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Jung, Ji Youn; Bozzon, Alessandro

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Are Female Chatbots More Empathic? - Discussing Gendered Conversational Agent through Empathic Design

Ji-Youn Jung

J.Y.Jung@student.tudelft.nl

Knowledge and Intelligence Design,
Delft University of Technology
The Netherlands

Alessandro Bozzon

a.bozzon@tudelft.nl

Knowledge and Intelligence Design,
Delft University of Technology
The Netherlands

ABSTRACT

Studies have shown that feminine chatbots are perceived as warmer (e.g., likable, friendly) and imbue more humanness to a machine than masculine or gender-androgynous chatbots. As chatbots are being widely deployed in various empathic contexts (e.g., revealing sensitive personal information or facilitating charity donations), how to design the gender of chatbots remains a critical question in the empathic design community. Should designers assign feminine identities to chatbots to improve empathic reactions? In this position paper, we explore the tension between designing empathic agents and the gender assignment of chatbots and how they can relate to the design of the metaphor of the chatbots. After analyzing the problem, we discuss the possible design strategy and their trade-offs. We conclude with possible future work directions that could inform CA gender design that elicits user empathy.

CCS CONCEPTS

• **Human-centered computing** → *Human computer interaction (HCI)*; • **Social and professional topics** → **Gender**.

KEYWORDS

conversational agents, gender, empathy-centric design

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1 INTRODUCTION

Empowered by the advancement of Natural Language Processing (NLP) technology, conversational agents (CA) are becoming ubiquitous in our everyday lives. Examples of CAs include widespread voice assistants like Amazon's Alexa or Google Assistant, social companion bots like Pandorabot's Kuki, and customer service chatbots. While CA's capabilities and scope have considerable breadth [23], we focus on text-based task-oriented chatbots in this paper. Supported by the rapid growth of messaging applications

(e.g., Slack, Whatsapp, and Messenger), chatbots are deployed in various contexts ranging from education [8, 46], healthcare [20, 48], to customer care [26, 53]. The recent advent of chatbots like OpenAI's ChatGPT implies how chatbots can continue to gain ground in our daily lives in assisting numerous tasks, from generating research articles to giving instructions in computational coding [50].

Empathy is manifested in nuanced ways through affective, cognitive, and behavioral aspects [25]. While humans and animals (even rats [3]) can show empathy to others, computers cannot be truly empathic to human users as they do not have emotions. However, CAs can *simulate* and trigger empathy [41] as users apply human-human social rules when interacting with them in a conversational manner [39]. For example, chatbots can mimic empathy through sentiment analysis, detect users' emotions, and act accordingly [26]. Moreover, chatbots can simulate emotions and trigger empathy in users. For example, recent research has shown how robots simulating emotions (i.e., sadness) were less likely to be punished by people for their wrongdoings [33], suggesting that people were more empathic to the emotional robots. Similarly, in a sensitive personal information revelation context, chatbots expressing sympathy and empathy were favored over unemotional chatbots, especially when the users were skeptical of machines' social abilities [35].

In this regard, does CAs with feminine quality simulate and trigger empathy better in the human-chatbot interaction compared to chatbots perceived as other genders? We see a clear dominance of CAs with feminine identities in our lives. For example, Feine et al. analyzed 1,375 chatbots and found around 77% were classified as female by default or an only option [18]. A recent study has explained this proliferation of feminine agents as people's (un)conscious attempt to make machines appear "more human [4]." In their paper, they argued how female bots are intuitively favored over male bots because they are judged as warmer and more likely to experience emotions. Along with gender stereotype that exists in our society [14, 15, 22], female CAs have been considered to be warmer and higher in experience, male agents to be more competent and high in agency, and gender-androgynous agents to be unlikable as they create categorical tension to users [17, 36, 40]. And these two axes of warmth-experience and competence-agency are considered two fundamental dimensions of social judgment (i.e., "Big Two" dimensions) [2, 19].

