

“Thank You, Siri”: Politeness and Intelligent Digital Assistants

Completed Research

Nathan Burton
Brigham Young University
burton15@byu.edu

James Gaskin
Brigham Young University
james.gaskin@byu.edu

Abstract

Interactions with intelligent digital assistants like Apple's Siri, Amazon's Alexa, and Google's Google Assistant can often be direct and terse, which is leading many to worry that users' uncivility towards digital assistants is causing users to become ruder in their human interactions. Although digital assistants are nearing ubiquity, not much is known about how interactions with this form of artificial intelligence may negatively impact human social behaviors. Practice-oriented researchers have started initial explorations into the effects of interaction with digital assistants from a social psychology perspective, and academics have pursued similar questions within the paradigm of current human-computer interaction research. However, neither party has addressed the psychological impact of the common practice of barking orders to our digital assistants instead of asking politely. Consequently, as an initial step towards better understanding this problem, we surveyed and observed 274 people to measure their general politeness and politeness towards digital assistants.

Keywords

Digital assistant, artificial intelligence, personification, politeness

Introduction

A digital assistant is a voice- or text-enabled computer software package capable of performing basic, information-based tasks for its users. The earliest commercially available digital assistants were automated telephone systems and medical dictation software, both of which were used almost exclusively by large enterprises, with widespread use starting around the 1980s (Zwass 2016). The first ubiquitous artificially intelligent digital assistant for personal use is widely considered to be Apple's Siri, released on the iPhone 4S on October 4, 2011 (Murph 2016). Since then, major technology companies including Google, Microsoft, and Amazon have developed their own artificially intelligent digital assistants in response to growing demand (Sterling 2018). Smart speakers, or speakers with a digital assistant built-in, are becoming more and more common in American households. Reports forecast that by 2020, there will be 76.5 million smart speaker users in the United States alone (Koestier 2018).

As digital assistants' performance is generally unaffected by politeness, many users of digital assistants may forgo the niceties of polite speech and instead make terse requests. Here, politeness can be defined as the combination of behaviors and attitudes that indicate courteousness and respect towards others. As a result, concerns have arisen about whether being impolite towards our digital assistants is making us less polite in our human-to-human interactions (Gartenberg 2017). Parents are especially concerned that the use of digital assistants is affecting their children's politeness (Truong 2016), resulting in Amazon adding a “magic word” feature to their Alexa digital assistant which verbally rewards children who ask politely (Baig 2018). However, others believe that being impolite towards digital assistants has no effect on one's interactions with others: after all, digital assistants are clearly not human (Ough 2018). However, neither group has produced empirical scientific evidence to support their claims about politeness towards digital assistants and its relationship to external social interactions.

In addition to politeness towards other people, politeness towards digital assistants may have a positive correlation with overall life satisfaction through several possible antecedents including patience, a lack of

stress, and a lack of feelings of inferiority. As digital assistants become more common, it is vital that scientific conversations around the effects of digital assistant use occur so that individuals can correct their interactions with digital assistants before bad habits become engrained. In a United States, a country where many people use digital assistants, there are concerns that decreasing levels of civility may be affecting citizens’ collective ability to work together as a society (Plante 2016) and overall levels of happiness have been decreasing for decades (Ingraham 2017). The augmentation of these negative trends by impoliteness towards digital assistants will only serve to increase their negative impact.

Our research question, therefore, is “How does politeness toward digital assistants relate to politeness and life satisfaction in general?” Work on similar research questions has been conducted by both practice-oriented researchers and academics. Practice-oriented researchers have been able to show that individuals do respond emotionally to digital assistants (Bland 2018), while academics have been able to demonstrate that computers can behave as social actors (Nass et al. 1994). Further research by academics has shown that people personify, or assign human characteristics to, digital assistants (Purinton et al. 2017), but the strength of this personification is currently unknown and may be relatively weak (Lopatovska and Williams 2018). However, no research has shown that the use of digital assistants relates users’ politeness or life satisfaction.

In a preliminary exploration of this research question, we distributed a perceptual survey to 274 students at a large, private university in the western United States. Our findings suggest that there is no relationship present between politeness towards digital assistants and politeness towards others or life satisfaction. However, our results show that politeness towards digital assistants may correlate with politeness towards intellectual non-peers. In this paper we identify the relevant reference literature, develop some preliminary theory and describe the method by which we tested it. We then present our findings and discuss limitations in the study design as well as opportunities for future research.

