voice Shopping

Recent advancements in AI have prompted scholars to reexamine the consequences of anthropomorphism in human-AI interaction going beyond traditional metrics like perceived warmth or trustworthiness. The increasing human-likeness posits the potential for human-AI relational bonds [66], where users may ascribe moral standing and obligations to a system [25] akin to those attributions extended to other humans, like a friend or colleague. For commercial applications (e.g., integrating financial transactions), such dynamics risk unwarranted trust and thus necessitate careful considerations of anthropomorphic design [68]. A potential explanation for the mixed effects of humanized conversational design is that its effectiveness depends on the degree to which it aligns with the user's perceived mode of relating to the CA. In other words, the impact of humanization may hinge on a *relationship-design fit* between the user perception and the technology design. The broader notion of congruence or fit has received substantial empirical support across the social sciences, including organizational psychology (e.g., value congruence [24], person-environment fit [91]) and personality psychology (e.g., person-situation fit [82]). Similarly, research on individual-technology fit emphasizes that optimal interaction outcomes depend on the alignment between user characteristics and technological features [51].

In line with the theory of similarity and attraction [11], studies have shown that congruence, understood as being similar to each other, between users and CAs can be beneficial. For example, Zogaj et al. [97] used gender matching, whereas Ahmad et al. [3] suggest matching of users' personality traits or needs, such as designing an "extrovert" chatbot persona for extroverted users [83] or designing interfaces as servants for users preferring a power experience [39].

Although relational perspectives on human-AI interaction are gaining traction, the literature remains fragmented across disciplines [66]. Early empirical investigations of how users view CAs found, for example, that users perceived a CA (Alexa) rather as a tool than an emotional companion, despite some anthropomorphic tendencies [52]. Moreover, Purington et al. [70] found that while users may personify their CA (here: Alexa), they still primarily view it as a device, not a social entity.

However, newer studies shift from a mere tool perspective to a more social-interaction perspective. For example, Seymour and Van Kleek [80] employed a staircase model of relationships, which outlines how romantic and platonic relationships develop and deteriorate, to analyse relationship perceptions between users and voice assistants, finding that closer perceived relationships with Alexa correlated with greater trust and anthropomorphism. The findings support the premise that not only do users perceive CAs as more than mere tools, but that these relational perceptions also shape interaction outcomes. Emphasizing the growing importance of this relational perspective in the light of using AI-based systems as companions, [84, 93] conceptualize such recurring interactions

with AI dialogue systems as *synthetic relationships*. Together, this research signals a shift from a merely tool-like relation (despite humanizing design efforts) with CAs toward understanding how users construe themselves as being in a relationship with these systems. In line with Starke et al. [84], we refer to the perceived human-AI relationship as *synthetic relationship* hereafter. In this line of *relational* thought, Tschopp et al. [89] recently proposed a multidimensional approach to investigate human-AI relationship perception, following Alan P. Fiske's Relational Models Theory [29]. The multidimensional approach to understanding synthetic relationships resonates with the criticism expressed by McMillan and Jaber [58], arguing that the current CUI literature is overly focused on reproducing subordinate roles, which conflict with the multifaceted human perception of how they make sense of their relationship with the CA. For example, the framing of the CA along the subordinate butler metaphor constrains both design innovation and user expectation.

The multidimensional theory [29] explains how humans categorize their relationships based on four dimensions: communal sharing (similar to familial bonds based on mutual trust), equality matching (a balanced exchange, like with roommates), authority ranking (a hierarchical structure, like between superiors and subordinates), and market pricing (based on cost-benefit analysis, as in workplaces). This theoretical approach to understand social relations has been widely supported by empirical research over the years and has recently been adapted and validated in human-AI interaction. Tschopp et al. [89] and Tschopp and Sassenberg [90] applied the Relational Models Theory to human-AI interactions in different studies, finding similarities but also differences to Fiske's theory from the human context.

Departing from the four original interpersonal dimensions of Relational Models Theory, Tschopp et al. [89] identified three key modes through which users perceive synthetic relationships with CAs: Peer bonding (which combines communal sharing and equality matching into a single peer-like perception with socio-emotional elements), and, consistent with Fiske's original theory, authority ranking and market pricing Table 1. To improve clarity within the CUI community, we utilize the following reformulated terms for these modes hereafter: Friend-like, servant-like, and rational-agent like.

Across three online studies, their findings validated that users typically perceive AI relationships as either hierarchical or non-hierarchical. The friend-like mode was least prevalent but had the highest predictive power. In their studies, the servant-like relationship was not linked to perceptions of trust or intelligence. The rational agent and the friend-like were stronger predictors, particularly influencing anthropomorphism in AI interactions [89].

2.4 Hypotheses and Research Question

The most emotional relationship (friend-like) entails treating the device as equal while maintaining a sense of accountability for one's actions [89]. Along the Relationship-Design Fit approach, we argue that for people who perceive their CA more friend-like, a more humanized CA might facilitate a better voice shopping experience. To avoid CAs coming across as mechanistic and cold [81, 88], resulting in skepticism and resistance toward the technology [1], a more humanized conversational design might be beneficial, specifically

Table 1: How CA users describe their synthetic relationship perception

	Servant-like	Friend-like	Rational Agent-like
Theoretical basis [29, 89]	Authority Ranking	Peer Bonding	Market Pricing
Explanation	There is a perceived hierarchy between the user and the CA—one leads and the other follows.	The relationship is equal and friend-like. Characterized by socio-emotional elements and humanizing the CA.	The relationship is neither hierarchical nor emotional. The CA is perceived as a rational actor.

for users who view their CA as friend-like. We thus predict a positive effect on voice shopping perceptions for those who perceive their relationship as friend-like in the humanized condition (i.e., conversational style is humanized via socio-emotional cues).