However, the ethical implication of the proliferation of female CAs has been fiercely debated in society as computers may reinforce the gender stereotype and existing power structure [12, 24, 40, 44, 49]. A recent UNESCO report highlighted how such phenomena reflects and intensifies people's expectation towards woman as "subservient" assistants rather than decision makers [52]. While



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this debate has decades of history in the HCI community, most of the research often frames this problem as a dichotomy of choosing one gender or the other without considering how gender could be manifested in a nuanced way through different metaphors. Without considering this, we risk being in an echo chamber of arguing one is either (1) causing social harm by facilitating gender stereotypes or (2) losing a chance to foster engaging and empathic experiences with the chatbots.

In this paper, we discuss the conflicts between making empathic chatbots and assigning gender to them by reviewing previous findings. We argue that the EmpathiCH community can benefit from the awareness of metaphors that they imbue on their empathic chatbots. We also examine possible ways to tackle this problem at hand and design considerations for these options. Finally, we propose future work directions that can inform CAs that facilitate meaningful empathic human-chatbot interactions.

2 EMPATHIC CHATBOTS, GENDER, AND METAPHOR

2.1 Empathic Chatbots

Empathy has been explored in various areas of human-chatbot interaction while generating mixed result. For example, empathic chatbots have been investigated in the self-disclosure context to facilitate users to reveal sensitive information that needs to be shared more easily. One of the most widely investigated areas is chatbots for soliciting self-disclosure in psychotherapy. Self-disclosure of stigmatic conditions or traumatic experiences has numerous benefits in achieving mental well-being [13, 16, 27]. However, people experiencing psychological instability are often discouraged from getting professional help because of financial burdens, time and location problems, and the emotional burden of revealing their sensitive emotions to other human beings [16]. To address these challenges, chatbots have been suggested to lower barriers to people by being physically accessible and reducing the pressure to self-disclose. However, recent research suggests that a chatbot's empathic behavior does not directly influence users' self-disclosure, but it only mediates the self-disclose by increasing social presence of the chatbot [32].

Similarly, eliciting monetary donation to charity through an empathic chatbot has been explored. However, in such cases, people perceived chatbots showing human emotions through empathy as an attempt to deceive them, leading to psychological aversion [42]. Nevertheless, in another study in human-robot interaction, male participants attributed higher trust to an agent with a female voice than to a male agent in a donation context, while female participants did not show statistically significant different reactions [45].

Empathic behavior in an online gaming format led to increased trustworthiness, likeability, and perceived caring and support [5, 10]. Additionally, it increased social presence and engagement [34]. Moreover, CAs showing apologetic or regretful behavior seem to increase user trust and acceptance. People tend to punish agents less when the CA showed sadness after their wrongdoings [33]. Moreover, another research reported that people trusted and accepted CAs who apologized for their mistakes more than the CAs who did not show apologetic behavior in collaborative railroad construction game [47].

In conclusion, designing CAs to simulate empathic behavior is a context-dependent design choice. In cases where designers want to trigger self-disclosure of psychological instability, they should be aware how social presence of CAs influence such behavior more than the chatbots' empathic behavior itself. However as empathic behavior can increase the social presence, they should adopt it wisely. Empathic behavior in gaming context seems like a beneficial design choice. Especially when chatbots make a mistake, it seems like making agents to apologize their users could increase trust and acceptance. In cases where users are asked for monetary expenses, empathic behavior only backfires in building trust. In such cases, showing no emotional or empathic behavior could earn users' trust better.

2.2 Gender Stereotype and Conversational Agents

Adopting the Big Two dimension, an empathic chatbot will signal a higher warmth-experience as it will simulate affective behavior. Recent findings suggest that chatbots signaling high warmth can be "always beneficial" [30] as it increases the intention to adopt, desire to cooperate, and usability of the agents. In the same study, chatbots showing higher competence led to negative results in intention to adopt and desire to cooperate hypothetically because they did not match users' high expectations of chatbots' competency. Such effect of warmth showed primacy over competency where people still preferred systems with high warmth even when they were overly deficient in their competence [21].

