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Be a Miracle - Designing Conversational Agents to Influence Users' Intention Regarding Organ Donation

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Completed Research Paper

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Abstract

The increasing need for organ donations remains a worldwide challenge as transplant waiting lists grow and donation rates persist at constant levels. The increasing popularity of conversational agents (CAs) has prompted new strategies for educating and persuading individuals to adjust their cognitive and behavioral beliefs and become donors. However, how CAs should be designed to modify uninformed users' intention to donate remains unclear. Against this background, we conducted an online experiment (N=134) to examine the impact of a human-like CA design on users' intention to become organ donors. Based on the three-factor theory of anthropomorphism and the elaboration likelihood model, we derive three theoretical mechanisms to understand the influence of a CAs human-like design on users' intention to donate. The findings show that perceived anthropomorphism does not directly impact persuasion and empathy but is mediated via perceived usefulness to influence the intention to donate.

Keywords: Conversational Agent, Human-like-design, Anthropomorphism, Intention to donate, Organ donation

Introduction

There are only a few acts in our lives that can save multiple lives. One such act is considered donating organs. In the U.S. alone, around 100,000 individuals are currently waiting for organ donations, with one new person added to the list every ten minutes (HRSA, 2023). In numerous countries worldwide, the demand for organs exceeds the supply; especially in post-pandemic times, the number of global transplantations has decreased (Ahmed et al., 2020). Consequently, several governments (e.g., U.K., Netherlands) have switched from opt-in (explicit consent) to opt-out (presumed consent) options (Lewis et al., 2021). Nonetheless, many other countries (e.g., Germany) still employ an opt-in system, which relies on individuals voluntarily participating (Hansen et al., 2021). To convince individuals to opt-in (and not to opt-out), various methods of communication have been employed to inform and educate individuals about

the importance of donating organs: TV advertisements (Latifi et al., 2018), social media campaigns (Kabbur, 2016), and newspaper ads (Feeley & Vincent, 2007). This is particularly important because numerous prejudices in organ conation exist (e.g., about the procedure) (Krupic, 2020). With the rise of technology and recent advancements in artificial intelligence (AI) (e.g., Google's Bard (Pichai, 2023)), new prospects have been investigated to influence users' behavior. In this context, Conversational agents (CAs) are considered a potential solution (Harris et al., 2022).

CAs are software-based agents that use natural language to communicate with human users (Feine et al., 2019). The reasons for their growing popularity can be found in their advantages, such as 24/7 availability (Meuter et al., 2005), cost-efficiency (e.g., in customer services contexts) (Araujo, 2018), scalability (Adamopoulou & Moussiades, 2020), and improving customer experiences (Kaushal & Yadav, 2023). Prominent examples of CAs are Amazon's Alexa and Apple's Siri (Reis et al., 2018). Specifically in health contexts, CAs have proven to be an effective mechanism in educating (e.g., regarding COVID-19 (Pietrantoni et al., 2022), or blood donation (Roman et al., 2020)) and impacting users' behavior (e.g., promoting healthy lifestyle (Piao et al., 2020)). Overall, research has shown that CAs can be an effective means of persuasion when designed correctly (Schwede et al., 2023).

In this regard, CAs can influence users' behavior by utilizing a human-like design (i.e., designing them with so-called anthropomorphic cues, such as a human name, greeting users, and using emoticons) (Diederich et al., 2019). This is because users tend to perceive anthropomorphism in CAs (Epley et al., 2007), which can impact their attitudes and intentions (Pizzi et al., 2023). The effect of viewing CAs as similar to a human, also known as anthropomorphism, refers to assigning human-like characteristics to non-human objects (Epley et al., 2007; Yuan & Dennis, 2019). Consequently, anthropomorphism can change how users think and behave. For instance, past research has revealed positive effects on increased purchase intentions (Schwede et al., 2023), higher intentions to comply (Pietrantoni et al., 2022), and increased persuasiveness (Diederich et al., 2019).

In this study, we extend the existing literature by examining the effects of influencing users' intention to donate organs based on previous findings regarding persuasive strategies. Because opt-out solutions (e.g., deemed consent) are mostly effortless for individuals (Miller et al., 2019), we focus on raising users' awareness regarding opt-in procedures. In particular, former scholarly work investigated CAs use through a rational decision-making lens, following factors that harm the donation process (e.g., missing compensation) (Lewis et al., 2021). This study aims to answer the following research question:

How does a CAs human-like design impact a user's intention to donate organs?

To answer this question, we theorize three different routes on how perceived anthropomorphism influences users' intention to opt-in to donate organs. The routes are based on the three-factor theory of anthropomorphism (Epley et al., 2007) and the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986). Based on an online experiment with 134 users, we tested these routes. The results reveal that perceived anthropomorphism does not directly influence perceived persuasion and perceived empathy. Instead, the CA's perceived usefulness serves as a mediator.

Research Background

Our study investigates how a CAs human-like design influences users' intention to donate organs. Against this background, we will outline current developments of CAs in the context of organ donations. Further, we will draw on literature regarding the human-like of CAs, anthropomorphism's resulting effects, and the underlying theoretical mechanism following the ELM.

