Celebrity at Your Service: The Effects of Digital-Human Customer Service Agents

Lingyao (Ivy) Yuan
Iowa State University
lyuan@iastate.edu

Antino Kim
Indiana University
antino@indiana.edu

Mike Seymour
University of Sydney
mike.seymour@sydney.edu.au

Alan R. Dennis
Indiana University
ardennis@indiana.edu

Abstract

It is now possible to create digital humans that look and sound like real human celebrities. However, it is unclear whether celebrity effects from product endorsements observed in marketing research transfer to digital-human celebrities providing customer service. We conducted an experiment to investigate the effects of a digital-human celebrity as a customer service agent. We used a state-of-the-art neural rendering method to generate a digital human of Hugh Jackman. Our results show that users' perceived celebrity of digital-human customer service agents leads to higher perceived ability, benevolence, and integrity of the agents, increasing the perception of trustworthiness and the intention to use the service. Also, when digital-human agents make a mistake, customers forgive celebrity agents more than non-celebrity agents. Contrary to what the prior literature suggests, whether the digital-human agents are controlled by a human or by AI has no influence on the impact of errors on perceived trustworthiness. However, the AI-controlled agents increase the willingness to use the service, though they are perceived to be less benevolent.

Keywords: Celebrity, digital human, human-computer interaction, customer service, experiment

1. Introduction

A digital human is a highly realistic representation of an actual human that can be controlled by artificial intelligence (AI) or by a human (Seymour et al., 2018). Understanding how users will perceive and interact with new human-like digital entities is crucial because this will affect future development and deployment.

Digital humans can look and sound like any person, real or not. Amazon has enabled its users to give Alexa the "personality" of Shaquille O'Neal or Melissa McCarthy. Past research shows that celebrity endorsements increase advertising effectiveness and brand evaluations (Febrian & Fadly, 2021; Spry et al., 2011). Celebrity endorsement has been widely researched (Bergkvist & Zhou, 2016), but the effects of AI-based celebrities providing service have not.

There are many appeals to the idea of digital humans designed to look like real celebrities providing customer service. First, digital-human celebrities (or "digital celebrities" for brevity) can be created without physically involving real human celebrities in the production process by using existing videos; that is how we created the digital human in our study. Second, digital celebrities can be customized and personalized to different customers. For instance, a digital celebrity can communicate in different languages to better serve customers. For instance, Bank ABC has launched a digital employee Fatema who can speak Arabic and English. Third, like all software, digital celebrities can be duplicated and scaled at a minimum cost, as most of the cost lies in creating the digital entity. Finally, digital celebrities can be interactive (e.g., Alexa), so users can ask questions and converse with digital celebrities in ways not feasible with real celebrities at scale.

Despite these promises, how consumers would respond to digital celebrities providing customer service remains to be examined. Will users regard digital celebrities as hollow representations of real human celebrities, or will they have an affinity with them? As users' needs drive the design of technology, understanding users' perceptions and attitudes towards digital celebrities would help guide their development and applications.

In this paper, we examine how trustworthy users perceive a digital celebrity to be and how willing they are to use it as a customer service agent. For our experiment, we used a state-of-the-art neural rendering method to generate a digital human of Hugh Jackman. We aim to answer the following research questions:

RQ1. *Compared to a non-celebrity digital-human customer service agent, do people perceive a digital celebrity agent as more trustworthy, and are they more willing to use it?*

RQ2. *Will the quality of the customer service (positive vs. negative) impact the effect of digital celebrity?*

RQ3. *Will the source of the intelligence controlling the digital-human agent (human- vs. AI-controlled) impact the effect of the agent?*

URI: https://hdl.handle.net/10125/103053
978-0-9981331-6-4

2. Theoretical Background

2.1. Celebrity

A celebrity is someone who gained public prominence or fame from their achievements (Rojek, 2001; Turner, 2013). Rojek argues that the amount of celebrity a person has can be measured by the impact that person has on public consciousness. Celebrity, in this broader definition, can also encompass those who are infamous or have notoriety for transgression, failure, or immorality. Our focus is on a subset of celebrities who can provide a celebrity benefit to consumer-focused services. Implicit in this focus is the assumption that the celebrity has a positively perceived set of virtues, skills, appeal, or credibility.