Literature Review

As intelligent digital assistants have become smarter and more prevalent over the past several decades, questions have arisen as to how these technologies are affecting human behavior. A growing body of research is showing that people are personifying, or assigning human characteristics to, digital assistants, suggesting that humans are able to develop real emotional and social connections with these programs (Purinton et al. 2017). Though a great deal of research has shown that computers can act socially (Nass et al. 1994), modern digital assistants are unique as a result of their voice-based interface, leading to possible further personification due to their human-like verbal communication (Knote et al. 2018). The presence of personification leads to more questions about how interactions with these more human-like digital assistants affects our interactions with other people.

As a result of mounting questions over the behavioral effects of digital assistant use, practice-oriented researchers have started experimenting with these interactions (Bland 2018). In a study by a private organization which specializes in tracking users’ emotions and behavior while using technology, practice-oriented researchers were able to show that users’ heart rates and GSR levels increased when using digital assistants, suggesting that users were emotionally responding to these devices. They also asked participants to swear at the digital assistants and observed that most were unwilling to do so. These researchers have called for further research into whether being rude towards artificial intelligence makes users ruder toward other people in general. This research provides valuable groundwork for our research and shows that our study can be an important contribution to the growing body of knowledge surrounding artificial intelligence and digital assistants.

Preliminary studies by academics have shown that users are indeed developing relationships with digital assistants. A recent analysis of Amazon reviews revealed that reviewers are likely to refer to Amazon’s Alexa as “she” rather than “it”, demonstrating that people are personifying digital assistants (Purinton et al. 2017). Likewise, a survey of users’ interactions with digital assistants at home shows that 10% of interactions are social “small talk” as opposed to pragmatic commands and requests, further supporting the idea of personification (Bentley et al. 2018). Another study even shows that when artificial intelligence is polite, people are more likely to be polite back (Salem et al. 2014). However, another study showed that people may not personify digital devices as much as originally thought, as many of the personifying

behaviors exhibited towards digital assistants, like polite speech and assigning gender, are likely results of overlearned social habits (Lopatovska and Williams 2018).

Beyond this research on the personification of digital assistants, computers and digital assistants have demonstrated their ability to:

- Influence human decision making (Fogg 2002)
- Convince users of their trustworthiness through personification (Kwon et al. 2016)
- Be easily personified with human traits (Nass et al. 1995)
- Be convincingly human—people responded to tweets by Twitterbots in the same way as tweets by other people (Edwards et al. 2016)
- And elicit feelings of trust and competence when collaborating with human team members (Burgoon et al. 2016)

However, currently, computers and digital assistants still lag behind humans in stimulating some emotional and social responses:

- Behavioral trait transfer does not occur in computer-human interactions as it does in human-human interactions (Beckner et al. 2015)
- People are motivated more by other people than robots when participating in exergames (Feltz et al. 2014)
- An fMRI study showed that people do respond to robots with emotion, but respond with more emotion towards other humans (Rosenthal-von der Pütten et al. 2014)

Our research question is also closely tied to studies surrounding online disinhibition. Online disinhibition is the process by which people become more comfortable with normally risky social behaviors like trolling and disclosing information about oneself while online. For example, online disinhibition has been shown to lead to behaviors like insulting and using vulgar language (Fichman and Peters 2019). Impolite behavior towards digital assistants is related to online disinhibition because it involves risky social behaviors and because several factors that predict online disinhibition also likely predict impoliteness towards digital assistants including dissociative anonymity, invisibility, and minimization of authority (Suler 2004).

Though these studies have been able to show the extent and limitations of the personification of digital devices in general, little research has been done on how our use of these devices change our external social behavior and internal self-perceptions through personification. We next theorize about these possible effects.

Theory

Since it has been shown that people personify digital assistants (Purinton et al. 2017), it follows that human interactions with digital assistants may share similar characteristics with human-to-human interactions. Objects that are assigned human characteristics by a user are likely to elicit social behavior usually reserved for other people, much like how dolls and action figures can prompt children to talk with them as though they were real human beings (Inagaki and Hatano 1987). The habits built while interacting with personified objects likely carry over into interactions with other people because interactions with personified objects in some ways parallel interactions with other humans. This is especially true with digital assistants, as they require the user to speak using natural language, a behavior usually reserved for human-to-human interactions. As a result, we hypothesize that politeness towards digital assistants will have a positive association with politeness towards other people.