Conversational Agents for Organ Donations

With the rise of new technological possibilities and recent advancements in AI, CAs have become mainstream across industries and contexts (e.g., Amazon's Alexa in private households) (Meloni et al., 2023). This development is further accelerated by the recent showcases of ChatGPT (OpenAI, 2022), which has led to an increase in interest in CAs in practice across disciplines (e.g., Brunet-Gouet et al.(2023), Chow et al. (2023), Singh (2023), Kurian et al. (2023)). Compared to traditional services, CAs are able to process numerous requests simultaneously, with no restrictions regarding time and geographical factors (Ball & Breese, 2000; Jenneboer et al., 2022). Consequently, CAs hold benefits for both providers and users.

Specifically, in health contexts, CAs have proven to be an effective mechanism for enhancing individuals' lifestyles by offering healthy nutrition advice (Fadhil, 2018), mental health counseling (Ly et al., 2017), pre-symptoms screening in the context of COVID-19 (Brendel et al., 2022), and for developing health literacy in educational settings (Mokmin & Ibrahim, 2021).

More prominently, CAs are used in digital health interventions to influence users' intended and actual behavior, i.e., by promoting a healthier lifestyle (Piao et al., 2020). In this regard, Harris et al. (2022) examined the role of a CA in the context of organ donations. This is of particular importance because the global shortage of donated organs continues to grow, and individuals need to be educated to overcome skeptical perspectives and false beliefs about the donation process (Lewis et al., 2021; Morgan, 2009). To address these challenges, CAs can couple pragmatic solutions (e.g., educating users) with the ability to shape a user's cognitive and behavioral beliefs (e.g., increasing the intention to donate blood (Roman et al., 2020)), which, thus, amounts to persuading users. This will enhance our understanding of how CAs can influence and persuade users' decision-making in the donation context. One prominent example of persuading users is by inducing anthropomorphism (Diederich et al., 2019).

Anthropomorphism of CAs

Anthropomorphism describes the subconscious effect of users attributing human-like characteristics to non-human objects (e.g., a smiling cat) (Epley et al., 2007; Howard & Kunda, 2000; Mithen & Boyer, 1996). The phenomenon of anthropomorphism can also be applied to CAs (Klein & Martinez, 2022; Waytz et al., 2010). For instance, adding a human name and avatar leads to a perception of humanness in users (Bührke et al., 2021; Go & Sundar, 2019). In this regard, the computers are social actors paradigm (CASA) (Nass et al., 1994), social response theory (Nass & Moon, 2000), and the three-factor theory of anthropomorphism (Epley et al., 2007) have been widely applied to explain this phenomenon.

CASA refers to users attributing human-like characteristics to computers, knowing they are not interacting with humans (Nass & Moon, 2000). The level of users' perceived anthropomorphism depends on how these human-like characteristics, manifest in the form of anthropomorphic cues, are used. Here, the social response theory complements CASA by explaining that anthropomorphic cues arouse user responses, resulting in interactions similar to human-to-human conversations (e.g., greeting the CA at the beginning) (Nass & Moon, 2000). Lastly, the three-factor theory of anthropomorphism (Epley et al., 2007) refers to three distinct psychological factors that trigger anthropomorphism in users: elicited agent knowledge, effectance motivation, and sociality motivation (Epley et al., 2007). Elicited agent knowledge refers to how users attribute human qualities to objects based on certain signals, such as a voice (e.g., attributing a gender based on voice). Effectance motivation refers to users' need to understand and predict their behavior by projecting human qualities on objects to control the situation. Finally, sociality motivation describes the process of anthropomorphizing objects due to the need for social interaction and contact.

To anthropomorphize objects, specifically CAs, various social cue categories have been introduced (Feine et al., 2019; Seeger et al., 2018). For example, CAs can be structured to signal human identity (e.g., avatars), verbal cues (e.g., syntax variability), and non-verbal cues (e.g., response delays) (Seeger et al., 2018).

The Elaboration Likelihood Model for Persuasion

Various studies report on the persuasion effects of anthropomorphizing CAs, leading to increasing willingness to donate (Yuan & Dennis, 2019), intention to donate for charity (Bührke et al., 2021), and purchase intention (Han, 2021). Research has engaged in various theoretical explanations and theories to understand how anthropomorphism can affect users' behavior and beliefs (e.g., social contagion theory (Yuan & Dennis, 2019)). Prominently, IS scholars examined this process through the ELM, which describes two routes for persuasion by which information influences users' attitudes (Chang et al., 2020; Petty & Cacioppo, 1986). According to the model, messages are cognitively processed either by a central route (high elaboration) or a peripheral route (low elaboration). For instance, the central route relies on logical reasoning and facts, and users who adopt the central route of persuasion tend to engage in the critical processing of the message. Applied to the context of this study, we propose that users' central route will be affected by the perceived usefulness of the CA. In contrast, the peripheral route relies on effortless cues such as emotional appeals, which can impact a user's empathy (Leong et al., 2019; Wang & Yang, 2019).