Our focus is on the potential transfer of celebrity to service quality rather than celebrity endorsement of a product (McCracken, 1989). Celebrity endorsement is defined as *an agreement between an individual who enjoys public recognition (a celebrity) and an entity (e.g., a brand) to use the celebrity for the purpose of promoting the entity* (Bergkvist & Zhou, 2016). Celebrity effects can transfer to various products and services (Bergkvist & Zhou, 2016). This is relevant to our research questions as we focus on the personalization of experience with a digital likeness of a celebrity, thereby transferring celebrity meaning to the new form of digital exchange. In this sense, the use of a digital celebrity is an implicit form of endorsement coupled with positive enjoyment from the novel interaction with the likeness of the positively viewed celebrity. The charisma of the celebrity is conveyed through a digital entity controlled by either a human or an AI agent simulating the behavior and responses of the celebrity.

Many companies invest in celebrity endorsers (McCracken, 1989). Celebrities often achieve public recognition through their attractiveness, personal charisma, or likable qualities, which are qualities companies aim to associate with their brands (Atkin & Block, 1983; Erdogan, 1999). Researchers have found that consumers associate the qualities of a brand with those of its celebrity endorsers and that consumers feel more comfortable when the product is presented by celebrities (Kusumasondjaja & Tjiptono, 2019; Loureiro & Sarmento, 2019).

2.2. Digital Humans

Digital humans can be deployed as human-controlled avatar puppets or as AI-controlled agents (Seymour et al., 2018; Seymour et al., 2020). Digital humans are prevalent in films, where actors can appear as someone else or be controlled by a stunt double. Human-controlled digital humans also have great potential in the customer service area. Digital humans can be customized to personalize the appearance, voice, gender, race, and other characteristics of a real agent based on the customers' demographic information. Users may see a human-controlled digital human either as a direct extension of the user controlling it or as a separate and distinct entity (Schultze, 2011).

Digital humans can be controlled by AI and perform functions similar to human agents (Mills & Liu, 2020; Rai et al., 2019). AI agents have been the focus of much research (Rai et al., 2019); initially, AI agents' potential to replace humans was at the center of discussions, and more recently, the concept of human-AI hybrids (i.e., AI agents working together with humans) also started garnering attention (Baird & Maruping, 2021).

Firms are beginning to deploy AI-driven digital humans in customer service functions (e.g., ANZ Bank, ZOZOTOWN, Arab Banking Corporation). These AI agents are designed to replace chatbots and humans in customer-facing roles. Researchers have started looking at perceptions of AI-driven digital humans (Stein et al., 2020). Mills and Liu (2020) argue that such digital humans will eventually be visually indistinguishable from real humans.

2.3. Trustworthiness

The concept of trustworthiness applies not only to human-to-human relationships (Mayer et al., 1995) but also to information systems (Benbasat & Wang, 2005; Komiak & Benbasat, 2006; Lowry et al., 2008; Vance et al., 2008). Trustworthiness is an important theoretical factor in the use of technology (Benbasat & Wang, 2005) and is essential in establishing working relationships with AI agents (Baird & Maruping, 2021; Ryan, 2020). Trust is an individual's willingness to be vulnerable to a specific action of another person or thing, while trustworthiness is an assessment of whether the entity is worthy of trust (Mayer et al., 1995).

Trustworthiness is a function of the trustor's assessment of the trustee's ability, integrity, and benevolence (Lewicki & Bunker, 1995; Mayer et al., 1995). Ability refers to the skills that enable the trustee to be competent within some domain. Ability is key because the trustor needs to know that the trustee is capable of performing the task the trustee is being trusted to do. Integrity is the adherence to a set of principles that the trustor finds acceptable and indicates the extent to which the trustee's actions are likely to follow the trustee's espoused intentions.

Benevolence is the extent to which the trustee is believed to feel care and willing to do good aside from a profit motive. Benevolence is important over the long term because it suggests that the trustee has some attachment to the trustor, over and above the transaction in which trust is being conferred (Mayer et al., 1995).

