

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/323504982>

Personification of the Amazon Alexa: BFF or a Mindless Companion

Conference Paper · March 2018

DOI: 10.1145/3176349.3176868

CITATIONS

165

READS

3,495

2 authors, including:



[Irene Lopatovska](#)

Pratt Institute

63 PUBLICATIONS 1,327 CITATIONS

SEE PROFILE

Personification of the Amazon Alexa: BFF or a Mindless Companion?

Dr. Irene Lopatovska

School of Information

Pratt Institute

144 W. 14 st., New York, NY 10011

ilopatov@pratt.edu

Harriet Williams

School of Information

Pratt Institute

144 W. 14 st., New York, NY 10011

hwilli13@pratt.edu

ABSTRACT

The conversational nature of intelligent personal assistants (IPAs) has the potential to trigger personification tendencies in users, which in turn can translate into consumer loyalty and satisfaction. We conducted a study of Amazon Alexa usage and explored the manifestations and possible correlates of users' personification of Alexa. The data were collected via diary instrument from nineteen Alexa users over four days. Less than half of the participants reported personification behaviors. Most of the personification reports can be characterized as mindless politeness (saying "thank you" and "please" to Alexa). Two participants expressed deeper personification by confessing their love and reprimanding Alexa. A new study is underway to understand whether expressions of personifications are caused by users' emotional attachments or skepticism about technology's intelligence.

KEYWORDS

Intelligent Personal Assistants, Digital Personal Assistants, Voice-Powered Personal Assistants, Conversational agent, Amazon Echo, Amazon Alexa, personification, anthropomorphizing

ACM Reference format:

I. Lopatovska and H. Williams. 2018. Personification of the Amazon Alexa: BFF or a mindless companion?. In *Proceedings of ACM CHIIR conference, New Brunswick, NJ USA, March 11-15, 2018 (CHIIR'18)*, 4 pages. DOI: 10.1145/3176349.3176868

1 INTRODUCTION

The idea of digital (also referred to as "intelligent") personal assistants (IPAs) is not new and traces back to the 1980th concepts of Apple's Knowledge Navigator, AT&T's PersonalLinks [26], and devices like IBM Simon and Apple Newton that were produced in the 1990s and aimed to assist users with managing calendars and notes, connecting to the network and other simple tasks [32].

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than the author(s) must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Permissions@acm.org. CHIIR'18, March 11-15, 2018, New Brunswick, NJ, USA.

© 2018 Copyright is held by the owner/author(s). Publication rights licensed to ACM.

ACM ISBN 978-1-4503-4925-3/18/03...\$15.00.

DOI: <http://dx.doi.org/10.1145/3176349.3176868>

The current generation of IPAs, including Google Assistant, Apple Siri, Microsoft Cortana, and Amazon Alexa, is designed to perform similar tasks and more through the natural language voice-control interfaces. The ability to "speak" to people often leads to attribution of human-like properties to the IPA systems [12]. Such attributions inspire researchers to examine user tendencies to personify this technology and even link personification to higher user satisfaction with IPAs [30, 25]. We expanded this line of inquiry by conducting a qualitative study of Amazon Alexa usage and explored the manifestations and possible correlates of users' personification of this technology.

2 RELEVANT LITERATURE

Personification, also frequently referred to as anthropomorphizing in the literature, can be defined as attribution of "humanlike properties, characteristics, or mental states to real or imagined nonhuman agents and objects" [11]. Research in the field of personification traces its roots in the works of Hume, Darwin, Feuerbach, and Freud and usually examines various forms of human interaction with animals, machinery and computers [31]. A number of authors address the question of why humans attribute humanlike qualities to nonhuman agents. Epley, Waytz, and Cacioppo [11] argue that personification of animals or objects serves three functions: 1) to make sense of a situation by projecting a person's own behaviors or thoughts onto an unfamiliar person/object, 2) to reduce the feeling of uncertainty in a situation by predicting the behavior of the other agents in it, and 3) to establish social connections. Epley, Akalis, Waytz, and Cacioppo [10] examined the link between loneliness or social disconnect and personification and found that "social disconnection leads people to seek companionship from nonhuman agents". Multiple studies suggest that people who are lonely are more likely to create relationships with pets or machines [16, 27] and that, in turn, a personified nonhuman agent can decrease the feeling of loneliness (for example, Banks, Willoughby, and Banks [2] found that a robotic dog did indeed decrease loneliness in nursing home residents).