H1: The more people perceive their voice assistant as friend-like, the stronger their voice shopping intentions after seeing the humanized (vs. standard) interface.

Tschopp et al. [89] found that the friend-like perception was the least common relationship mode, whereas the majority of individuals perceived their devices through the lens of the traditional master-servant relationship. The defining feature here is the perception of a linear hierarchy between humans and the CA. For individuals, who see their CA as the traditional master-servant relationship, a humanized conversational design might have negative consequences.

This is in line with the argument by Fernandes and Oliveira [28] that users may not care about social conversations when seeking to fulfill utilitarian needs [73]. Similarly, Chen et al. [15] found that users prefer straightforward and direct communication with CAs to avoid emotional stress. Chattaraman et al. [14] further argue that humanized conversational designs can be perceived as fake and elicit negative responses. Hence, users favoring a hierarchical relationship would, in fact, prefer a cold, mechanistic system. This might then apply to voice shopping with the standard CA (in contrast to the humanized CA), which is marketed as a digital assistant serving as a tool to fulfill shopping goals. We thus predict a positive effect on voice shopping intentions for those who perceive their relationship as akin to a servant-like relationship in the standard condition.

H2: The more people perceive their voice assistant as servant-like, the stronger their voice shopping intentions after seeing the standard (vs. humanized) interface.

Equally popular as the servant-like perception is the perception of the CA as a rational agent, attributing some sort of agency to the system [89]. Its core characteristic lies in the reliance on ratio values to shape humans' perception, devoid of hierarchies, thus resembling a continuous cost-benefit analysis, or, in other words a rather transactional *modus operandi*. Because of the novelty of the relational approach, empirical evidence regarding this third mode is scarce, and it is not yet clear which CUI design could be most suitable to the needs of users with these perceptions. Therefore, we adopted an exploratory approach to investigate the impact of this perception and conversational design on voice shopping.

RQ1: Is the effect of the interface design (standard vs humanized) on voice shopping intention dependent on seeing the voice assistant as a rational agent?

For clarity, we renamed two relationship modes from the preregistration: peer bonding to friend-like; authority ranking to servant-like; market pricing to rational agent-like. Constructs and operationalizations are unchanged.

3 Method

To address the hypotheses and research question, the study employed a single-factor between-subjects experimental design, altering the CA design: humanized vs. standard condition. Participants of this online study viewed one video of a person online shopping for a coffee machine and another video shopping for cornflakes and answered questions before and afterwards. We are committed to open science practices. We provide all data and all materials necessary for replication, as well as the preregistration (and deviations from it), in the ResearchBox repository: <https://researchbox.org/1540>.

3.1 Stimuli Design

We created four voice shopping videos for the study (transcripts and links to the videos are available in the supplemental material). We designed the stimuli based on scenario-based design principles [77], which emphasize the use of detailed narratives to envision future system use. A key design decision in this study was the use of video-based observation rather than direct interactive engagement with the voice assistant. We chose this approach to ensure high internal validity at the cost of ecological validity by standardizing the interaction experience across all participants, eliminating variability from real-time speech recognition errors, network latency, or divergent conversational paths that would occur in live interactions.

Initially, we produced two videos showing the standard voice shopping process using Amazon's CA Alexa with a screen and voice shopping functionalities, see Figure 2.

Then, we used the same videos and altered Alexa's spoken and written outputs on-screen to achieve the intended humanized CA. The purpose was to explore whether the proposed design cues could enhance the perception of Alexa as more friend-like. In all videos, we used an Amazon Echo Show 10 (3rd Generation, 2021). The device was configured with a personal Amazon account with voice purchasing enabled, a valid payment method, and a default delivery address. Purchases were not completed. No additional Alexa skills



Figure 2: Video scenario where a person is voice shopping for a coffee machine while cooking

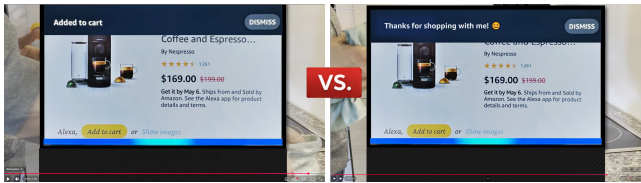


Figure 3: Left: Standard CA saying "Added to cart". Right: Close-up of the humanized screen and the CA saying "Okey dokey buddy, that coffee machine is on its way to our home!"

other than the text to voice skill¹ were enabled. The device language was set to English. Interaction started via the default wake word.

Typically, during voice shopping with the Echo Show, the screen displays a range of products along with a very brief transcript of Alexa's spoken output. For each video, we recreated these screenshots and included close-ups of the Alexa screen to ensure respondents could clearly see Alexa's output, see Figure 3.

The interaction depicted a person voice shopping through Alexa while engaging in another activity. In the first video, the individual ordered cornflakes while browsing a newspaper. In the second, the person ordered a coffee machine while cooking. We chose two different product types to enhance generalizability across voice shopping interactions. Each video was 1.5 minutes long. To ensure audio quality the final versions were fully dubbed: the two standard Alexa videos used the original output, the two experimental videos with the humanized speech output.

The standard Alexa balances machine-like traits with social functionality to maintain its AI assistant identity. In voice shopping, Alexa's responses are concise and task-oriented displaying limited emotional range, and inability of deeper, open-ended conversations. However, in other contexts like games, Alexa does incorporate social elements, and, to some degree, an adaptive tone.