2.4. Hypotheses

Prior research has found that celebrities can influence consumers' behaviors and attitudes (Arora et al., 2019; Liu et al., 2007). Celebrity endorsement can increase a consumer's purchase intention for a product (Jin & Ryu, 2020; Osei-Frimpong et al., 2019) and increase brand credibility (Chin et al., 2020) due to the celebrity's trustworthiness and familiarity (Hambrick & Mahoney, 2011; Osei-Frimpong et al., 2019). The celebrity effect works because consumers transfer their perceptions of the celebrity to the products and services that the celebrity endorses (Hambrick & Mahoney, 2011; Osei-Frimpong et al., 2019).

We theorize that these same theoretical processes will be at work for a digital celebrity. Specifically, users will transfer their perceptions of the real celebrity to the digital celebrity. In this case, the celebrity does not explicitly endorse the digital human in the same way that he or she would endorse a specific product or service, but instead, the celebrity *becomes* the service. The celebrity implicitly (or explicitly) endorses the service by licensing his or her image and voice, which then quite literally embodies the service.

Firms will choose celebrities they consider to be consistent with their brands (Chin et al., 2020), exhibiting the characteristics needed to promote a good service encounter. Therefore, they will choose a celebrity they believe exhibits the characteristics needed to induce high trustworthiness (i.e., ability, benevolence, and integrity). Users will then transfer the high ability, benevolence, and integrity of the celebrity to the digital celebrity. Thus:

Hypothesis 1. *The users' perceived celebrity of a digital-human customer service agent increases the perceived a) ability, b) benevolence, and c) integrity of the agent.*

The celebrity effect may also alleviate the negative experience when customer service agents make errors. Individual attitudes and behavior are strongly influenced by the individual's subjective interpretation of a situation (James et al., 1978; Ross, 1977). Individuals often wrongly ascribe the cause of errors (Jones & Harris, 1967; Ross, 1977). As a result, perceptions of a situation are often strikingly different among different people who observe the exact same events (James et al., 1978).

The fundamental attribution error refers to the tendency of individuals to ascribe the cause of errors made by others to some weakness or lack of ability rather than being a function of the situation (Jones & Harris, 1967; Ross, 1977). In other words, when someone or something makes an error, it is a reflection of who they are and their abilities rather than being caused by the situation (Jones & Harris, 1967; Ross, 1977). Thus, when users see a digital human make a mistake, they are likely to perceive it as lacking ability.

However, all situations are merely inputs that are interpreted and then encoded within our cognitive structure (James et al., 1978; Sedikides & Skowronski, 1991). In many cases, input is ambiguous (James et al., 1978; Sedikides & Skowronski, 1991). For example, if someone uses an incorrect term, is the person incapable, or was it a simple misstatement? The input situation is interpreted with reference to the individual's pre-existing beliefs—usually, a belief structure that is active in the memory and semantically close to the input (Sedikides & Skowronski, 1991).

A digital celebrity has been selected because the celebrity is perceived to have high ability. Therefore, when a digital celebrity is seen to make a mistake, this clashes with the user's pre-existing belief that the celebrity is capable. Thus, there is a greater likelihood that the error will be attributed to the situation rather than to the digital human itself. For example, when the digital celebrity is not able to understand what a user said, users would be more forgiving and not perceive the error as a reflection of its ability. Thus, we hypothesize:

Hypothesis 2. *The users' perceived celebrity of a digital-human customer service agent weakens the negative impact of errors on the perceived a) ability, b) benevolence, and c) integrity of the agent.*

Trustworthiness is shaped by social classification: People trust in-group members more than out-group members (Delhey et al., 2011; Foddy et al., 2009; Tajfel et al., 1971). This natural categorization process shapes how we view the behavior of others and how we behave towards them (Brewer, 1979; Delhey et al., 2011; Molenberghs et al., 2013).