Contrary to the "purposive" definition of personification by Epley et al. [11], Nass and Moon [22] and Nass, Steuer, and Tauber [24] describe personification as a mindless activity or an automatic reflex that can be triggered by the proper social cues. The authors call this behavior "overlearned politeness". Nass and Moon [22] observed that people are more polite in direct face-to-face interactions with other humans than indirect interactions. The researchers observed the same interaction tendencies towards computers despite people's universal denial that computers have "feelings" or warrant polite treatment: "The

social rule that dictates insincere responses (the 'politeness' rule) automatically came into play as soon as the computer asked about itself" [22].

Humans seem to find it easier to interact with technology that resembles some of their characteristics, so it is not surprising that popularity and usability of many modern technologies, including IPAs, is predicated on their anthropomorphic characteristics and abilities to support social interactions [4]. Characteristics of behavioral realism aim to improve system functions and experiences [14].

Some of the technology design features that contribute to the illusion that the device has "consciousness, intentions, and emotional states" [11] include but are not limited to "faces" [23], voices [8], movement [20], and voices with social speech patterns [22]. Some of the personification triggers are further refined for gender, ethnicity and other factors, and are aimed to elicit different responses in users [23]. For example, Nass and Moon [22] conducted experiments in which "the generally positive praise from a male-voiced computer was more compelling than the same comments from a female-voiced computer".

Breazeal [4] developed a classification of technology based on the type of personification experience it elicits, including socially evocative, social interface, socially receptive, and sociable. Socially evocative technology uses cues that encourage people to personify it and interact with it. An example of such technology is the Tamagotchi toy that has features (such as a baby-like face) that trigger children to nurture the toy. Social interface technology uses "human-like social cues" to interact with humans for the purpose of making the interaction easier for the human. Examples of social interfaces include avatars that are designed to deliver information and, in some instances, "understand" the verbal message from a human and return the requested information or behavior. Socially receptive technology "learns" from humans, increasing its vocabulary or gestures by copying and predicting human behaviors in order to aid its users (e.g. machine learning). The highest level of social interaction is represented in sociable technology that aims to "read" human cues, learn and expand in order to improve its own functioning [4]. In the context of developing conversational agents, Cassell [6] emphasized the following system requirements: a) ability to recognize verbal and non-verbal input, b) ability to generate verbal and non-verbal output, c) support conversational norms (e.g. turn-taking, feedback), and others.

Amazon Alexa can be described as a social interface that uses "human-like social cues and communication modalities in order to facilitate interactions with people" and relies on the "shallow" social model of a person [4]. Its conversational functions are limited and do not fully meet Cassell's requirements [6]. Alexa does not learn, and does not have internal goals beyond the task given to it by its owner. It resides on a stationary device, Amazon Echo, with no "face". However, due to its speech features and ability to produce humorous responses, it is not unreasonable to expect that this device would trigger some kind of personification response from users, even if it is a shallow one. A recent study explored the levels of user personification of Alexa, the factors affecting personification and user satisfaction by analyzing the content of user reviews of the Echo/Alexa posted on the Amazon.com website [25]. Results indicate that over half of the reviewers include the personified name "Alexa" and reference the device with the object pronouns. The authors

found that personification of Alexa is associated with increased levels of satisfaction, even in cases when owners experience technical problems with the device. The study also suggests that reviewers from multiple-member households are more likely to personify the device than reviewers who live alone, a finding that goes against earlier work on increased personification tendencies in lonely people [2]. Turk [30] discusses the manifestations and causes of IPAs' personification. The author observes that users tend to interact with IPAs similarly to how they interact with pets or friends, and even say "please", "thank you" or "I love you" to Alexa. Turk [30] hypothesizes that such emotional interactions with Alexa suggest the presence of human longing for social connections that is satisfied by technology personification. Purington [25] and Turk [30] illustrate the dominance of the quantitative approach to studying IPA's personification.