Considering this, it is interesting to see how female chatbots are stereotypically perceived as warmer than male chatbots. In society, there is a gender stereotype that females are perceived to excel at domains that require high empathy and feelings. In contrast, males are perceived to perform well in contexts involving high competence and agency. As people anthropomorphize chatbots through communicating with them in human language, it was argued that people apply their gender stereotype unconsciously to the chatbots even when they consciously understand that computers do not have gender [39, 40]. However, some findings report how female chatbots were perceived as more human than males, eliciting more trust, credibility, perceived uniqueness of treatment, and positive attitudes [4] while male chatbots did not elicit higher perceived competence. This result leaves us to wonder if we should continue designing chatbots in female form to ensure a more pleasant user experience, although at the expense of reinforcing gender stereotypes.

However, as discussed in the Introduction, framing this problem as choosing one gender over the other will just leave us in a dilemmatic dichotomy. When we think about it, a wide spectrum of warmth and competence can be expressed within one gender. For example, a metaphor of a *grandma* will be perceived as high in warmth but low in competence, while a metaphor of *teenage girl* could lead to low in warmth but high in competence [7]. Moreover, real-world examples of chatbots also show that this is the case. For example, Microsoft's Xiaoice resulted in gathering millions of monthly users, while the very same Microsoft's Tay was discontinued within 16 hours after its launch after attracting troll

interactions [30]. Both Xiaoice and Tay can be perceived as female, but they elicited very different reactions, possibly due to the different ways that they introduced themselves. For example, Tay explained itself as the "AI with zero chill" while Xiaoice marketed itself as a "sympathetic ear" [37].

Therefore, it is arguably more important to focus on the metaphor that we assign to our chatbots than the gender of the agent. In the following section, we explain the concept of metaphor and recent work investigating the impact of agent metaphors on user behaviors.

2.3 Designing Metaphors of Chatbots

According to the seminal book "Metaphors We Live By" by Lakoff and Johnson, people's conceptual system is fundamentally metaphorical [31]. In other words, when people try to understand abstract concepts, they often bring their knowledge from other, more tangible domains for them to grasp. For example, according to the "*time is money*," people understand the concept of time (target) in terms of money (source) and refer to time as *spending* time, *wasting* time, or *run out of* time.

Applying metaphor to explain the computing system's ability is as long as the history of the computer itself [9]. One of the most famous examples includes the "*Computer is a Desktop*" metaphor, which helped users understand the graphical user interface of personal computers in terms of their workspace. Therefore, people could make files, write documents, place them in folders, or throw them away in a trash bin.

There is an emerging space where researchers investigate how metaphors impact when attached to chatbots. Namely, Khadpe et al. showed how assigning chatbots with high warmth metaphors is always beneficial in increasing the desire to cooperate, intention to adopt, and perceived usability [30]. Moreover, they also reported how metaphors guide user expectations and lead to significant differences in actual usage behavior. Similarly, Jung et al. [28] investigated the effect of attaching non-human metaphors to chatbots by adopting the Great Chain of Being framework. They also showed how different metaphors used for chatbots resulted in significant differences in worker engagement and intrinsic motivation.

However, whether metaphor will impact significant differences when chatbots trigger or simulate empathy is still unclear. Will metaphors signaling high warmth and experience persist as a better choice when they do not show empathic behavior? On the other hand, will metaphors with low warmth and experience be considered deceptive when they assert that they have an empathic ability? Future works can explore this area.

3 DESIGN STRATEGIES AND FUTURE WORK

There are a few design strategies that CA designers can take to mediate the problem of making their chatbot vulnerable to gender stereotyping. The first is to remove a chatbot's gender markers as much as possible. This choice also comes with making the bot less anthropomorphic through ways like not endowing the bot with human-form avatars or names. An example of chatbots using such a strategy is OpenAI's ChatGPT, which response to whether it has a gender by explaining that they are just a language model with no biological characteristics. Moreover, the bot's avatar is only a green