Past empirical research has noted that we evaluate AI differently from the way we evaluate humans who perform similar tasks. Sometimes we trust AI more (Logg et al., 2019; Sundar & Kim, 2019) and sometimes less (Dietvorst & Bharti, 2019; Dietvorst et al., 2015, 2018). If humans make an error, they may or may not make the same error again, whereas if an AI agent makes an error, we are more likely to believe

that it will make the same error again because software behavior is more consistent than human behavior (Rai et al., 2019). They are more likely to ascribe the root cause of the error to the AI's lack of ability than to the situation. As a result, we trust AI less than humans if we see AI make an error (Dietvorst & Bharti, 2019; Dietvorst et al., 2015, 2018). Thus, users who see an AI-controlled digital human make several mistakes are more likely to perceive the AI agent as having less ability, benevolence, and integrity than a human who makes the same mistakes. Thus:

Hypothesis 3. *The negative impact of errors on the users' perceived a) ability, b) benevolence, and c) integrity of a digital-human customer service agent is stronger if the agent is controlled by AI than by a human.*

Consistent with prior research and theory, we posit that trustworthiness is affected by ability, benevolence, and integrity (Mayer et al., 1995). Trustworthiness is an important factor influencing people's willingness to interact with AI agents (Baird & Maruping, 2021; Etemad-Sajadi, 2016). Based on the theory of Baird and Maruping (2021), we also theorize that intention to use is influenced by the same factors that influence trustworthiness:

Hypothesis 4. *The users' perceived a) ability, b) benevolence, and c) integrity of a digital-human customer service agent are positively associated with users' perceptions of the agent's trustworthiness.*

Hypothesis 5. *The users' perceived a) ability, b) benevolence, and c) integrity of a digital-human customer service agent are positively associated with the intention to use the agent.*

3. Preliminary Test

3.1. Treatment Design

We hired a professional actor—whom we refer to as Hugh Seymour in our experiment—to play the role of the customer service agent in the video used in our treatments. As the digital celebrity figure, we chose Hugh Jackman, a famous Australian actor, and performer. Henceforth, we refer to these actors, both real and digital, by their last names as introduced to our participants (e.g., Jackman and Seymour).

The Hugh Jackman video (see Figures 1a and 1b) was created using neural rendering face replacement based on curated training data of both actors. We used state-of-the-art tools—DeepFaceLab2 and Foundry's Nuke—to infer Hugh Jackman's face, delivering the scripted dialogue, and then professionally composited this face with Seymour's body. This way, both actors are presented with the same script, delivery, and lighting. As our Seymour actor sounded similar to Hugh Jackman's Australian accent, there was no additional audio processing. We hired a third actor to play the role of the customer; see Figure 1c.

We conducted a preliminary test to ensure that there were no significant differences between the original videos produced (which we refer to as Seymour videos) and those produced using neural rendering (which we refer to as Jackman videos). Specifically, we checked (i) the perceived quality of the videos, (ii) the level of overall realism, and (iii) the physical attractiveness of the actors in the videos.

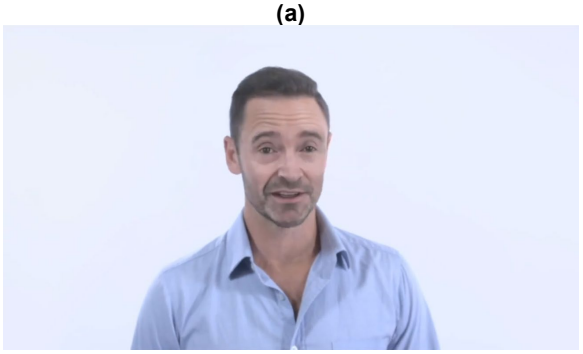
3.2. Method

We recruited 100 adult participants in the United States from Mechanical Turk who had completed 5000 tasks with an approval rate of 98% (Peer et al., 2014; Steelman et al., 2014); 49 of them were female, and all passed two simple attention tests in the study (e.g., "choose 'Strongly agree' if you're paying attention"). Researchers have found online crowdsourcing markets to be as good or better than student samples (Steelman et al., 2014). The subjects saw the introduction to the study and then watched one of the two videos and answered questions about it. For the preliminary test, we used a video in which the customer contacts customer service to place a travel notice on her credit card. Depending on the random assignment, the subjects saw either Jackman or Seymour appear as the customer service representative in the video. A power analysis using G*Power (Faul et al., 2007) determined that a sample of 100 participants with this design would provide a power of 0.8 to detect a medium effect size (Cohen f=0.50).