Research Model and Hypotheses Development

To enhance our understanding of how human-like designed CAs influence users' intention to donate organs, we build on the three-factor theory of anthropomorphism (Epley et al., 2007), CASA paradigm (Nass et al., 1994), and ELM (Petty & Cacioppo, 1986). Against this background, we developed several hypotheses to explain the relationships between the human-like CA design on perceived anthropomorphism, perceived empathy, perceived usefulness, perceived persuasion, and intention to donate (see Figure 1). In the following sections, the derived hypotheses will be explained in detail.

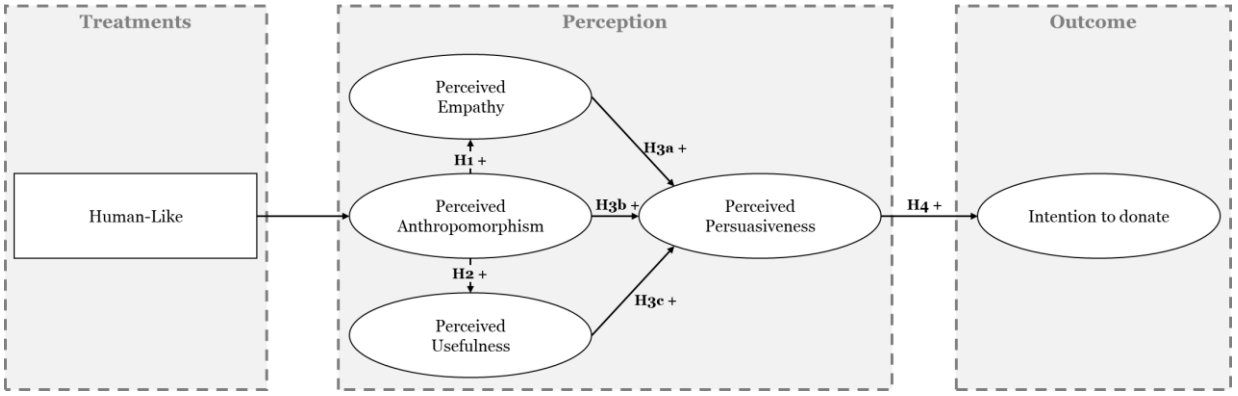


Figure 1. Research Model and Hypotheses

Perceived Anthropomorphism

In the context of CAs, the users' perceived anthropomorphism can relate to a CA's anthropomorphic cues (i.e., social cues) (Y. Kim & Sundar, 2012). In general, users have a natural tendency to attribute human-like characteristics to non-human like objects (Epley et al., 2007), leading to an increased perception of humanness, when anthropomorphic cues are applied (Nass & Moon, 2000; Nass et al., 1994). Anthropomorphic cues refer to a CAs characteristic of having a name (Araujo, 2018), an avatar (Bührke et al., 2021), greeting the user at the beginning of a conversation (Morana et al., 2020), or such as using dynamic response relays (Bao et al., 2022). In this regard, recent examples report the positive effects of anthropomorphic cues on users' behavioral intentions (Adam et al., 2021; Brendel et al., 2022; Pietrantoni et al., 2022). However, because the level of perceived anthropomorphism can vary across individuals based on the extent to which they are applied (J. Liu & Bailey, 2020), we employ two CAs to aim for different levels of perception.

Perceived Empathy

The perception of empathy relates to the capacity to understand another's feelings and beliefs (Hall & Schwartz, 2019). Following the three-factor theory of anthropomorphism (Epley et al., 2007), individuals desire social interaction, i.e., a sociality motivation, because by nature, they are social beings (Hari et al., 2015). In this context, the perception of empathy is an essential part of human-to-human interaction (Reynolds & Scott, 1999; Wieseke et al., 2012), and CA research shows that users are indulged to assign empathy to CAs that are perceived to be human-like (Pelau et al., 2021), despite that they are not reacting to users' emotions (Clark, 2010; Daher et al., 2020). For instance, in health advising CAs, Daher et al. (2020) reveal that empathic CAs that interact with human-like characteristics, such as showing a more supportive manner, are preferred over advice-only CAs. Similarly, Riek et al. (2009) showed that a CA's human-like characteristics elicit greater empathy in users than mechanical-looking robots. As a result, we expect similar outcomes in the context of organ donations. Against this background, we derive the following hypothesis:

H1: *Perceived anthropomorphism increases the perceived empathy.*

Perceived Usefulness

In IS research, perceived usefulness can be described as the extent to which users think a specific system can improve their ability to perform a particular task (Davis, 1989). In the organ donation context of this study, this means that a CA is useful and informative in the process of getting informed about organ donations. Following the three-factor theory of anthropomorphism (Epley et al., 2007), individuals can rely on anthropocentric knowledge when judging unfamiliar entities or objects, referring to the elicited agent knowledge. This process occurs because the unknown objects trigger knowledge structures that relate to individuals themselves or humans in general (Eyssel et al., 2012). Applying this knowledge makes it easier for humans to navigate and interact with the non-human object (Epley et al., 2007). In the context of CAs, users apply knowledge from human-to-human interactions to the interaction, subjectively helping them communicate with it. Based on the previously outlined conceptualization, the relationship between anthropomorphism and the perceived usefulness of CAs has been reported in the current literature. For example, Stroessner and Benite (2019) reveal that users rated anthropomorphic robots more competent than mechanical ones. Further, in CA research, perceived usefulness was shown to positively affect users' behavioral intention (Gümüş & Çark, 2021). Also, Blut et al. (2021) reveal in a meta-analysis with 108 independent studies that anthropomorphism positively relates to a user's perceived usefulness. Thus, we postulate the following hypothesis:

H2: *Perceived anthropomorphism increases the perceived usefulness.*

Perceived Persuasiveness

Persuasiveness refers to the process of successfully changing users' attitudes and intentions toward a desired state, intended to lead to desired behavior (Lehto et al., 2012). In the context of CAs, perceived persuasion can be understood as achieving the desired outcome after an interaction with a CA (e.g., increasing the intention to donate). Following the ELM (Petty & Cacioppo, 1986) and its conceptualization of the peripheral route (i.e., humans consider factual unrelated cues when being persuaded), we expect in this context, that perceived empathy to effect persuasiveness. In essence, another entity that (appears) to be aware of one's emotions is a positive perception.

This proposition is backed by current literature. For instance, Liu and Sundar (2018) examined the role of empathy in CAs, revealing that users rate empathic CAs more positively than CAs that provide only information in health contexts. Further, de Gennaro et al. (2019) show that, after experiencing social exclusion on social media, empathy in CAs can be effective in producing more favorable moods in users. Additionally, He et al. (2022) find that higher levels of perceived empathy in CAs positively affect motivation to quit smoking, thus persuading users to change their behavioral intention. Therefore, we hypothesize:

H3a: *Perceived empathy increases perceived persuasiveness.*

Similar to perceived empathy, the perceived anthropomorphism of a CA can be expected to drive the perceived persuasion, following the ELM (Petty & Cacioppo, 1986): the perceived anthropomorphism influences users thinking and behavior via the peripheral route (Njenga, 2018). In the literature, various studies can be found that report on the effects of CAs using the ELM (e.g., Seiler & Schär (2021), Rhee & Choi (2020)). For instance, Diederich et al. (2019) showed that perceived anthropomorphism drives persuasion in promoting sustainability beliefs. In addition, a CA that displays (positive) emotions can be perceived as more persuasive than a CA without emotional statements (Adler et al., 2016). Similarly, in the context of COVID-19, Brendel et al. (2022) revealed a positive influence of social presence on perceived persuasion. On this basis, we formulate the following hypothesis:

H3b: *Perceived anthropomorphism increases perceived persuasiveness.*

Further, numerous studies show that usefulness affects a user's behavioral intention and is a strong determinant in influencing users' attitudes toward CA adaption (Brandtzaeg & Følstad, 2017; Zarouali et al., 2018). In this regard, following the ELM, if users perceive the CA as useful, i.e., perceiving the CA as providing a practical benefit, users' cognitive beliefs and attitudes will be triggered through the central route, thereby influencing users' perception of persuasion. In mobile tourism contexts, Kim et al. (2016) disclose that argument quality positively affects users' central route of cognition. Regarding CA literature, Zamri and Idris (2013) show that perceived usefulness is a critical element in driving purchase intention,

which is also reported in other studies (e.g., Gümüş & Çark (2021)). Against this background, we postulate the following hypothesis:

H3c: *Perceived usefulness increases perceived persuasiveness.*

Intention to Donate

The intention to donate is considered a key factor in determining actual donation behavior (Ferguson, 1996; Giles & Cairns, 1995). Regarding this study, we follow established literature that measured the 'intention to act' in different contexts, referring to the prerequisites of actual behavior, as in the intention to donate data (Skatova & Goulding, 2019). In this organ donation context, persuasion can influence users' intentions because it refers to changing individuals' attitudes and beliefs depending on different communication strategies (Braddock & Dillard, 2016; O'Keefe, 2009). Consequently, if a CA successfully persuades users, the resulting behavioral intention is also increased. In CA literature, Schwede et al. (2023) examined different persuasion tactics on the intention to purchase, showing that persuasion can be a key driver in influencing customers' intentions. Similarly, Diederich et al. (2019) demonstrate significant effects of perceived persuasion on users' behavioral beliefs. Therefore, we derive the following hypothesis:

H4: P*erceived persuasiveness increases users' intention to donate.*

Method

This experiment examines the effects of different CA designs (e.g., human-like versus non-human-like) on the intention to become an organ donor via perceived anthropomorphism, perceived empathy, perceived usefulness, and perceived persuasiveness. The following sections will present more details on the sample, task, procedure, and measurements.