3 METHODS

In order to understand users' perspectives on their interactions with Alexa and examine users' accounts of personification behaviors, we designed a qualitative study. The study data were collected primarily through the structured online diary, which participants were asked to complete once a day for four days. The diary method is commonly used in information interaction research and enables researchers to examine user behaviors with technology in their daily lives [3, 9, 17]. The decision to use a structured diary instrument was made in order to minimize time- and effort-related burdens on participants and collect comparable data across all study participants [15]. Participants were asked to fill out the diary once a way and identify the types of interactions with Alexa, their rate of success, user satisfaction and memorability as well as personification language they reported using with Alexa. Parents of young participants were asked to fill out the diary based on their children's accounts, as well as parents' own observations of children interactions with Alexa. The diary was recorded on two work days (Friday and Monday) and the weekend (Saturday and Sunday). In addition to the diary, participants were asked to fill out an online demographic questionnaire and share information about their Alexa ownership. The study was approved by the IRB. The details on the study instruments and procedures can be found in Lopatovska et. al. [18]

The study recruited a sample of 19 heterogeneous participants from nine households using a snowball sampling technique. Post hoc, the participants, ranging from 4 to 55 years of age, were grouped into three categories: children 4-10 years old (6), younger adults 20-39 years old (7) and older adults 40-60 years old (6). Twelve (63%) participants reported being professionally employed (e.g. two nurses, a lawyer, and a professor), 5 (26%) were students, and 2 (10%) were unemployed or declined to respond. Six households reported having one Alexa, two households reported having two devices and one reported three devices in their homes. Six households have had their Alexa(s) for at least 3-12 months, two households had Alexa for less than 3 months and only one household had their Alexa for more than a year. Seven (36%) participants reported using Alexa very frequently, 8 (42%) said that they used it very infrequently, and 4 (21%) respondents reported medium usage. The most frequent Alexa uses reported by the participants

included quick information searches (17), entertainment (15), and control of other devices (9).

4 RESULTS AND DISCUSSION

The total of 127 interactions with Alexa were reported over the course of four days. The most frequent types of interactions included quick weather checks (N=39) and music-playing requests (N=29). Other types of interactions (e.g. use of Alexa to control other devices, check facts or news) were reported less frequently. Participants also reported an overall high satisfaction (N=124) and positive memorable experiences (N=33) with Alexa even for interactions that it did not produce desirable outcomes. The patterns of Alexa usage suggest that the interaction experience is more important to the users than its outcome.

In order to examine whether Alexa generates personification behaviors, we examined instances when participants referred to Alexa as if it had human-like qualities and analyzed the non-command language that participants reported in their “conversations” with Alexa. Of the nineteen study participants, eight (42%) participants, representing different age groups, reported seventeen instances of behaviors that could be described as personification. Analysis of participants’ comments revealed 12 instances of “thank you” responses, 9 mentions of Alexa as a “she”, two responses of “please” and one “good afternoon” greeting to Alexa. Four participants mentioned that while they do not converse with Alexa, they talk to Apple Siri as if it was human. All participants who expressed personification signs were part of the multi-person households, confirming the findings of Purington, Taft, Sannon, Bazarova, and Taylor [25], but going against the hypothesis that lonely people are more likely to personify [10, 16]. Length of Alexa ownership or frequencies of its use did not seem to affect personification tendencies.

We attribute most of the recorded personification responses to what Nass and Moon [22] call “over-learned social behaviors”, or social mindless responses that humans say to each other without hearing or meaning anything by the response. We noted that all ages, except the very young, engaged in mindless responses, including three middle-aged participants, two ten-year-olds and two older participants. It is possible that the very young participants did not direct any social responses towards Alexa due to not-yet-established social manners. It is also possible that children realize that Alexa does not react to politeness or impoliteness, and therefore treat Alexa rudely (a hypothesis that is supported by previously reported parents’ accounts [29]). Further investigation into reasons behind presence and lack of social mindless responses in various age groups is needed.