We measured the perceived quality of the videos as the average of three items on seven-point Likert scales: *The video has good quality*, *I can view the whole video clearly*, and *There is no issue with the quality of the video*. Cronbach's α was adequate at 0.85. The overall realism of the videos was measured as the average of seven items on seven-point Likert scales: *The customer service agent was realistic*, *the behavior of the customer service agent was realistic*, *I felt comfortable looking at the customer service agent*, *the customer service agent was lifelike*, *the communication between the user and the customer service agent was realistic*, *the customer service agent was likable*, and *the portrayal of the characters was realistic*. Cronbach's α was 0.93. Finally, we also measured the physical attractiveness of the actors

using five items on seven-point Likert scales from Ohanian (1990): *What do you think about the customer service agent in the video? (Attractive; classy; handsome; elegant; sexy)*. Cronbach's α was 0.89.

(a)



(b)

(c)

Figure 1. Example screenshots of (a) the user and the digital-human customer service agent, (b) the digital-human customer service agent from the customer's point of view, and (c) the customer

3.3. Results

From our preliminary test, we found no significant differences between the two videos across all three dimensions; there were no significant differences in (i) videos quality ($t(98) = 1.40$, $p = 0.17$), (ii) realism ($t(98) = 1.20$, $p = 0.23$), and (iii) attractiveness of the actors ($t(98) = 0.23$, $p = 0.82$). See Table 1.

Table 1. Summary statistics for treatments

	Videos	N	Mean	Std Dev
Video Quality	Jackman	50	6.53	0.09
	Seymour	50	6.70	0.07
Realism	Jackman	50	6.11	0.11
	Seymour	50	5.88	0.17
Physical Attractiveness	Jackman	50	5.45	0.15
	Seymour	50	5.39	0.19

4. Main Study

4.1. Method

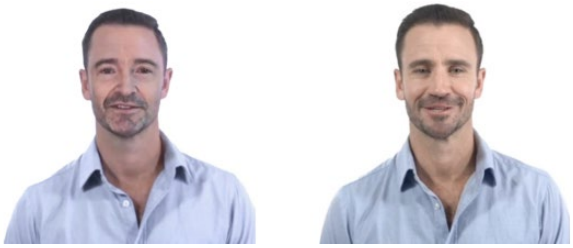
4.1.1. Participants. For our main study, we recruited 500 participants in the United States from Mechanical Turk in accordance with the same protocols used in the preliminary test. Out of the 500 participants recruited, 205 participants were female. We removed 25 participants who either failed one or more of the attention checks or had an unusually high fraud score according to Qualtrics' guidelines (i.e., above 80).

4.1.2. Treatments. The study used a 2×2×2 design, varying celebrity (Jackman or Seymour), experience quality (positive or negative), and the controller behind the digital-human customer service agent (AI or human). Celebrity and experience were manipulated by using different videos, while the controller was manipulated by the experimental instructions. Subjects were assigned one of four videos: (i) positive experience with Jackman, (ii) positive experience with Seymour, (iii) negative experience with Jackman, and (iv) negative experience with Seymour. All the videos showed an interaction between a customer and a customer service agent at a credit card company, with the positive-experience videos showing the agent making no mistakes, whereas, in the negative-experience videos, the agent made several mistakes (e.g., incorrectly hearing the customer's name, not recognizing the address, repeatedly asking the same question). The positive experience videos were the same ones from the preliminary test. The errors for the negative experience videos were recorded with the same actors. To control for any brand-related constructs (e.g., brand loyalty), we used a hypothetical credit card company.

The subjects were randomly assigned to either the AI-controlled treatment or the human-controlled treatment. For the AI-controlled treatment, the instruction showed: "*The appearance of the customer service agent is generated using a new computer graphics technology, and this agent is controlled by Artificial Intelligence (AI). You can think of the agent like a very advanced chatbot or Apple's Siri who can help solve customer problems, but it is not a real*

human." For the human-controlled treatment, the instruction showed: "*The appearance of the customer service agent is generated using a new computer graphics technology, and this agent is controlled by a real human. You can think of the agent like a service representative talking on a video call (e.g., Facetime, Zoom, and Skype) to help solve customer problems while using a video filter to look like someone else.*"