Participants

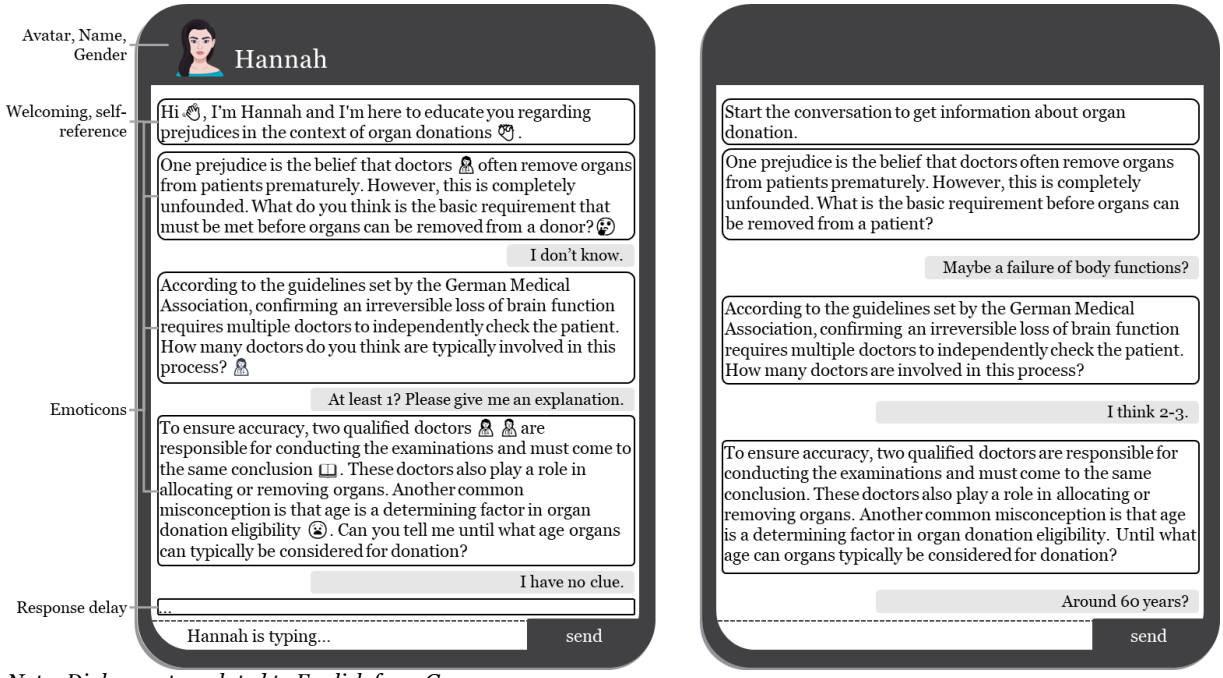
We recruited German participants via the crowd-working platform Clickworker to measure the users' intention to donate because Germany follows an opt-in procedure. This allowed us to examine the direct effects of the CAs' interaction with users who can actively decide whether they want to become donors. Using G*Power, we conducted a prior power analysis with a significance level of 0.05, which revealed that a minimum sample size of 128 participants would be required to achieve a statistical power of 0.80 for detecting a medium effect size (f = 0.50) (Faul et al., 2007). In total, we recruited 137 participants. To ensure the quality of our data, we performed two attention checks (e.g., "Please verify that you read each question carefully and select point 1"), leading to the removal of three participants and a final sample size of 134. On average, participants were 38.6 years old (SD=12.26), and 37,3 % identified as women. The median time for completing the experiment was less than 10 minutes. Each participant received €2,00 reimbursement.

Task and Procedure

For this study, we implemented a structured dialogue, following the example of other recent studies on CA design (e.g., Brendel et al. (2022), Lee et al. (2020)). Before being randomly assigned to one of the treatment groups, participants were directed to a briefing page with information about the experiment (e.g., procedure, tasks, and context). In this briefing, we explicitly informed participants that they will interact with a machine and not a human. After completing three comprehension checks about the concept of this study (e.g., "What is this experiment about?" and "Will the interaction be with a human?"), the participants were directed to the structured dialogue. The interaction process consisted of three distinct steps: (1) greeting the user, (2) sharing information and knowledge related to organ donation, and (3) concluding the conversation. The CAs, implemented via Google Dialogflow, were technically identical in using identical dialogues and training phrases. The CAs had the ability to comprehend and process various phrasings, such as responses to a question regarding organ donation. Further, our CAs were implemented as a responsive web interface that enabled universal access across different devices.

Treatment Design

We employed a between-subject design with differences in the CA design (e.g., human-like versus non-human-like) (see Figure 2). We applied several human-like design cues regarding human-identity, as well as verbal and non-verbal cues (Seeger et al., 2018). For human identity, we used a name (Hannah), an avatar, and gender (female). Our verbal cues were welcoming and self-referencing phrases (e.g., "Hi, I'm Hannah [...]"), and non-verbal cues used emoticons and response delays, which were indicated by three dots at the bottom of the chat interface (similar to Facebook's messenger service). We applied a selection of design cues, following the example of recent studies (e.g., Diederich et al. (2019), Brendel et al. (2022)).