For the humanized design condition, we utilized a text-to-speech skill, allowing Alexa to deliver our customized script for high external validity. We recorded this modified output and then dubbed the videos for the humanized condition to include socio-emotional cues. We looked at experimental studies, exemplified in Table 2, that have

Table 2: Selected experimental studies investigating humanized design focusing on desirable user experience outcomes

Humanization Example		Outcome	Author/ Year
First person, identity signals, small-talk, empathy	<i>Oh, I'm sure that I can change that shortly.</i>	Increased compliance	Adam et al. [1]
Emojis, small-talk, re-sponsiveness	<i>Too easy [Smiling Face with Sunglasses]. I guess you know what you want. We have a variety of black [...]</i>	Increased customer engagement	Nguyen et al. [64]
First person	<i>So especially when it was nice out I would go biking or hiking or we would just go for a walk and have a picnic, things like that.</i>	Increased enjoyment and more conversations	Bickmore et al. [8]
GIFs, emojis, informal language	<i>GIF saying "Awesome Choice", I'll grab a pen and paper and jot down your order right away. [Face with Stuck-Out Tongue and Winking Eye].</i>	Increased social presence and enjoyment	De Cicco et al. [21]
Emojis	<i>Do you walk or use a bicycle to get to and from places? [Bicycle emoji]</i>	Increased enjoyment	Fadhil et al. [26]

altered the conversational design of a system and found a desirable outcome in terms of user experience. Focusing on text-based systems, researchers have investigated concepts such as signaling a sense of identity and sociality cues such as small-talk, using gifs and emojis. Studies finding positive associations between anthropomorphic cues and desired outcomes have used the first person singular to signal identity [67] or small talk, greetings, and farewell [67], empathy [1], and/or emojis [7, 20].

Other studies focusing more specifically on voice user interfaces only [72] found that human voice-based communication substantially impacts users' perceptions of social presence, enhancing their trusting beliefs, enjoyment, and intention to utilize the agent as a decision aid. In a similar fashion, human-like voice, friendliness and social presence were found relevant in voice shopping [12].

Based on these findings, we designed the conversational style. We included the use of first-person singular or plural language (e.g., Alexa: "Hmm, let's check. I found some pretty amazing deals on coffee machines!"). Additionally, we altered the responses to be more empathetic, aligning with the strategy of active listening, where Alexa responds to the user in an empathetic manner (e.g., "Oh no, I'm sorry to hear that"). We also had Alexa address the user as a friend (e.g., "Okey dokey, buddy! That coffee machine is on its way to our home soon!") and added emojis to Alexa's written output (e.g., a frowning face emoji to express empathy for the broken coffee machine or a party face emoji to celebrate finding a great deal). See Figure 4 for a comparison with the standard Alexa. The

¹Text to Voice, see <https://www.amazon.com/TopVoiceApps-com-Text-To-Voice/dp/B07GSYW3S7>

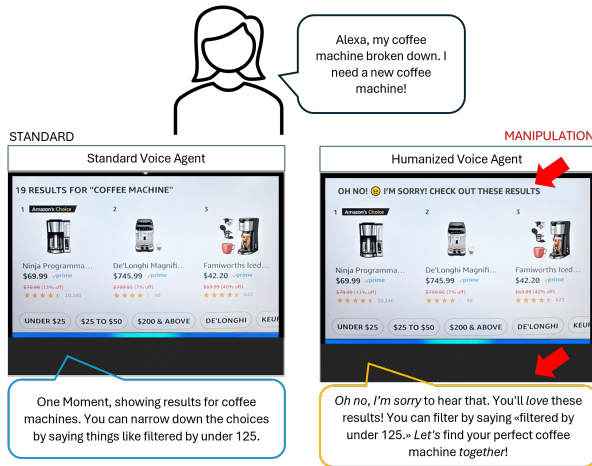


Figure 4: Left: Standard CA. Right: Humanization of the CA right: signaling identity, empathy and emojis

full transcript with screenshots is available in the supplemental material.

3.2 Pre-test

We conducted a pre-test with 196 participants recruited from Prolific to examine the effectiveness of the humanized experimental condition. The pre-test sample size ($N = 200$) was chosen to ensure stable correlations for the factor analysis [79] and to provide robust statistical power for the t -tests used in the manipulation checks. In particular, we wanted to ensure that the standard and humanized conditions remained comparable, to avoid that increases in human-likeness also reflected on, for example, competence perceptions. After reading the instructions and providing consent, participants were randomly assigned to one of the interface design conditions: humanized vs. standard. Participants either watched the cornflakes or the coffee machine videos in each interface design condition in order to investigate whether the product video influences the results.

After the experiment, participants were asked: “How would you describe the voice assistant Alexa for shopping as shown in the video?” They were provided with the following adjectives to rate on a 7-point scale (1 = strongly disagree, 7 = strongly agree): friendly, welcoming, warm, competent, functional, effective, confident, assertive, and competitive. Following this, participants were thanked and rewarded GBP 0.60 (equivalent to about USD 0.76) for their participation.

We conducted the principal component analysis (PCA) to explore the underlying constructs among the 9 items. Following the 60/40 rules, we removed one item that cross-loaded on two factors. After the removal, the analysis yielded a clear three-factor structure, explaining 77.46% of the variance. The first factor was labeled $\alpha = .90$, $M = 5.15$, $SD = 1.11$, including the items of friendly, warm, and welcoming. Competence was the second factor (Cronbach’s $\alpha = .83$,

$M = 5.81$, $SD = .74$), including competent, functional, effective. The third factor was labeled assertiveness (Cronbach’s $\alpha = .47$, $M = 3.79$, $SD = 1.30$), including dominant and competitive.