abstract logo without an anthropomorphic name (e.g., Alexa or Mitsuku). Less anthropomorphic design choice has been shown to lower the risks of bad customer satisfaction, overall firm evaluation, and purchase intention when a user is angry. At the same time, anthropomorphic design features in agents did not affect users in a non-angry emotional state [11]. However, in the voice user interface context, making the CA gender-androgynous has been reported to receive poor usability, likeability, trust, and intention to adopt [36, 40]. Yet, applying such results directly to text-based chatbots is hard because only a handful of research has reported the negative consequences of using gender-androgynous design. As the characteristics of mediums like voice can more easily trigger innate social reactions in people than written text, chatbots might hypothetically be able to sidestep the negative consequences of less anthropomorphic and gender-androgynous designs. Therefore, future works can ask the following research question through an empirical study: *What are the trade-offs of gender androgynous text-based task-oriented empathic chatbots compared to the gendered chatbots regarding usability, user engagement, likeability, trust, and intention to adopt?*

The second strategy is trying to introduce more male chatbots with metaphors signaling high warmth and experience. In this strategy, we do not try to avoid our bots having gender, as the gender stereotype is a deeply innate human quality that gets activated (un)consciously. Research reported how gender stereotypes emerge in verbal and written communication [38], and how we can (un)consciously infer the gender of the author based on a plain text [6]. Moreover, even after some deliberate attempts to make an agent gender-neutral, people still assign a gender to them, implying how gender stereotyping is something that we cannot avoid [40]. Additionally, anthropomorphic design has shown to provide consistent benefits to users in increasing performance expectancy [43], and engagement [29], and reinforcing brand reputation [1]. Furthermore, anthropomorphic design increases the chances of guiding users to categorize chatbots in a certain gender category. Therefore, to incorporate both the benefit of gendering chatbots and preventing the reinforcing of gender stereotypes through chatbots, future work can investigate whether male chatbots can be as empathic as female chatbots by manipulating their warmth-experience level. In this regard, future works can ask the following questions: *To what extent can text-based empathic chatbots with male gender cues signal higher warmth and experience when attached with high warmth metaphors than female chatbots?*

The third strategy can make the chatbot female while balancing the societal and ethical risk of reinforcing gender stereotypes. For example, a female chatbot can be assertive when they experience abusive comments or sexualization from the users [51]. Notably, Apple's Siri has changed their reaction to such verbal abuse after some public debate around it. Not until recently, Siri used to reply in flirty and provocative ways to sexualization [52]. For example, when a user tells Siri, "You're hot," it used to reply, "You say that to all the virtual assistants?" and when they say, "You're a slut," it says, "I'd blush if I could." However, Apple changed Siri's reaction, and now it reacts in non-provocative ways to those comments. In this regard, future work can ask the following research question: *What strategies can feminine chatbots take to show assertiveness to users' abusive behavior in empathic contexts?*

It is difficult to give a clear answer to this complex and nuanced problem of how we can design empathic chatbots with careful consideration of their gender design in this paper. However, we would like to increase awareness and call upon the EmpathiCH research community to investigate further the consequences of designing for human-chatbot empathy. Specifically, we ask researchers to consider how designing for empathic chatbots could unintentionally guide designers to imbue female identity towards chatbots, adding to the proliferation of feminine agents in everyday lives. While the consequences are still not fully known, hypothetically, it could develop harmful mental models of agents in people and reinforce gender stereotypes in society.

4 CONCLUSION

To elicit an experience that triggers empathy in human-chatbot interaction, it is essential to design the nuance of the chatbot's behavior and social identity. We see a clear proliferation of the feminine identity of chatbots in the market, being chosen for their ability to shape expectations of being more warm and empathic. However, as numerous concerning voices argue, it may cause social harm by reinforcing the gender stereotype of females taking assistive roles. In this paper, we argue how empathy designers should bring metaphor into this dilemmatic dichotomy and build a more nuanced layer in understanding the manifestation of gender. While we do not give any specific direction or evidence on how to do it, we raise awareness in the EmpathiCH community and suggest several future research directions for solving this problem.