Note: Dialogues translated to English from German

Figure 2. CA interface with human-like design (left) and without (right)

Measures

The survey included numerous constructs and items from established literature that were all measured on a 7-point Likert scale, ranging from 1 ("fully disagree") to 7 ("strongly agree"). We measured perceived anthropomorphism (Gefen & Straub, 1997), perceived empathy (Meyer-Waarden et al., 2020), perceived usefulness (Gefen & Straub, 2004; McKinney et al., 2002), persuasiveness (Lehto et al., 2012), and intention to donate (Conner et al., 2013; Janahi et al., 2018; Sura et al., 2017). In this regard, the term intention to donate is used interchangeably with a user's intention to become a donor, which is consistent in the language among other studies (e.g., El-Menyar et al. (2020), Doyle et al. (2019), Fan et al. (2022)). We evaluated the constructs and items in all our treatments regarding factor loadings, Cronbach's α, composite reliability (CR), and average variance extracted (AVE). Because every factor loading was >.60, no item had to be removed (Gefen & Straub, 2005). Further, all constructs demonstrated sufficient composite reliability (CR >.70) and AVE >.50 (Nunally, 1970), as well as Cronbach's α > .50 (DeVellis & Thorpe, 2021). Table 1 represents a comprehensive overview of all our constructs and items, including their Cronbach's α, CR, and AVE.

Constructs and Items	Mean	SD	Loadings
Perceived Anthropomorphism (Cronbach's α = .880, CR = .926, AVE = .806) (Gefen & Straub, 1997)			
I felt a sense of human contact with the chatbot.	4.128	1.609	.866
I felt a sense of human warmth with the chatbot.	3.198	1.684	.908
I felt a sense of sociability with the chatbot.	3.302	1.709	.918
Perceived Empathy (Cronbach's α = .839, CR = .903, AVE = .756) (adapted from Meyer-Waarden et al. (2020))			
The chatbot is sympathetic.	4.477	1.431	.882
The chatbot is honest.	4.763	1.310	.830
The chatbot is attentive.	4.376	1.370	.896
Perceived Usefulness (Cronbach's α = .894, CR = .926, AVE = .758) (adapted from Gefen & Straub (2004) and McKinney et al. (2002))			
I think this chatbot is useful for breaking mind barriers about organ donation.	4.879	1.413	.890
I think this chatbot provides valuable information about organ donation.	4.437	1.520	.845
I think this chatbot is convenient for getting information about organ donation.	5.101	1.447	.884
I think this chatbot can improve awareness of organ donation.	5.116	1.370	.863
Perceived Persuasiveness (Cronbach's α = .895, CR = .934, AVE = .826) (adapted from Lehto et al. (2012))			
The chatbot made me think about registering for organ donation.	4.042	1.633	.904
The chatbot is personally relevant to me.	3.667	1.597	.911
The chatbot makes me reconsider the way I think about organ donation.	4.570	1.620	.912
Intention to donate (Cronbach's α = .868, CR = .911, AVE = .721) (adapted from Conner et al. (2013), Sura et al. (2017), and Janahi et al. (2018))			
I intend to sign a donor card in the near future.	3.922	1.661	.897
I am confident that I can overcome the obstacles that would prevent me from signing a donor card in the near future.	4.328	1.639	.900
If I sign a donor card in the near future, I would be proud.	4.272	1.627	.860
Donating organs would allow a part of myself to live on after I die.	4.000	1.832	.727
CR = Composite Reliability, AVE = Average Variance Extracted, SD= Standard Deviation | Note that all items were translated to German for the survey.			

Table 1. Measurement of Constructs and Items

In addition, convergent validity is given due to AVEs greater than > .50 (Hair et al., 2010) (see Table 2). Further, because the square roots of the AVEs surpass the correlations between the constructs, the Fornell-Larcker Criterion is met, and discriminant validity is given (Fornell & Larcker, 1981). As a result, our research model shows sufficient levels of reliability and validity.

Constructs	1	2	3	4	5	6
1. Human-like	n.a.					
2. Intention to donate	-.013	**.849**				
3. Perceived Empathy	.231	.381	**.870**			
4. Perceived Anthropomorphism	.238	.386	.710	**.898**		
5. Perceived Usefulness	.141	.537	.697	.601	**.871**	
6. Perceived Persuasion	.037	.638	.544	.526	.702	**.909**
n.a. = not applicable						

Table 2. Inter-Construct Correlations and Validities

Results

To test whether the participants were aware of the different treatment conditions (human-like vs. non-human-like), we performed a two-sample t-test *("Did you notice that the CA had any human-like representations (e.g., an avatar or a name)?")*. The results showed a significant p-value ($p < .001$),

indicating that the users perceived a difference in our treatments. Further, the effect of the human-like treatment on perceived anthropomorphism was significant, at $p < .005$.

To test our derived hypothesis regarding the relationships between a human-like CA and perceived anthropomorphism, perceived empathy, perceived usefulness, perceived persuasion, and the intention to donate, we applied the partial least square (PLS) regression method using Smart PLS 4.0.0.9. PLS is widely applied in IS research (Marcoulides & Saunders, 2006). For our research design, we chose the structural equation model due to the method's consideration of measurement errors and our theoretical constructs' multidimensional structure (Bagozzi & Yi, 1988). To determine the significance of the path coefficients, we used the bootstrapping resampling method with 5,000 samples, as suggested by Chin (1998). Figure 3 presents the results, including the corresponding relationships and R^2-values.