H1. How one treats digital assistants has a positive association with how one treats others

Though users may personify digital assistants, they are unlikely to consider them intellectual peers (Nass et al. 1994). A digital assistant may be more like a pet—something with human-like characteristics and some form of intelligence but not enough to be considered an intellectual peer. Pets, in some ways, are treated like people—pet owners often name, talk to, and assign personalities to their pets—but pets are not considered intellectual equals. It is likely, then, that personified social objects, such as digital assistants, are treated much like pets. Treatment of digital assistants may also be related to treatment of young

children or the impaired elderly, as both may generally be considered by adults to be intellectual non-peers. Adults often talk to children differently than they talk to other adults (Holmes and Wilson 2017), much like how users often talk differently when using a digital assistant. Similarly, paramedics are encouraged to speak more simply when talking with those with mental and/or social impairment, such as dementia (Blaber and Harris 2011). As a result, we theorize that polite treatment of digital assistants correlates with how one treats intellectual non-peers, like pets, children, and the impaired elderly.

H2. How one treats digital assistants has a positive association with how one treats intellectual non-peers

Disrespectful behavior towards digital assistants may also be related to reduced life satisfaction through several possible antecedents. Those who act rudely towards a digital assistant may lack patience, a virtue that is linked to increased perceived well-being (Schnitker 2012). The disrespectful behavior could also be a result of psychological stress, which has also been shown to be related with lower life satisfaction (Buser and Kearney 2017). Bullying, which could be considered an extreme form of disrespect, has often been associated with feelings of inferiority (Piotrowski and Hoot 2008), as an inferiority complex can often lead individuals to seek superiority by bringing others down. It follows, then, that those who are disrespectful towards digital assistants may simply be trying to assert dominance as a result of their feelings of inferiority and that these feelings are reducing these individuals’ level of life satisfaction. From these possible avenues, we postulate that polite treatment of digital assistants correlates positively with life satisfaction.

H3. How one treats digital assistants has a positive association with one’s life satisfaction.

Methods

College students were asked to take an online perceptual survey on a computer in a supervised research lab in exchange for extra credit. Students from all majors in the business school were solicited. There were 274 survey responses, of which 10 were eliminated for incorrectly answering an attention trap question in the survey. Table 1 shows the demographics of the 264 students who were included in the analysis. Demographics were captured for the sake of potential confounds or alternative explanations for the observed relationships. For example, gender may have an effect on politeness or self-image (Holmes 1993), as might age (Axia and Baroni 1985) and culture (Ogiermann 2009). Similarly, because we theorize that people may treat digital assistants the way they treat children, we captured data about who had children and who had siblings. An analysis of these potential confounds is provided in the analysis section.

Male	68.18%	0 children in current residence	73.86%
Female	31.82%	1-2 children in current residence	17.42%
		2-4 children in current residence	7.20%
Raised Primarily in United States	94.32%	5+ children in current residence	1.52%
Raised Primarily outside the United States	5.68%		
		No Siblings	1.14%
		1-2 Siblings	23.11%
Ages 18-20	21.21%	3-4 Siblings	48.48%
Ages 21-23	61.36%	5-6 Siblings	19.70%
Ages 24+	17.42%	7+ Siblings	7.58%

Table 1. Participant Demographics

On entering the research lab, subjects were asked to fill out a consent form. After completing the form, one subject at a time would hand the form to the experimenter. The experimenter would accept the form and give the subject a wrapped chocolate truffle as well as an identification number. The experimenter consistently used the words “here you go” for each exchange. “Here you go” was considered to be a non-valenced or neutral communication that would neither elicit or discourage a reciprocal communication (e.g., “thank you”). This exchange was conducted intentionally for the experimenter to observe and record the participants actual polite behavior. After the exchange, the subject’s verbal response and identification number were then recorded in a spreadsheet. During the survey, students were asked to give their identification number so that the experimenters could connect the survey responses of the subject to his/her observed verbal response. Later, the experimenters rated the received verbal responses on a standardized scale of 0-6, with 0 being no verbal response, and 6 being a very polite response. To create the scale, both authors rated the responses independently and discussed and reconciled any discrepancies.

Analysis

Before testing the hypotheses, we ensured the latent measures were reliable by assessing Cronbach’s alphas. The alphas are shown in Table 2. All reliability values were above the recommended 0.700 threshold except treatment of children, which was still above the minimum threshold of 0.600 (Hair et al. 2010) and treatment of impaired elderly. For this reason, we dropped treatment of impaired elderly from our analysis. This was not too dire an action, as we had still two other groups of intellectual non-peers (pets and children).