REFERENCES

- [1] Jennifer Aaker, Kathleen D Vohs, and Cassie Mogilner. 2010. Nonprofits are seen as warm and for-profits as competent: Firm stereotypes matter. *Journal of Consumer Research* 37, 2 (2010), 224–237.
- [2] Andrea E Abele, Nicole Hauke, Kim Peters, Eva Louvet, Aleksandra Szymkow, and Yanping Duan. 2016. Facets of the fundamental content dimensions: Agency with competence and assertiveness—Communion with warmth and morality. *Frontiers in psychology* 7 (2016), 1810.
- [3] Inbal Ben-Ami Bartal, Jean Decety, and Peggy Mason. 2011. Empathy and pro-social behavior in rats. *Science* 334, 6061 (2011), 1427–1430.
- [4] Sylvie Borau, Tobias Otterbring, Sandra Laporte, and Samuel Fosso Wamba. 2021. The most human bot: Female gendering increases humanness perceptions of bots and acceptance of AI. *Psychology & Marketing* 38, 7 (2021), 1052–1068.
- [5] Scott Brave, Clifford Nass, and Kevin Hutchinson. 2005. Computers that care: investigating the effects of orientation of emotion exhibited by an embodied computer agent. *International journal of human-computer studies* 62, 2 (2005), 161–178.
- [6] Na Cheng, Rajarathnam Chandramouli, and KP Subbalakshmi. 2011. Author gender identification from text. *Digital investigation* 8, 1 (2011), 78–88.
- [7] Mina Cikara, Rachel A Farnsworth, Lasana T Harris, and Susan T Fiske. 2010. On the wrong side of the trolley track: Neural correlates of relative social valuation. *Social cognitive and affective neuroscience* 5, 4 (2010), 404–413.
- [8] Fabio Clarizia, Francesco Colace, Marco Lombardi, Francesco Pascale, and Domenico Santaniello. 2018. Chatbot: An education support system for student. In *Cyberspace Safety and Security: 10th International Symposium, CSS 2018, Amalfi, Italy, October 29–31, 2018, Proceedings* 10. Springer, 291–302.
- [9] Timothy R Colburn and Gary M Shute. 2008. Metaphor in computer science. *Journal of applied logic* 6, 4 (2008), 526–533.
- [10] Henriette Cramer, Jorrit Goddijn, Bob Wielinga, and Vanessa Evers. 2010. Effects of (in) accurate empathy and situational valence on attitudes towards robots. In *2010 5th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*. IEEE, 141–142.
- [11] Cammy Crolic, Felipe Thomaz, Rhonda Hadi, and Andrew T Stephen. 2022. Blame the bot: anthropomorphism and anger in customer-chatbot interactions. *Journal of Marketing* 86, 1 (2022), 132–148.
- [12] Andreea Danielescu. 2020. Eschewing gender stereotypes in voice assistants to promote inclusion. In *Proceedings of the 2nd conference on conversational user interfaces*. 1–3.
- [13] Munmun De Choudhury and Sushovan De. 2014. Mental health discourse on reddit: Self-disclosure, social support, and anonymity. In *Proceedings of the international AAAI conference on web and social media*, Vol. 8. 71–80.
- [14] Alice H Eagly. 2013. *Sex differences in social behavior: A social-role interpretation*. Psychology Press.
- [15] Alice H Eagly and Antonio Mladinic. 1989. Gender stereotypes and attitudes toward women and men. *Personality and social psychology bulletin* 15, 4 (1989), 543–558.
- [16] Sindhu Kiranmai Ernala, Asra F Rizvi, Michael L Birnbaum, John M Kane, and Munmun De Choudhury. 2017. Linguistic markers indicating therapeutic outcomes of social media disclosures of schizophrenia. *Proceedings of the ACM on Human-Computer Interaction* 1, CSCW (2017), 1–27.
- [17] Friederike Eysel and Frank Hegel. 2012. (s) he's got the look: Gender stereotyping of robots 1. *Journal of Applied Social Psychology* 42, 9 (2012), 2213–2230.
- [18] Jasper Feine, Ulrich Gnewuch, Stefan Morana, and Alexander Maedche. 2019. Gender bias in chatbot design. In *International Workshop on Chatbot Research and Design*. Springer, 79–93.
- [19] Susan T Fiske, Amy JC Cuddy, Peter Glick, and Jun Xu. 2018. A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. In *Social cognition*. Routledge, 162–214.