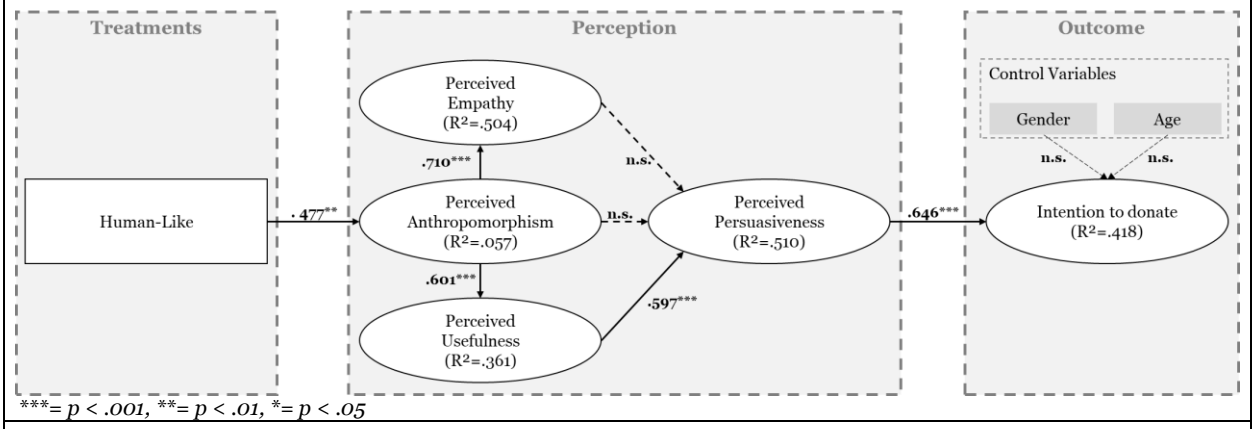


Figure 3. PLS Structural Model (N=134)

The results of our experiment show that the human-like design significantly impacts perceived anthropomorphism in users ($\beta = .477$, $p = 004$). Further, perceived anthropomorphism positively impacts perceived empathy ($\beta = .710$, $p < .001$), supporting **H1**. Additionally, perceived anthropomorphism also positively influences perceived usefulness, confirming **H2** ($\beta = .601$, $p < .001$). In contrast, we found no support for hypothesis **H3a** ($\beta = .019$, $p = .886$). Similarly, our results do not support **H3b**, referring to a positive relationship between perceived anthropomorphism on perceived persuasiveness ($\beta = .154$, $p = .202$). However, in the context of organ donation, we find support that the perceived usefulness increases the perceived persuasion ($\beta = .597$, $p < .001$), thus confirming **H3c**. Finally, our results show that perceived persuasiveness significantly influences the intention to donate ($\beta = .646$, $p < .001$), supporting **H4**. Table 3 provides an overview of all our hypotheses and findings regarding the corresponding relationships.

Regarding our R^2-values and according to Cohen (1988), our results indicate a small power ($.02 < x < .13$) for perceived anthropomorphism ($R^2 = .057$), and large powers (>.26) for perceived empathy ($R^2 = .504$), perceived usefulness ($R^2 = .361$), perceived intention to donate ($R^2 = .418$).

Further, perceived anthropomorphism has no direct effect on perceived persuasion. Thus, we calculated the specific indirect effect of perceived anthropomorphism on the intention to donate (perceived anthropomorphism → perceived usefulness → perceived persuasion → intention to donate, $\beta = .229$, $p < .001$), showing a mediation of perceived anthropomorphism through perceived usefulness.

Hyp.	Relationship	β-value	t-value	p-value	Support
-	Human-like → Perceived Anthropomorphism	.477	2.876	.004**	**Supported**
H1	Perceived Anthropomorphism → Perceived Empathy	.710	17.339	< .001***	**Supported**
H2	Perceived Anthropomorphism → Perceived Usefulness	.601	10.229	< .001***	**Supported**
H3a	Perceived Empathy → Perceived Persuasiveness	.019	0.143	.886	Not supported
H3b	Perceived Anthropomorphism → Perceived Persuasiveness	.154	1.276	.202	Not supported
H3c	Perceived Usefulness → Perceived Persuasiveness	.597	5.711	< .001***	**Supported**
H4	Perceived Persuasiveness → Intention to donate	.646	11.851	< .001***	**Supported**

*Note all β-values are standardized | ***= p < .001, **= p < .01, *= p < .05*

Table 3. Results of Hypothesis Tests

Discussion

This study examined the effects of a human-like design CA on the intention to donate organs from a user's cognitive perspective based on the ELM (Petty & Cacioppo, 1986), CASA paradigm (Nass et al., 1994), and three-factor theory of anthropomorphism (Epley et al., 2007). We extend the increasing literature on investigating the behavioral impact on CAs by showing that perceived anthropomorphism does not have a direct effect on perceived persuasion and perceived empathy but is explained via the influence of perceived usefulness. Based on these findings and CAs in the context of organ donation, we outline numerous theoretical and practical implications and provide future research avenues.