The common section for the instruction showed: "*Since the appearance of the customer service agent is computer-generated, the agent can look like anyone.*" For the Jackman videos, the instruction showed: "*The credit card company has made the agent look like the movie star Hugh Jackman, who has an agreement with the company to permit the usage of his image. Hugh Jackman is an Australian actor, singer, and producer.*" For the Seymour videos, the instruction showed: "*The credit card company has made the agent to look like someone (selected from a pool of applicants), who has an agreement with the company to permit the usage of his image. This is Hugh Seymour, and he was selected among the applicants.*" Based on the assigned video, the subjects were shown a headshot (taken from the treatment videos) of either Jackman or Seymour; see Figure 2.



a) Jackman **b) Seymour**

Figure 2. The two digital humans

After reading the instructions and seeing the headshot of the assigned actor, the subjects answered questions about the actor's recognizability and affinity. They then watched the treatment video and answered questions about the interaction between the customer and the customer service agent in the video.

4.1.3. Independent variables. Celebrity is in the eye of the beholder (Bergkvist & Zhou, 2016), so we measured perceived celebrity as self-reported by participants after seeing the assigned actor. The definition of a celebrity is someone whom people recognize and feel an affinity with (McCracken, 1989). It is possible to recognize someone and have a strong positive or negative feeling toward that person (e.g., Donald Trump), so it is important to jointly assess both recognition and affinity at the individual participant level. We used three items to assess recognition (7-point scales): *I recognize Hugh Jackman/Seymour*, *Hugh Jackman/ Seymour is a celebrity*, and *Hugh Jackman/Seymour is famous*. Cronbach's α was 0.98. We used three items (on a scale from −3 to 3) to assess affinity for the actor: *I like Hugh Jackman/Seymour*, *I feel positive about Hugh Jackman/Seymour*, and *I have good feelings about Hugh Jackman/Seymour*. Cronbach's α was 0.97. Affinity ranges from negative to positive values since a participant's feelings toward an actor can be positive or negative. Celebrity is the joint function of recognition and affinity, so we multiplied the two terms for the perceived celebrity variable, which ranges from −21 to 21. Thus, if a participant recognizes the actor and feels a strong positive affinity with the actor, the perceived celebrity would be large and positive. By contrast, if a participant recognizes the actor and strongly dislikes the actor, the perceived celebrity would be large and negative. Lastly, if a participant does not recognize the actor or does not have strong feelings toward him, the perceived celebrity would be weak; see Figure 3.

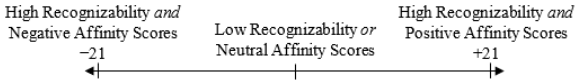


Figure 3. Perceived Celebrity Scale

AI is a binary treatment variable that indicates whether the instruction showed that the digital human was controlled by AI or a human. Negative experience is another binary treatment variable that indicates whether the customer service agent made any mistakes or not. We also controlled for the participants' gender.

4.1.4. Mediating variables. We used established measures of ability, integrity, and benevolence (Dennis et al., 2012). All three constructs were reliable with Cronbach's α above 0.85; see Table 2.

4.1.5. Outcome variables. We used an established measure of trustworthiness (Dennis et al., 2012). Use intention was measured using three items (Venkatesh et al., 2003). All constructs were reliable, with Cronbach's α higher than 0.95; see Table 2.

Table 2. Constructs, Cronbach's α, and measurement Items

Construct	α	Item
Ability	0.95	The customer service agent seemed to be successful in the activities he undertook.
		I felt very confident about the customer service agent's skills.
		The customer service agent was

		well qualified.
Benevolence	0.89	The customer service agent was concerned with what was important to the user.
		The customer service agent cared about the user's feelings.
		The customer service agent was benevolent.
Integrity	0.86	The customer service agent did what he said he would do.
		I like the customer service agent's work values.
		The customer service agent showed integrity.
Trust-worthiness	0.97	Overall, the customer service agent is very trustworthy.
		I trust the customer service agent.
		I can rely on the customer service agent.
Use Intention	0.96	I would use this customer support.
		I would be comfortable using this customer support in the future.
		I predict I would use this customer support in the future.
		If a friend were in need of similar help, I would recommend the service to him or her.