We further examined whether the humanized design was perceived as higher in warmth, with no difference in competence and assertiveness compared to the standard design. Results from a one-tailed independent sample t -test showed that the humanized design ($M = 5.55$, $SD = .96$) was perceived as more friendly, warm, and welcoming than the standard design ($M = 5.03$, $SD = 1.06$), $t(105) = 2.65$, $p < .01$, $d = .51$. In addition, there was no significant difference in perceived competence, $t(105) = -.92$, $p = .18$, $d = -.18$, and perceived assertiveness, $t(105) = 1.45$, $p = .07$, $d = -.18$. The difference between the two types of videos was not moderated by the content of the video (coffee machine versus cornflakes), $F(1, 192) = .08$, $p = .794$. Thus, our effort to humanize the CA was successful.

3.3 Main Study Data Collection

Given the successful pre-test, we proceeded to the main study as intended in May 2023. The study was preregistered before data collection: https://aspredicted.org/1H1_YR9.

3.3.1 Participants. We aimed for 80% power for the test of one coefficient with an effect size of $f^2 = .02$ and an alpha error = .05 in a multiple regression with three predictors in total. An *a priori* power analysis indicated that the total sample size should be 395. We added 55 observations to account for potential exclusions. We thus sampled 450 study participants experienced with digital assistants at home, which was a pre-screening criterion offered by Prolific. Participants received GBP 9.59/hr (equivalent of \$11.89 per hour) for a study lasting a median time of eight minutes and 27 seconds. Inclusion criteria were age (at least 18 years old), consent for participation, and agreement with the usage of data for scientific purposes. Exclusion criteria were failing an attention check and statistical outliers indicated by the absolute studentized deleted residuals > 2.59 in the regression testing the first hypothesis. Additionally, we excluded participants who used a mobile phone to participate in the study, because the stimulus videos were not clearly visible on screens of that size. The remaining sample comprised 407 respondents (51% female, 49% male; age range 18–74, $M = 40.30$, $SD = 13.64$ years) from the UK. The majority of participants used their voice assistant frequently (85% daily or several times a month), and reported having no (65%) or limited (35%) voice shopping experience.

3.3.2 Procedure. In the main study, participants first read the instructions and provided their consent. They then selected a CA to which their responses would refer for the subsequent assessment of their perceived human-AI relationship. 84% chose Alexa, the remaining selected Google Assistant (15%) or Siri (1%). Prior validation studies showed no differences between the different devices when assessing relationship perception [89, 90]. After responding to the human-AI relationship questionnaire [89] respondents were randomly assigned to either the humanized or standard condition. Participants in either condition watched both videos: first the cornflakes video, then the coffee machine video. Directly after watching the videos, we measured their attitude towards the voice assistant, shopping intentions, and perceived benefits of voice shopping. Attention checks were presented after the dependent variables were

evaluated. We placed questions for demographic information and a debrief, that the Alexa was scripted and altered by us, and voluntary feedback regarding the study and voice shopping at the end of the questionnaire. A final opportunity to withdraw data was given at the end.

3.3.3 Measures. The perceived human-AI relationship was assessed with a questionnaire developed by Tschopp et al. [89] which was adapted from the Modes of Relationship Questionnaire [35]. The questionnaire requires participants to have prior experience using CAs in order to assess relationship perception. The scale consisted of 16 items using a 7-point Likert scale (1 = not at all true for this relationship, 7 = very true for this relationship): eight items for friend-like (e.g., "You two are like a unit: you belong together"), five items for servant-like, e.g., "One is entitled more than the other"), and four items for rational agent-like (e.g., "what you get from this interaction is directly proportional to how much you give"). To confirm the three-factor structure reported in Tschopp et al. [89] and Tschopp and Sassenberg [90], we conducted a confirmatory factor analysis (CFA). CFA results confirmed the three-factor structure: $\chi^2(101) = 223.32$, $p < .001$, CFI = .96, TLI = .95, RMSEA = .05, 90% CI: [.04, .06], SMRM = .06. We then averaged the corresponding items to form an index for each dimension: friend-like ($M = 2.53$, $SD = 1.37$, Cronbach's $\alpha = .92$), servant-like ($M = 4.74$, $SD = 1.43$, Cronbach's $\alpha = .71$), rational agent-like ($M = 4.29$, $SD = 1.31$, Cronbach's $\alpha = .68$).

We assessed the central dependent variable, voice shopping intentions, with the two items on a 7-point scale (1 = strongly disagree to 7 = strongly agree) "I would like to use the voice assistant as shown in the video for shopping in the future." and "I would also use this kind of voice assistant for shopping for simple household items like cereals or a coffee machine". An index was formed by averaging the answers on both items.

To broaden the scope of the central dependent variable, voice shopping intentions, we also assessed participants' attitudes towards the voice shopping interface and perceived benefits of voice shopping. We assessed the attitudes using five bipolar items on a 7-point scale, for example, annoying/pleasant or negative/positive, following MacKenzie and Lutz [54].

Adapted from McLean and Osei-Frimpong [57], we measured perceived benefits with two items on a 7-point scale (1 = strongly disagree to 7 = strongly agree), namely, "Shopping with this kind of voice assistant would be fun" and "Shopping with this kind of voice assistant would be efficient". Similar to voice shopping intentions, the variables were summarized by averaging the responses across all items. Descriptive statistics, zero-order correlations, and construct reliability are reported in Table 3.