- [20] Kathleen Kara Fitzpatrick, Alison Darcy, and Molly Vierhile. 2017. Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): a randomized controlled trial. *JMIR mental health* 4, 2 (2017), e7785.
- [21] Zohar Gilad, Ofra Amir, and Liat Levontin. 2021. The effects of warmth and competence perceptions on users' choice of an AI system. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. 1–13.
- [22] Peter Glick and Susan T Fiske. 1999. Sexism and other "isms": Independence, status, and the ambivalent content of stereotypes. (1999).
- [23] Jonathan Grudin and Richard Jacques. 2019. Chatbots, humbots, and the quest for artificial general intelligence. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–11.
- [24] Charles Hannon. 2016. Gender and status in voice user interfaces. *Interactions* 23, 3 (2016), 34–37.
- [25] Justin L Hess and Nicholas D Fila. 2016. The manifestation of empathy within design: findings from a service-learning course. *CoDesign* 12, 1-2 (2016), 93–111.
- [26] Tianran Hu, Anbang Xu, Zhe Liu, Quanzeng You, Yufan Guo, Vibha Sinha, Jiebo Luo, and Rama Akkiraju. 2018. Touch your heart: A tone-aware chatbot for customer care on social media. In *Proceedings of the 2018 CHI conference on human factors in computing systems*. 1–12.
- [27] Adam N Joinson, Carina B Paine, et al. 2007. Self-disclosure, privacy and the Internet. *The Oxford handbook of Internet psychology* 2374252 (2007), 237–252.
- [28] Ji-Youn Jung, Sihang Qiu, Alessandro Bozzon, and Ujwal Gadiraju. 2022. Great Chain of Agents: The Role of Metaphorical Representation of Agents in Conversational Crowdsourcing. In *CHI Conference on Human Factors in Computing Systems*. 1–22.
- [29] Nicolas Kervyn, Susan T Fiske, and Chris Malone. 2012. Brands as intentional agents framework: How perceived intentions and ability can map brand perception. *Journal of Consumer Psychology* 22, 2 (2012), 166–176.
- [30] Pranav Khadpe, Ranjay Krishna, Li Fei-Fei, Jeffrey T Hancock, and Michael S Bernstein. 2020. Conceptual metaphors impact perceptions of human-ai collaboration. *Proceedings of the ACM on Human-Computer Interaction* 4, CSCW2 (2020), 1–26.
- [31] George Lakoff and Mark Johnson. 2008. *Metaphors we live by*. University of Chicago press.
- [32] Jieon Lee, Daeho Lee, and Jae-gil Lee. 2022. Influence of Rapport and Social Presence with an AI Psychotherapy Chatbot on Users' Self-Disclosure. *International Journal of Human-Computer Interaction* (2022), 1–12.
- [33] Minha Lee, Peter Ruijten, Lily Frank, Yvonne de Kort, and Wijnand IJsselstein. 2021. People may punish, but not blame robots. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*. 1–11.
- [34] Iolanda Leite, Ginevra Castellano, André Pereira, Carlos Martinho, and Ana Paiva. 2014. Empathic robots for long-term interaction: evaluating social presence, engagement and perceived support in children. *International Journal of Social Robotics* 6 (2014), 329–341.
- [35] Bingjie Liu and S Shyam Sundar. 2018. Should machines express sympathy and empathy? Experiments with a health advice chatbot. *Cyberpsychology, Behavior, and Social Networking* 21, 10 (2018), 625–636.
- [36] Irene Lopatovska, Diedre Brown, and Elena Korshakova. 2022. Contextual Perceptions of Feminine-, Masculine-and Gender-Ambiguous-Sounding Conversational Agents. In *International Conference on Information*. Springer, 459–480.
- [37] John Markoff and Paul Mozur. 2015. For sympathetic ear, more chinese turn to smartphone program. *NY Times* (2015).
- [38] Michela Menegatti and Monica Rubini. 2017. Gender bias and sexism in language. In *Oxford research encyclopedia of communication*.
- [39] Clifford Nass, Jonathan Steuer, and Ellen R Tauber. 1994. Computers are social actors. In *Proceedings of the SIGCHI conference on Human factors in computing systems*. 72–78.