Within the group of seven personifying participants, two provided responses that might indicate levels of personification that went beyond over-learned politeness. One person (age 53) told Alexa she loved it, and another one (age 24) chastised Alexa for not accomplishing its task. We see two possible explanations for such higher-level personification behaviors including: a) purposeful treatment of technology as human [10, 11] and observations about human longing for social connections [30] or b) purposeful testing of its intelligence to highlight its limitations and nonhuman nature. The second explanation follows Mori’s [21] discussion of the “uncanny valley” phenomenon that refers to human tendencies to create a distance with technology that appears unnervingly human [21]. Using the “uncanny valley”

explanation, users’ expressions of affection might in fact be expressions of mockery aimed at demeaning technology and emphasizing its inferior nonhuman performance. Several websites are dedicated to “funny things to ask Alexa” and provide users with “tricky” questions that point to Alexa’s limited conversational abilities [13].

Several participants’ responses reinforce the notion of participants’ awareness of Alexa’s nonhuman nature and limitations:

P1: [Alexa] couldn't respond to my child's questions (what's my brother's name);

P2: She had some silly responses in relation to the questions we asked.

Affective expressions towards Alexa might also signal users’ tendencies to test the system that they do not fully understand and that “fools” them to believe it is more “human” than it actually is [19]. The fact that participants requested Alexa to tell jokes only six times also points to participants’ awareness of technology’s limitations for social interactions. Further in-depth analysis of users’ reasoning behind the expressions of extreme personification is needed to understand whether such expressions manifest emotional attachments or skepticism towards human-like technology or some of its features.

5 CONCLUSIONS

Our findings did not confirm high levels of IPAs’ personification suggested by some previous work [25, 30]. Only seven of the nineteen participants reported personifying behaviors during Alexa interactions. The majority of these behaviors can be categorized as overlearned social mindless responses [22] or “shallow” interactions [4]. Only two reported behaviors could be characterized as higher-level personification, and none of these behaviors were associated with children. Factors that attribute to some users’ personification tendencies need further investigation. We did not, for example, find that heavier users or users who owned Alexa for a longer period of time were more likely to personify it than infrequent users or new owners. Similar to Purington et al. [25], we found that participants from multi-person households were more likely to personify than participants from the single-person households, possibly confirming that mindless politeness is more prevalent in a group than a lonely setting. Unlike Purington et al. [25], however, we did not find a link between user satisfaction with Alexa and its personification, as all users reported high levels of satisfaction with Alexa even when it failed to deliver the desirable outcome (for example, play a song).

The study had a number of limitations, mainly reliance on a small sample and self-report data. A new larger study is underway, collecting logfile and observational data on user interactions with Alexa. So far, the new study findings confirm our diary results pertaining to the tendency of the majority of the users to non-personify or make fun of Alexa, with very few users developing deep engagement with this technology (e.g. sharing their life stories with it). We plan to expand the old and share the new findings in the areas of a) over-learned mindless personification and b) high-level personification as an expression of emotional attachment or skepticism.

Personification is a double-edged sword: it can lead to long-term attachments to objects or it can cause frustration when the object does not live up to expectations or becomes too human-

like [5, 7, 21, 19]. Finding the right balance might translate into more successful IPA products and happier users.

ACKNOWLEDGMENTS

We would like to thank the following student researchers for the contributions to the project: Katrina Rink, Ian Knight, Kieran Raines, Kevin Cosenza, Harriet William, Perachya Sorscher, David Hirsch, Qi Li, and Adrianna Martinez