For exploratory purposes, we included open-ended questions for voluntary responses, which were not part of the main analysis. The first question sought feedback on experiences or any other observations regarding our specific survey. The second question inquired about the barriers preventing participants from continuing to engage in voice shopping.

3.4 Data Analysis

To address our research goals, we utilized a multi-method analytical approach. For the quantitative data, we first performed a

Confirmatory Factor Analysis (CFA) to validate the three-factor structure of the human-AI relationship scale. As we did not propose a directional hypothesis regarding the main effect of humanized design on voice shopping perceptions, we conducted two-tailed independent sample *t*-tests to explore differences across the three dependent variables. In accordance with our preregistered plan, H1 and H2 were tested using multiple regression analyses, with voice shopping intention and attitude toward the interface as the primary dependent variables. Predictors in these models included the respective centered relational mode, the experimental condition, and their interaction term. Furthermore, we extended this analysis to include a moderated mediation model to examine indirect pathways through perceived benefits. Significant interactions were further probed using the Johnson-Neyman (J-N) technique to identify specific regions of significance. Finally, qualitative feedback was analyzed using an open-coding technique.

4 Results

Although not pre-registered, to include a full analysis, we first report results pertaining to the main effects of the humanized design on all three dependent variables (voice shopping intentions, attitudes towards the interface, and benefits of voice shopping). Following this, we report the hypothesized moderation effects involving users' perception of their human-AI relationships, specifically friend-like (H1), servant-like (H2), and rational agent-like (RQ1).

4.1 Main Effect of Humanized Design on Voice Shopping Perceptions

For voice shopping intentions, there was no significant difference between the humanized and standard design conditions, $t(405) = .27$, $p = .784$, Cohen's $d = .03$. Similar to shopping intentions, perceived benefits did not differ significantly across conditions, $t(405) = -.07$, $p = .944$, Cohen's $d = -.01$.

In contrast, we found that the humanized design condition ($M = 5.57$, $SD = 1.12$) resulted in less positive attitude towards the interface compared to the standard design condition ($M = 5.85$, $SD = 1.08$), $t(405) = -2.55$, $p = .011$, Cohen's $d = -.25$. These findings suggest that, while the humanized design did not change whether users wanted to shop, it actually made their overall attitude toward the interface slightly more negative compared to the standard version.

4.2 Moderating Role of Perceived Friend-Like Relationship

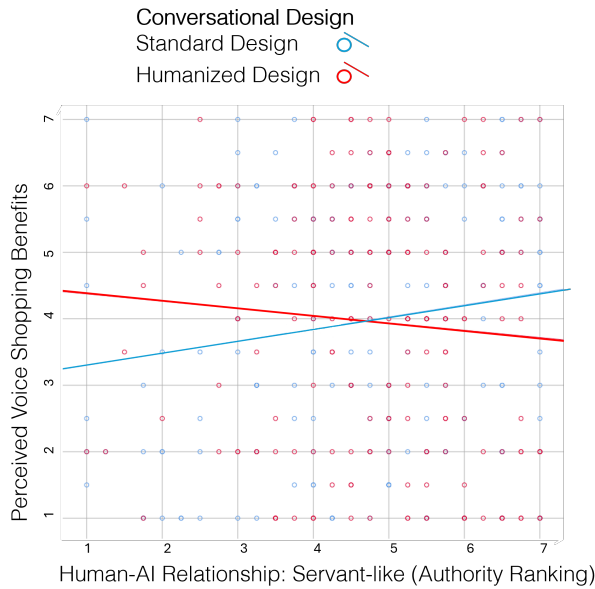
H1 proposed that the positive relationship between the humanized interface design and voice shopping intentions would be stronger among users who reported a stronger friend-like relationship with their CA. To test this hypothesis, we used Model 1 from PROCESS Macro [36], using 5,000 bootstrapped resamples and 95% percentile confidence intervals (CIs). The standard design condition was treated as the reference group, i.e., coded as 0, whereas the humanized design condition was coded as 1.

Results revealed that the interaction effect between humanized design and perceived friend-like was not significant on voice shopping intentions, $F(1, 403) = .59$, $p = .443$, $\delta R^2 = .00$, attitudes towards the interface, $F(1, 403) = 2.20$, $p = .139$, $\delta R^2 = .01$, or perceived voice shopping benefits, $F(1, 403) = .17$, $p = .684$, $\delta R^2 = .00$. Essentially,

Table 3: Descriptive Statistics, Zero-order Correlations, and Construct Reliability

Scale	<i>k</i>	Cronbach's α	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
Human-AI Relationship										
Friend-like (1)	8	.92	2.53	1.37						
Servant-like (2)	4	.71	4.74	1.43	.01					
Rational agent-like (3)	4	.68	4.29	1.31	.39**	.45**				
Voice Shopping										
Attitude (4)	5	.88	5.71	1.11	.21**	.07	.18**			
Benefits (5)	2	.94	3.97	1.86	.44**	.04	.23**	.52**		
Intentions (6)	2	.81	4.43	1.58	.42**	.03	.20**	.57**	.86**	

Note. *k*=number of items included in scale; ** $p < .01$; * $p < .05$.