Construct	Measures	Cronbach’s Alpha
Politeness to Digital Assistants	<ol style="list-style-type: none"> 1. I am polite to digital assistants 2. I am as polite to my digital assistant as I am to other people 3. I talk to my digital assistant in the same way I talk with other people 	0.807
Perceived Politeness	<ol style="list-style-type: none"> 1. I am polite 2. I am a kind person 3. I treat others kindly 4. I am respectful toward others 	0.856
Treatment of impaired elderly	<ol style="list-style-type: none"> 1. I enjoy time spent with the impaired elderly 2. People should be kind to the impaired elderly 3. The impaired elderly should be treated like other adults 4. The impaired elderly shouldn't be talked down to 	0.539
Treatment of pets	<ol style="list-style-type: none"> 1. People should be kind to pets 2. Pets have rights 3. I am kind towards pets 4. I treat pets with respect 	0.837
Treatment of children	<ol style="list-style-type: none"> 1. I enjoy time spent with the children 2. People should be kind to children 3. Children should be treated with respect 4. Children shouldn't be talked down to 	0.668
Satisfaction with life	<ol style="list-style-type: none"> 1. In most ways my life is close to my ideal 2. The conditions of my life are excellent 3. I am satisfied with my life 4. So far I have gotten the important things I want in life 5. If I could live my life over, I would change almost nothing 	0.834

Table 2. Reliability of Measures

After assessing reliability, we created summative scores (Hair et al. 2010) to represent our latent constructs. We then assessed the normality of all our variables (observed and summative). The results of the skewness tests are shown in Table 3. The skewness values for household and country are slightly high, but not alarming. Most respondents reported having no children in their household, which is normal for sophomores (which comprised the majority of our respondents). Similarly, most participants were from within the United States, which led to some skewness in country (which we recorded as binary).

DA_Polite	GenPolite	Resp	LifeSat	Child	Pet	Gender	Age	country	House	Siblings
0.109	-0.272	-1.027	-1.018	-1.445	-1.595	0.785	1.997	-3.851	3.748	1.204

Table 3. Normality Statistics (Skewness)

Because our hypotheses are non-causal, and only imply a correlative association, our analyses are fairly simple and straightforward. To test our non-causal hypotheses, we engaged in simple correlation analysis in SPSS 25. We also examined each key variable for correlations and differences based on demographic control variables. For these latter tests, we used t-tests for the binary variables (gender and nationality) and correlation for the continuous variables (age, siblings, children in household). The results of the correlations are shown in Table 4, with significant correlations lightly highlighted in gray, and test statistics (statistics testing a specific hypothesis) highlighted in black. The results of the t-tests are shown in Tables 5 and 6.

	DA_Polite	GenPolite	Response	LifeSat	TreatChild	TreatPet	Age	Household
GenPolite	0.116							
Response	0.026	0.110						
LifeSat	-0.003	0.304**	0.041					
TreatChild	0.122*	0.445**	0.064	0.252**				
TreatPet	0.087	0.207**	0.043	-0.027	0.202**			
Age	0.071	0.020	-0.081	-0.058	0.041	0.004		
Household	-0.003	-0.008	-0.079	-0.023	0.009	-0.080	-0.086	
Siblings	0.015	0.072	0.102	0.128*	0.122*	-0.130*	0.082	0.062

*p-value < 0.05; **p-value < 0.01

Table 4. Correlations of Key Constructs

From the correlation table, we can see that our first hypothesis (how we treat digital assistants is related to how we treat others) is not supported. We can also see that our second hypothesis (how we treat digital assistants will be similar to how we treat intellectual non-peers) is supported in the case of children, but not pets. Lastly, our third hypothesis (how we treat digital assistants is related to our life satisfaction) is not supported. Examining the control variables, we can see that age and number of children in the household are not related to any of the key variables. Number of siblings, however, is related to life satisfaction, how we treat children, and how we treat pets (inversely), but is not related to how we treat digital assistants.