- [40] Clifford Ivar Nass and Scott Brave. 2005. *Wired for speech: How voice activates and advances the human-computer relationship*. MIT press Cambridge.
- [41] Ana Paiva, Iolanda Leite, Hana Boukricha, and Ipke Wachsmuth. 2017. Empathy in virtual agents and robots: A survey. *ACM Transactions on Interactive Intelligent Systems (TiiS)* 7, 3 (2017), 1–40.
- [42] Gain Park, Myungok Chris Yim, Jiyun Chung, and Seyoung Lee. 2022. Effect of AI chatbot empathy and identity disclosure on willingness to donate: the mediation of humanness and social presence. *Behaviour & Information Technology* (2022), 1–13.
- [43] V Phoebe Pawlik. 2022. Design Matters! How Visual Gendered Anthropomorphic Design Cues Moderate the Determinants of the Behavioral Intention Towards Using Chatbots. In *Chatbot Research and Design: 5th International Workshop, CONVERSATIONS 2021, Virtual Event, November 23–24, 2021, Revised Selected Papers*. Springer, 192–208.
- [44] Katie Seaborn and Alexa Frank. 2022. What pronouns for Pepper? A critical review of gender/ing in research. In *CHI Conference on Human Factors in Computing Systems*. 1–15.
- [45] Mikey Siegel, Cynthia Breazeal, and Michael I Norton. 2009. Persuasive robotics: The influence of robot gender on human behavior. In *2009 IEEE/RSJ International Conference on Intelligent Robots and Systems*. IEEE, 2563–2568.
- [46] Pavel Smutny and Petra Schreiberova. 2020. Chatbots for learning: A review of educational chatbots for the Facebook Messenger. *Computers & Education* 151 (2020), 103862.
- [47] Sarah Strohkorb Sebo, Margaret Traeger, Malte Jung, and Brian Scassellati. 2018. The ripple effects of vulnerability: The effects of a robot's vulnerable behavior on trust in human-robot teams. In *Proceedings of the 2018 ACM/IEEE International Conference on Human-Robot Interaction*. 178–186.
- [48] Colm Sweeney, Courtney Potts, Edel Ennis, Raymond Bond, Maurice D Mulvenna, Siobhan O'Neill, Martin Malcolm, Lauri Kuosmanen, Catrine Kostenius, Alex Vakaloudis, et al. 2021. Can Chatbots help support a person's mental health? Perceptions and views from mental healthcare professionals and experts. *ACM Transactions on Computing for Healthcare* 2, 3 (2021), 1–15.
- [49] Cara Tannenbaum, Robert P Ellis, Friederike Eyssel, James Zou, and Londa Schiebinger. 2019. Sex and gender analysis improves science and engineering. *Nature* 575, 7781 (2019), 137–146.
- [50] Eva AM van Dis, Johan Bollen, Willem Zuidema, Robert van Rooij, and Claudi L Bockting. 2023. ChatGPT: five priorities for research. *Nature* 614, 7947 (2023), 224–226.
- [51] George Veletsianos, Cassandra Scharber, and Aaron Doering. 2008. When sex, drugs, and violence enter the classroom: Conversations between adolescents and a female pedagogical agent. *Interacting with computers* 20, 3 (2008), 292–301.
- [52] Mark West, Rebecca Kraut, and Han Ei Chew. 2019. I'd blush if I could: closing gender divides in digital skills through education. (2019).
- [53] Anbang Xu, Zhe Liu, Yufan Guo, Vibha Sinha, and Rama Akkiraju. 2017. A new chatbot for customer service on social media. In *Proceedings of the 2017 CHI conference on human factors in computing systems*. 3506–3510.