4.2. Results

4.2.1. Measurement model. We performed confirmatory factor analysis (CFA) of our latent variables to validate the reliability and to test the convergent and discriminant validity of the measurement model. The factor loadings of items on the latent variables are shown in Table 3. The overall model provided a good comparative fit index (CFI = 0.98) with acceptable error terms, as indicated by the root mean square error of approximation (RMSEA = 0.08) and standardized root mean square residual (SRMR = 0.04).

Table 3. Confirmatory factor loadings

Items	Constructs				
	Ability	Bene.	Inte.	Trust	Use
Ability1	0.89	—	—	—	—
Ability2	0.95	—	—	—	—
Ability3	0.95	—	—	—	—
Bene.1	—	0.92	—	—	—
Bene.2	—	0.89	—	—	—
Bene.3	—	0.76	—	—	—
Integrity1	—	—	0.70	—	—
Integrity2	—	—	0.90	—	—
Integrity3	—	—	0.88	—	—
Trust1	—	—	—	0.96	—
Trust2	—	—	—	0.97	—
Trust3	—	—	—	0.94	—
Use1	—	—	—	—	0.98
Use2	—	—	—	—	0.96
Use3	—	—	—	—	0.93
Use4	—	—	—	—	0.85

Note: Chi-square=353.183 (p<0.001)
Chi-square/df=3.76, CFI=0.98, TLI=0.97
RMSEA=0.08, SRMR=0.04

The correlations of all variables are presented in Table 4. We note that trustworthiness and use were correlated at r=0.81, indicating that they are different but related constructs. We conducted a randomization check by assessing whether there were any differences in gender across the eight different cells in the study and found no significant differences; thus, we conclude that the randomization was successful.

Table 4. Correlation matrix

Variables	Ability	Bene.	Inte.	Trust	Use
Ability	**1**	—	—	—	—
Bene.	0.74	**1**	—	—	—
Integrity	0.80	0.82	**1**	—	—
Trust	0.83	0.79	0.84	**1**	—
Use	0.79	0.73	0.75	0.81	**1**

4.2.2. Hypotheses testing. To test our hypotheses, we followed the procedures of Hayes (Hayes, 2017) using the SPSS macro developed by Preacher and Hayes (Preacher & Hayes, 2004) (specifically Model#10).

As shown in Table 5, the perceived celebrity had a significant and positive effect on ability, benevolence, and integrity; H1a-c are supported. The interaction between perceived celebrity and the negative experience was positive and significant for ability, benevolence, and integrity. This indicates that celebrity offsets the significant negative impact of errors. In other words, customers are more forgiving of errors made by digital celebrity. Thus, H2a-c are supported.

Table 5. Analysis results showing betas

	Ability	Bene.	Inte.	Trust	Use
Neg.Exp.	-1.54***	-1.13***	-0.96***	0.10	0.26
Celeb.	0.02*	0.02*	0.02**	0.01	0.01
AI	-0.21	-0.36*	-0.24	0.12	0.33**
Neg.×Celeb.	0.03*	0.04*	0.03*	0.00	-0.02
Neg.×AI	0.40	0.29	0.18	0.12	-0.19
Ability	—	—	—	0.35***	0.52***
Bene.	—	—	—	0.20***	0.29***
Inte.	—	—	—	0.47***	0.20**
R^2	0.25	0.15	0.19	0.79	0.69

Note: N = 475; *p < 0.05, **p < 0.01, ***p < 0.001.

We found that the AI treatment had a negative and significant impact on perceived benevolence but not on ability and integrity. In other words, users perceived a human-controlled digital agent to be more

benevolent compared to an AI-controlled agent. However, the interaction between negative experience and AI had no significant impact on ability, benevolence, and integrity, suggesting that whether the agent is human- or AI- controlled had little effect. Contrary to our hypothesis, we did not find any evidence of "algorithm aversion" in our context; H3a-c are not supported.

Consistent with prior research, we found that ability, benevolence, and integrity all had significant positive effects on perceived trustworthiness. They also had significant positive effects on intention to use. Thus, H4 and H5 are supported.