REFERENCES

- [1] Amazon. 2017. Echo & Alexa Devices. Retrieved from <https://www.amazon.com/Amazon-Echo-And-Alexa-Devices/b?ie=UTF8&node=9818047011>
- [2] Marian R. Banks, Lisa M. Willoughby, and William A. Banks. 2008. Animal-assisted therapy and loneliness in nursing homes: Use of robotic versus living dogs. *J. Am. Med. Dir. Assoc.* 9, 3 (Mar. 2008), 173-177. DOI: 10.1016/j.jamda.2007.11.007.
- [3] Karley Beckman, Sue Bennett, and Lori Lockyer. 2014. Reconceptualizing technology as a social tool: A secondary school student case study. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2014*. EdMedia2014, AACE, Chesapeake, VA, 1554-1559.
- [4] Cynthia Breazeal. 2003. Toward sociable robots. *Robot. Auton. Syst.* 42 (2003), 167-175. Retrieved from <http://robotic.media.mit.edu/wp-content/uploads/sites/14/2015/01/Breazeal-RAS-03.pdf>.
- [5] Elizabeth Broadbent. 2017. Interactions with robots: The truths we reveal about ourselves. *Annu. Rev. of Psychol.* 68, 1 (Jan. 2017), 627-652. DOI: 10.1146/annurev-psych-010416-043958.
- [6] Justine Cassell. Tim Bickmore, Lee Campbell, Hannes Vihjalmsson & Hao Yan. 2000. Human Conversation as a System Framework: Designing Embodied Conversational Agents. In *Embodied Conversational Agents*. Justine Cassell. (ed) MIT Press: 29-63
- [7] Jesse Chandler and Norbert Schwarz. Use does not wear ragged the fabric of friendship: Thinking of objects as alive makes people less willing to replace them. *J. Consum. Psychol.* 20, 2 (2010), 103-228. DOI: 10.1016/j.jcps.2009.12.008.
- [8] Mick P. Couper, Roger Tourangeau, and Darby M. Steiger. 2001. Social presence in web surveys. In *Proceedings of the CHI 2001 Conference on Human Factors in Computing Systems*. ACM, New York, NY, 412-417. DOI: 10.1145/365024.365306.
- [9] Stefanie Elbeshausen, Thomas Mandl, and Christa Womser-Hacker. 2015. Collaborative information seeking in the context of leisure and work task situations: A comparison of three empirical studies. In *Collaborative Information Seeking*, Preben Hansen, Chirag Shah, and Claus-Peter Klas (Eds.). Springer, Cham, 73-98. DOI: 10.1007/978-3-319-18988-8_5.
- [10] Nicholas Epley, Scott Akalis, Adam Waytz, and John T. Cacioppo. 2008. Creating social connection through inferential reproduction: Loneliness and perceived agency in gadgets, gods, and greyhounds. *Psychol. Sci.* 19, 2 (2008), 114-120. DOI: 10.1111/j.1467-9280.2008.02056.x.
- [11] Nicholas Epley, Adam Waytz, and John T. Cacioppo. 2007. On seeing human: A three-factor theory of anthropomorphism. *Psychol. Rev.* 114, 4 (2007), 864-886. DOI: 10.1037/0033-295X.114.4.864.
- [12] Friederike Eyssel, Dieter Kuchenbrandt, Simon Bobinger, Laura de Ruiter, and Frank Hegel. 2012. 'If you sound like me, you must be more human': on the interplay of robot and user features on human-robot acceptance and anthropomorphism. In *Proceedings of the seventh annual ACM/IEEE international conference on Human-Robot Interaction* ACM, 125-126.
- [13] Hayden. 2016. 101 Fun Things to Ask Alexa. Retrieved from <http://thingstoaskalexa.com/index.php/2016/03/10/101-fun-things-to-ask-alexa/>.
- [14] Kerstin Heuwinkel. 2012. Framing the Invisible – The Social Background of Trust. In *Your Virtual Butler: The Making-of*. Robert Trappl (ed). Springer, 16-26. doi: 10.1007/978-3-642-37346-6_3
- [15] Masumi Iida, Patrick E. Shrout, Jean-Philippe Laurenceau, and Niall Bolger. 2012. Using diary methods in psychological research. In *APA Handbook of Research Methods in Psychology: Vol. 1. Foundations, Planning, Measures, and Psychometrics*, H. Cooper (Ed.). American Psychological Association, Washington, D.C., 277-305. DOI: 10.1037/13619-016.