Implications for Theory and Future Research

Compared to decisions on any other form of donation (e.g., donating money for charity), the decision-making process of organ donation is rather complex and considered to be a highly personal and emotional concern that is influenced by numerous factors (e.g., personal beliefs, sociographic status, culture) (El-Menyar et al., 2020). Organ donation is an invasive topic because it involves the potential infringement of bodily integrity, making it a highly emotional and sensitive matter (Morgan & Miller, 2003). In this regard, our results reveal that persuasion is driven by perceived usefulness rather than perceived anthropomorphism and perceived empathy. However, perceived anthropomorphism is fully mediated through perceived usefulness and perceived persuasion. This implies, regarding the ELM (Petty & Cacioppo, 1986), that users' underlying mechanisms of being persuaded are driven by systematic, rational judgments, i.e., they are influenced via the central route rather than being persuaded by peripheral cues. In other words, our results suggest that anthropomorphism does not directly impact users' persuasion; rather, it affects persuasion via the evaluation of perceived usefulness, indicating users' preference for fact-based judgments in the context of organ donation. Further, regarding the three-factor theory of anthropomorphism (Epley et al., 2007), this study highlights that users confirm the effects of elicited agent knowledge and effectance motivation by demonstrating that users perceive this CA as empathic and useful. Consequently, we suggest future research should examine how users elaborate on information gained in CA interaction regarding different donation contexts. For instance, Maiberger et al. (2023) recently showed that, in contrast to previous results in the literature, users' emotional-arousal and cognitive routes (central vs. emotional) are simultaneously influenced, rather than one or the other being activated.

Further, we enhance the IS in healthcare research stream regarding the growing popularity of investigating behavioral effects of CAs on users (Kamita et al., 2019; Meier et al., 2019; Pereira & Díaz, 2019) by showing that anthropomorphism itself is not decisive for perceiving a CA as persuasive. Rather, it is the secondary effect of perceived anthropomorphism on perceived usefulness that increases users' perceived persuasion. In this regard, we expand on previous studies by examining both the dual impacts of anthropomorphism and the influence of a CAs appearance on users' attitudes and decisions regarding organ donation. By

viewing our results through a cognitive lens, we find that the mere presence of anthropomorphism is not enough to persuade users and ultimately impact the purchase decision. Based on this finding, researchers could be able to build on theories established in behavioral science, such as the prospect theory (Kahneman & Tversky, 1979), which argues that individuals' decision-making process is influenced by their attitudes towards risk and gain or loss. In this regard, researchers could examine how CAs may affect users', i.e. risk perceptions, and how these influence users' intention to donate. For example, researchers can examine how messages in CAs should be framed and how the type of framing (e.g., loss vs. gain framing) will impact the users' intention to donate.

Lastly, we would like to address the double-edged sword of persuasion because enhancing a CAs technological as well as anthropomorphic capabilities can influence a user's behavioral beliefs and attributes without the users being aware of their active decision-making process. Specifically, responding to anthropomorphic cues is a subconscious and unthinking process (Y. Kim & Sundar, 2012). In this regard, native advertising (e.g., when ads are seamlessly placed into the content of a website) becomes increasingly popular and dangerous because users' free will and choices are manipulated (Taylor, 2017). Therefore, the indirect and direct effects of persuasion must be carefully examined to overcome immoral outcomes. Thus, regarding CAs, we emphasize the importance of engaging with ethical principles, thereby opening new research avenues, especially for sensitive health topics. For example, in a similar context, considering digital nudging, Lembcke et al. (2019) advised attention to the ethical considerations in developing nudge interventions.

Implications for Practice

In the context of organ donation, this study's results indicate that two mechanisms influence users' intended cognitive behavior. First, users seek information rather than emotional statements when intending to donate. Thus, practitioners should provide valuable knowledge so users can make informed decisions. Second, the human-like design affects users' perception of usefulness, leading to higher rates of intention to comply. Hence, practitioners should make use of anthropomorphic cues to adjust users' perceptions. Nonetheless, applying CAs with human-like design elements should be done cautiously due to their ability to influence users' decision-making processes, possibly leading to unethical decisions.

Limitations

Even though our results have important implications, we are aware that this study has several limitations. First, although we designed it in accordance with recent research, the human-like design of the CAs remains a complex task. Hence, depending on the chosen anthropomorphic cues, future research needs to investigate different variations and quantities to discover how these cues condition users' behavior. Second, our sample is solely based on a crowd worker population and is limited to geographically since we recruited only participants from German-speaking countries. Last, we showed that the intention to donate could be increased, yet did not consider means of controlling the actual behavior.

Conclusion

Worldwide, the demand for organ donations remains a pressing issue, which has brought increased awareness in practice and research. To address this challenge, we conducted a between-subject experiment with a CA to investigate the relationships between perceived anthropomorphism and users' intention to donate via three routes. Our results reveal that the impact of perceived anthropomorphism on users' intention to donate is not through direct effects on perceived persuasion or indirectly via perceived empathy. Instead, it is mediated by the CA's perceived usefulness. In the context of organ donation, this study emphasizes that users' cognitive response relies on factual rather than emotional-based persuasion.

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