Table 5 also shows that in addition to the mediation effects of ability, benevolence, and integrity, AI has a significant positive direct effect on use intention, indicating that people are more likely to use AI-controlled digital humans than human-controlled digital agents, after accounting for any differences in perceived ability, benevolence, and integrity.

5. Discussion

The advancements in AI technologies in the past decade have now made it feasible for companies to deploy digital humans as customer service agents, interacting with users in real time. The appearance of digital humans can be customized to look like anyone, including celebrities. However, while companies *can* create and deploy digital celebrities as customer service agents, the key question is whether they *should*.

Overall, the results from our experiment show that using a digital celebrity as a customer service agent may be beneficial. Digital celebrity customer service agents were perceived to have more ability, benevolence, and integrity than non-celebrity digital humans. They were also less affected when the digital human-made mistakes. Ability, benevolence, and integrity have strong and significant effects on perceptions of trustworthiness and intention to use, suggesting that there is an overall benefit in using digital celebrities as customer service agents.

A human-controlled agent was perceived to be more benevolent compared to an AI-driven one, but there were no differences in perceived ability and integrity. Interestingly, we found the AI-driven agent to have a positive direct effect on use intention (over and above the effects of ability, benevolence, and integrity) though such an effect was not hypothesized. We speculate that this result could be because of the recent proliferation of digital assistants such as Alexia, Siri, Google Assistant, and other types of chatbots.

Another notable observation is actually what we did not find: Unlike what the prior literature on algorithm aversion suggests, the interaction between the AI condition and negative experience had no significant effect on any of our mediating variables and outcome variables. In short, users did not penalize AI for errors any more than human errors.

One possible limitation of our study is the particular choice of Hugh Jackman as the celebrity in our experiment. We chose Hugh Jackman because he had the qualities we needed for our study: He is well-known and has maintained a generally positive public image over several decades. Celebrity lies in the eyes of the beholder, and our choice is limited in gender (male), race (Caucasian), and the nature of celebrity (movie industry). As technology continues to advance, future research may be able to easily generate a wide array of different digital celebrities, match them with users, and examine the effects in various contexts such as e-commerce, healthcare, game, and others. Ultimately, letting users choose the celebrity they prefer may increase trustworthiness and use. For example, Amazon is giving users choices for celebrity personalities for Alexa.

Another potential limitation of this study is that we used a novel measure of perceived celebrity. A celebrity in our study context, where a firm chooses a brand ambassador, is someone who is not only recognizable but also maintains a positive public image. It is implausible that companies would choose a celebrity with negative public perception to represent their products or services. In fact, celebrities are often removed from representing companies when they are caught involved in crimes or scandals. Hence, for our perceived celebrity construct, we combined two subconstructs of recognizability and positive affinity. While this measure of celebrity is reasonable for our study context, other application contexts may require a different definition—or dimensions—of celebrity.

Finally, we note that the coefficients for the celebrity effects are somewhat small. Even though perceived celebrity has statistically significant effects, the one unit increase in the perceived celebrity (a 2% change on our −21 to +21 point scale) would increase perceived ability, benevolence, and integrity by 0.3% (0.02 points on the 7-point scale). We posit that this may be due to the nature of our experiment design. We used a vignette-based study, where the participants observed a customer service encounter rather than directly interacting with the customer service agents. It is common to use vignettes to study human behavior and technology use (Cram et al. 2009; Shaw et al. 2003), and meta-analyses show that using vignettes results in the same research conclusions as studying actual behavior and technology use (Cram et al. 2009; Shaw et al. 2003). However, the effects observed in

vignette-based studies may be smaller than in settings where subjects directly interact with artifacts (Mullen and Hu 1989). In our setting as well, we anticipate the manipulation would be stronger if the participants directly interact with the customer service agents.

Despite these limitations, however, our results provide some useful insights into the use of digital celebrities in customer service. We used high-quality videos to capture a plausible customer service scenario with photo-realistic digital humans. Instead of a technology that is already well-understood and widely used in the industry, our study investigates a novel application of new technology, digital-human celebrities. Does it make sense for companies to provide "celebrities at scale" now that they can with digital humans? Our study points to some promising signs.

6. References

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