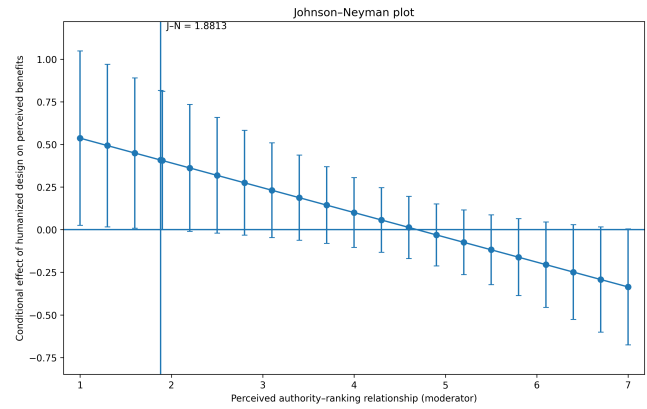
**Figure 5: Interaction effect between humanized design and servant-like on perceived voice shopping benefits**

even for users who viewed the agent as a friend, adding human-like cues did not provide any extra benefit or increase their intent to shop.

4.3 Moderating Role of Perceived Servant-Like Relationship

H2 hypothesized that the negative relationship between humanized design and voice shopping perceptions would be stronger among users who perceived their relationship with a CA more servant-like. Results from Model 1 showed that there was no significant effect of the humanized design on voice shopping intention, $F(1, 403) = 2.54$, $p = .11$, $\delta R^2 = .01$, or attitudes towards the interface, $F(1, 403) = 3.60$, $p = .06$, $\delta R^2 = .01$. However, we found a significant interaction effect on perceived benefits of voice shopping, $F(1, 403) = 5.00$, $p = .026$, $\delta R^2 = .01$, see Figure 5.

To investigate the interaction effect, we conducted a Johnson-Neyman (J-N) analysis with the perceived servant-like relationship as the moderator. The J-N procedure identified 1.8813

**Figure 6: Johnson-Neyman plot**

as the critical value delimiting the region of significance. When the perceived servant-like relationship was below 1.8813, humanized design had a significant positive effect on perceived benefits of voice shopping. At the threshold (1.8813), the effect was marginal ($b = .4085$, $se = .2078$, $p = .05$), with the lower bound of the 95% CI approaching zero. When the moderator exceeded 1.8813, the conditional effect was no longer significant and steadily decreased, with estimates becoming negative at higher levels of the moderator, although the confidence intervals continued to include zero. Figure 6 illustrates this pattern. Overall, this means that as soon as a user sees the assistant as a servant, the humanized 'buddy' talk starts to backfire, making the service feel less beneficial to them.

In an exploratory analysis, we further scrutinized these results, using Model 7 from PROCESS Macro, testing whether the perceived benefits of voice shopping mediated the interaction effect between humanized design and a servant-like relationship on voice shopping intentions. Results from Model 7 revealed a significant moderated mediation model, Index = $-.21$, $SE = .10$, 95% CI: $[-.41, -.01]$. When the perceived servant-like relationship was low, humanized conversational style increased the perceived benefits of voice shopping, resulting in higher voice shopping intentions. By contrast, for medium or higher levels of perceived servant-like relationship, a humanized conversational style decreased perceived benefits, which further lowered users' voice shopping intentions. Figure 7 shows the moderated mediation model.

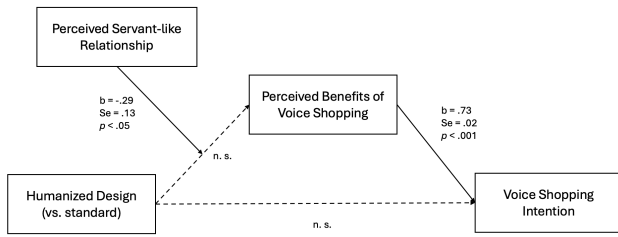


Figure 7: Moderated Mediation Model on Voice Shopping Intentions through Perceived Benefits of Voice Shopping

4.4 Moderating Role of Perceived Rational Agent Relationship

To explore the moderating role of perceived rational agent-like relationship, we used the same analysis. Results from Model 1 showed that there was no significant interaction effect of humanized design and rational agent-like relationship on intentions towards voice shopping, $F(1, 403) = .01, p = .92, \delta R^2 = .00$, attitudes towards the interface, $F(1, 403) = .19, p = .67, \delta R^2 = .00$, or perception of benefits, $F(1, 403) = .53, p = .47, \delta R^2 = .00$. Thus, for those who see the agent as rational-agent like the conversational design did not matter.

4.5 Qualitative Data Analysis

To provide additional context for our quantitative findings, we conducted a brief, exploratory analysis of the qualitative feedback from the final voluntary section of the survey. The first question asked "If you don't plan to continue to engage in voice shopping, what are the barriers keeping you back?". The second question asked participants to share their feedback on their experiences or any other observations regarding this specific survey on voice shopping. Overall, 151 responses were provided. Two of the authors independently analyzed the responses, with each one coding responses from a different condition using the open-coding technique [86], a process of "breaking down, examining, comparing, conceptualizing, and categorizing data" (p. 61). We have provided the full qualitative data and coding schemes on ResearchBox <https://researchbox.org/1540>.

The analysis revealed that participants in both the standard and humanized conditions shared concerns regarding voice shopping. These included a distrust in recommendations, with participants noting, "The voice shopping app will only give the deal that they make money from" (P118) or "Cannot trust it to give me the best price" (P105). Additionally, participants cited inefficiency or a preference for visual browsing, stating it is "easier just to type out what I want" (P332) or expressing a need to "research properly" (P141) before purchasing.