- [16] Lee A. Kirkpatrick, Daniel J. Shillito, Susan L. Kellas. 1999. Loneliness, social support and perceived relationships with God. *J. Soc. Pers. Relat.*, 16, 4 (Aug. 1999), 513-522. DOI: 10.1177/0265407599164006.
- [17] Irene Lopatovska, Megan R. Fenton, and Sara Campot. 2012. Examining preferences for search engines and their effects on information behavior. In *Proc. Am. Soc. Info. Sci. Tech.* American Society for Information Science and Technology, Baltimore, MD, 49, 1 (Oct. 2012), 1-11. DOI: 10.1002/meet.14504901110.
- [18] Irene Lopatovska, Katrina Rink, Ian Knight, Kieran Raines, Kevin Cosenza, Harriet William, Perachya Sorscher, David Hirsch, Qi Li, and Adrianna Martinez, (in print). Talk to me: exploring interactions with the Amazon Alexa. *J. of Librarianship & Info. Sci.*
- [19] Ewa Luger and Abigale Sellen. 2016. Like Having a Really Bad PA: The Gulf between User Expectation and Experience of Conversational Agents. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* ACM, 5286-5297.
- [20] Carey K. Morewedge, Jesse Preston, and Daniel M. Wegner. 2007. Timescale bias in the attribution of mind. *J. Pers. Soc. Psychol.* 93, 1 (2007), 1-11. DOI: <http://dx.doi.org/10.1037/0022-3514.93.1.1>.
- [21] Masahiro Mori. 1970. The uncanny valley. *Energy* 7, 4 (1970), 33-35. Translated by Karl F. MacDorman and Takashi Minato.
- [22] Clifford Nass and Youngme Moon. 2000. Machines and mindlessness: Social responses to computers. *J. Soc. Issues* 56, 1 (Spring 2000), 81-103. Retrieved from http://ldt.stanford.edu/~ejbailey/02_FALL/ED_147X/Readings/nass-JOSI.pdf
- [23] Clifford Nass, Youngme Moon, and Nancy Green. 1997. Are computers gender-neutral?: Gender stereotype responses to computers. *J. Appl. Soc. Psychol.* 27, 10 (May 1997), 864-876. DOI: 10.1111/j.1559-1816.1997.tb00275.x.
- [24] Clifford Nass, Jonathan Steuer, and Ellen R. Tauber. 1994. Computers are social actors. In *Proceeding CHI '94 Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. ACM, New York, NY, 72-78. DOI: 10.1145/191666.191703.
- [25] Amanda Purington, Jessie G. Taft, Shruti Sannon, Natalya N. Bazarova, and Samuel Hardman Taylor. 2017. Alexa is my new BFF: Social roles, user satisfaction, and personification of the Amazon Echo. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*. ACM, New York, NY, 2853-2859. DOI: 10.1145/3027063.3053246.
- [26] Marina Roesler, and Donald T. Hawkins. 1994. Intelligent Agents: Software Servants for an Electronic Information World (And More!). *Online* 18, 4, 18-20,22,24-26,28-30,32.
- [27] James A Serpell. 1991. Beneficial effects of pet ownership on some aspects of human health and behavior. *J. Roy. Soc. Med.*, 84 (Dec. 1991), 717-720. DOI: 10.1177/014107689108401209.
- [28] Lee Sproull, Mani Subramani, Sara Kiesler, Janet H. Walker, and Keith Waters. 1996. When the Interface is a Face. *Hum-Comput. Interact.* 11, 2 (1996), 97-124. DOI: 10.1207/s15327051hci1102_1.
- [29] Alice Truong (2016, June 9). Parents are worried the Amazon Echo is condition their kids to be rude. *Quartz*. Retrieved from <https://qz.com/701521/parents-are-worried-the-amazon-echo-is-conditioning-their-kids-to-be-rude/>
- [30] Victoria Turk. 2016. Home invasion. *New Sci.* 232, 3104-3106 (Dec. 2016), 16-17. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0262407916323181>.
- [31] Adam Waytz, Joy Heafner, and Nicholas Epley. 2014. The mind in the machine: Anthropomorphism increases trust in an autonomous vehicle. *J. Exp. Soc. Psychol.* 52 (May 2014), 113-117. DOI: <http://dx.doi.org/10.1016/j.jesp.2014.01.005>.
- [32] Pei Zheng and Lionel Ni. 2006. *Smart Phone and Next Generation Mobile Computing*. Elsevier, Amsterdam.