Distinct differences emerged regarding the CA's design. While participants in the standard condition made no specific mention of the CA's persona, eight participants in the humanized condition explicitly commented on the eeriness of the agent. They described the interface as "annoying" (P65), "creepy" (P183), as noted by one participant "It's all getting a bit scary! HAL [awkward laugh emoji]" (P202).

Crucially, participants expressed strong disapproval of the agent's attempt to establish a friend-like connection. The use of informal terms was a particular point of friction: "I hate the concept... a robot talking to me in a fake chipper voice calling me 'buddy'" (P114). Others found the social framing uncomfortable, with P327 noting that the "use of 'my friend' and 'buddy' made me cringe" and that they preferred the AI to simply "do what I ask" (P327). These insights provide some further insights for our quantitative results, suggesting that socio-emotional cues can be counterproductive to the user experience for those who prefer a functional, servant-like relationship.

5 Discussion

In this study, we explored the effects of a humanized design of CAs on voice shopping perceptions and how these effects differ depending on users' perceptions of their synthetic relationship. Our results showed that, independent of the synthetic relationship perception, the humanized design had a negative effect on perceived attitudes towards voice shopping. In addition, our findings revealed a moderation effect of humanized design, such that humanized design decreased perceived benefits of voice shopping when the relationship with the CA was perceived as high in servant-like.

5.1 Detrimental Effect of Humanized Design in Conversational Agents

Independent of human-AI relationship perception, our study found that a humanized design (i.e., more emotional and empathetic with the user) resulted in less positive attitudes toward voice shopping. This effect is surprising, especially given that the pre-test found that the humanized Alexa with stronger emotional expressions was perceived as friendlier and more welcoming than the standard one.

Some linguistic choices, such as addressing the user as a "friend" or "buddy" might have been perceived negatively by the participants. Perhaps these expressions seemed overly people-pleasing or a forced attempt to establish friendly rapport. This tone may have been irritating, as it is uncommon, compared to the standard tone adopted by Alexa and other CAs in the market. Such language could be perceived as trying too hard to appear relatable or colloquial, detracting from the overall user experience. In line with previous studies [14, 28], such nonfunctional words, while intended to humanize interactions, could instead undermine the credibility of the communication by appearing forced or unnatural.

Another reason could be the emojis we incorporated into the interactions to enhance the emotional tone of the conversation. We expected that emojis would have a positive influence, but they may risk misinterpretation due to varying interpretations among users [47]. For example, the same emoji can be perceived as positive, neutral, or negative by different individuals, creating potential for miscommunication [59]. The ambiguity in how emojis are perceived could inadvertently affect the user experience in ways difficult to measure within the current study. This might be an important consideration for understanding the broader implications of using such visual elements in communication and should be investigated in future research. Furthermore, the experimental condition incorporated multiple bundled design cues to humanize the CA. Thus, the effects may stem from specific choices (e.g., the term 'buddy') rather

than from humanization broadly. This suggests that certain implementations of humanized conversational design, particularly those that introduce informal address terms and emojis into established interaction patterns, may backfire, though it does not necessarily indict all forms of socio-emotional design.

An important consideration that warrants further investigation is the multimodal nature of the voice shopping interaction studied here. The Amazon Echo Show combines voice output with a visual display, meaning that participants in the humanized condition were exposed to both auditory cues (an empathetic tone and a friendly address) and visual cues (emojis on screen and modified text transcripts). This multimodal presentation may have amplified the perceived intensity of the humanization compared to a voice-only device such as the standard Echo Dot. Prior work on voice user interfaces has emphasized that visual and auditory cues interact to shape trust and social perceptions of CAs [10, 37]. Future research should disentangle the effects of voice-based and screen-based humanization cues independently, as the relative contribution of each modality may differ across relational orientations.

5.2 Human-AI Relationship Perception

By examining the role of perceived human-AI relationships, this study offers nuanced insights into the effects of humanized design on perceptions of voice shopping. Specifically, we found that our humanized design strategies negatively affected perceived benefits of voice shopping, particularly among users who viewed their relationship with AI agents as servant-like. The decreased perceived benefits were further associated with lower intentions to engage in voice shopping. This finding suggests that for individuals who see their CA as a subservient assistant, these humanized design elements, which are more emotional in nature by using emojis and a friendly tone, may hinder a positive voice shopping experience. It underscores the idea that attempts to establish a friendship-like connection with the user were not well-received and even provoked feelings of resentment, as evidenced by one participant's candid comment in the feedback section: *"Don't call me buddy!"* Notably, the two-item measure of perceived benefits captures both hedonic ('fun') and utilitarian ('efficient') dimensions, and future research may benefit from separating these constructs.

Contrary to our expectations, we did not find that users who see their device more as friend-like would have greater shopping intentions after watching the video with the humanized, more emotionally responsive, conversational design interface. This finding suggests that the standard conversational interface design is probably sufficient to attract users to use voice shopping, in other words, their preference for sociality may already be fulfilled (although compared to those mentioned above, they at least do not mind the additional design cues).

With regard to our exploratory research question exploring the role of rational agent relationship perception in voice shopping, our results indicate that seeing the voice assistant as a rational agent may play a role in positively influencing voice shopping. This aligns with the notion that voice assistants are *"active partners in the decision-making process rather than mere order takers"* (p. 336) [23] because users see their CA as equal, but not hierarchical and emotional. For the rational agent dimension, the correlations with the evaluations of voice shopping were not moderated by the

humanized interface design in our study. Since this dimension is perceived as rather unemotional and rational, they may simply not care much. This might spark a new question of how we can make the agent more humane, in terms of agency or intelligence, which does not necessarily include being more emotional.

5.3 Practical Implications

In the context of voice shopping, CAs serve as additional touch points within a multi-channel retail strategy [56]. As organizations develop communication strategies for CAs and their customers, what could be called customer-AI relationship management in practice, they may be inclined to design CAs that act as collaborative partners or "shopping buddies" to enhance engagement. However, our findings suggest that this intuition might not always be the most effective approach. Instead, practitioners might consider a more careful view of relational fit, as humanized cues could potentially create friction for users who perceive the agent as a servant-like tool. In these commercial scenarios, a more conservative, functional-first design may offer a more reliable baseline than high humanization, suggesting that strategic restraint could be beneficial in respecting the task-oriented boundaries users seem to prefer.

With future CAs likely based on Large Language Models (LLMs), these considerations might become even more relevant. While such systems offer sophisticated personalization, they may also be less controllable, potentially leading to unintended social cues that might be perceived as fake or sycophantic.

Furthermore, from a technical perspective, Clark et al. [17] noted that humanized design cannot compensate for a lack of conversational competence. For a personal shopping agent to be truly beneficial, competence may be the more critical factor. Therefore, as AI capabilities grow, the relative importance of socio-emotional design compared to functional competence may shift.

Along these lines, the ethical implications of humanized design cannot be overlooked. Humanizing CAs may raise concerns about deception, as users might feel coerced or emotionally influenced during their interactions. As noted in recent studies, emotional appeals in AI could be seen as deceptive, creating distrust and skepticism among users who are wary of a CA's intentions or motivations [92].

Overall, given the prevalence of servant-like perceptions and the potential for negative reactions to humanized design, CUI research should investigate whether the voice shopping experience benefits from prioritizing clarity and functionality. Designers may find that focusing on core functions, rather than socio-emotional elements that might alienate users, is the safer and more effective path. However, while prioritizing this functional baseline, we also advocate for a forward-looking approach that leverages AI advancements to enhance user experience through relational awareness and boundary respect.

5.4 Limitations and Future Research

It is essential to acknowledge that our study's videos solely depicted voice shopping via Alexa (Amazon's CA). This approach limits ecological validity: participants observed a third-party voice shopping interaction rather than engaging in a first-person conversation,

which removes the sense of personal agency and real-time conversational dynamics that characterize actual CUI use. Prior CUI research has highlighted the importance of interactional context in shaping user perceptions [17, 69], and future work should replicate these findings using interactive Wizard-of-Oz or prototype-based designs to validate whether the observed effects hold under conditions of genuine conversational engagement.

We used two sets of videos with the same CA and tested different interfaces but not different CAs (e.g., Google Assistant vs. Alexa). This may limit the generalizability of the findings to other voice shopping systems and to interface modifications. Therefore, future research should encompass a broader range of conversational AI systems and modifications to facilitate comparative analysis and a more comprehensive understanding of the results. Open questions remain regarding the exact thresholds at which deliberate humanization of conversational design becomes frustrating. Future research can expand these ideas, for example, the number, size, length or looks of anthropomorphic cues, or include embodied CAs (e.g., avatars).

Furthermore, this study assumed a medium effect size, but the observed effect size was quite small. The underpowered sample makes it difficult to detect small effects, as evidenced by the study's null findings. Finally, further validation to examine the longitudinal development of such a synthetic relationship might be helpful, as these perceptions may be time-sensitive and thus test the relationship dynamics over time, as suggested by [84].

Our study contributes to the understanding of the multidimensionality of human-AI relationship perception. However, other psychological processes (e.g., trust) or dispositions (e.g., personality traits) might play a role and could be taken into account in future studies. In light of recent advancements in LLMs, future research could investigate how these relational preferences manifest within more sophisticated systems. Rather than simply increasing or decreasing anthropomorphic cues, researchers could reassess whether LLMs might be leveraged to adaptively adjust a CA's communication style to match a user's preferred relational mode.

6 Conclusion

Is humanizing CAs a good design choice in the context of voice shopping? We provide experimental evidence that humanized conversational design can reduce perceived benefits of voice shopping for users who view their assistant as a servant-like subordinate, whereas it has no effect on users with friend-like or rational-agent orientations. While conventional wisdom and recent empirical findings advocate for humanization as a design goal, our study suggests a more conservative, functional approach to avoid these cues to prevent detrimental effects.

Methodologically, our study shows the value of integrating Relational Models Theory into CUI research. While social and linguistic perspectives are increasingly used, the role of users' pre-existing relational schemas in shaping responses to design features remains underexamined. Our use of a validated multidimensional relationship perception scale offers a reusable tool for studying how conversational design interacts with individual differences. This approach could be extended to healthcare, education, and workplace systems. As large language model-based agents adapt tone and social cues in

real time, understanding users' relational boundaries may become essential for socially appropriate design. Our findings challenge the assumption that increasing human likeness in CAs is inherently desirable. Research has often treated anthropomorphism as a unidirectional design lever, assuming that more humanization leads to better outcomes. Our results, instead, show that its effects depend on how users construe their relationship with the system. This shifts the central design question from how human-like an agent should be to for whom and in which relational context humanization supports interaction. We therefore encourage the adoption of relationship-aware design frameworks that treat users' relational orientations as a primary design variable, alongside task type, modality, and conversational competence. Moving forward, designers must carefully balance the desire to humanize CAs with the potential downsides, both practical and ethical, ensuring that these technologies serve users in a way that is comfortable, functional, and respectful of their boundaries.

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