The tables below show the difference of means tests (t-tests) conducted on our binary control variables for our key constructs. For gender, women were generally politer to other humans and gave politer responses to the experimenter (who was a young male) than men. For country, those raised in the USA tended to be less polite to digital assistants, but more satisfied with life than those raised outside the USA. Significant differences (at 90% confidence level) are highlighted in gray.

	t	df	p-val	Mean Diff	S.E. Diff	Lower	Upper
DA_Polite	-0.238	262	0.812	-0.129	0.541	-1.193	0.937
GenPolite	-1.690	262	0.092	-0.502	0.297	-1.086	0.083
Response	-2.405	262	0.017	-0.466	0.194	-0.847	-0.084
LifeSat	-1.387	262	0.167	-0.918	0.662	-2.222	0.385

Table 5. Mean Difference of Key Constructs by Gender

	t	df	p-val	Mean Diff	S.E. Diff	Lower	Upper
DA_Polite	2.793	262.000	0.006	2.996	1.073	0.884	5.108
GenPolite	-0.793	262.000	0.428	-0.476	0.600	-1.656	0.705
Response	-1.588	262.000	0.114	-0.622	0.392	-1.395	0.150
LifeSat	-1.847	262.000	0.066	-2.454	1.328	-5.069	0.162

Table 6. Mean Difference of Key Constructs by Country

Limitations

As this study is exploratory in nature, our study design has several limitations. First, a survey was used instead of an experiment, so this study cannot claim a causal relationship between the independent variable and the dependent variables. Second, only a small amount of observation of actual behavior was made, so the observed behavior may not be the best indicator of true politeness, though it is likely a better measure than perceived politeness, as perceived measures are often poor substitutes for observed measures. Third, all the survey respondents were adult, college-age students so the results do not apply to populations that may be more susceptible to personifying digital assistants, like children. Fourth, this study was cross-sectional instead of longitudinal, so no conclusions about impoliteness towards digital assistants over time can be made. Finally, some of the participants may have untruthfully answered questions about undesirable social behaviors, like impoliteness.

Future study into our research questions could involve collecting and analyzing actual transcripts of human-to-human and human-to-digital assistant interactions or directly observing interactions between humans and digital assistants. These kinds of direct observation of actual behavior could help alleviate some of the limitations involved with our perceptual survey approach. Further research using a more diverse sample and a more longitudinal design could also further help to support or challenge our hypotheses.

Discussion and Findings

New technologies, like digital assistants, often affect users in unexpected ways for better and for worse. The purpose of this study is to explore one of these possible unexpected influences and show if there is a correlation between the politeness towards digital assistants and politeness towards intellectual peers, politeness towards intellectual non-peers, and life satisfaction. To test the validity of these hypotheses, 274 volunteer students at a large, private university in the western United States were given a survey as well as a small treatment in a lab setting. The results of the survey demonstrate that politeness towards digital assistants did not have a statistically significant relationship with politeness towards intellectual peers (other adult humans) or with life satisfaction. However, there is a statistically significant relationship between politeness towards digital assistants and politeness towards children, demonstrating that people likely do, in some ways, personify digital assistants, if only as intellectual non-peers.

Parents and news outlets alike have been asking whether we should be polite to our digital assistants in order to keep in the habit of being polite. This study demonstrates that, for adults, there is likely no need to say “please” or “thank you” when using a digital assistant. Additionally, this study suggests that digital assistants, in their current form, likely are not personified enough by users to affect human-to-human interactions. However, there is evidence that we may treat digital assistants as intellectual non-peers, and as technology improves and digital assistants become more human-like, this study and similar studies may need repeating.

Beyond this research, there is a wide variety of possible points of scientific inquiry about digital assistants that may yet be pursued. For example, in September 2018, Anki, a company specializing in home robotics, released Vector, a small home robot with built-in Alexa (Greene 2018). Vector was designed with personification in mind: Vector has expressions animated by former Pixar employees, responds to touch, and even plays games. Perhaps embodied digital assistants that focus on personification, like Vector, have a greater influence on users' behavior as a result of their more human-like characteristics. Another possible point of inquiry is how the use of digital assistants, which provide near-instant access to information, affect one's ability to delay gratification, a skill which has been shown to have a positive correlation with higher self-worth, lower rates of drug use, and reduced interpersonal problems (Ayduk et al. 2000) and therefore possibly greater life satisfaction.

Conclusion

From this study, it has become clear that, although users may personify digital assistants, this personification is likely not strong enough to influence users' behavior with other people. Worried parents and news outlets alike have fretted about how this personification affects our politeness, yet we have found little reason to worry about adults becoming ruder as a result of barking out orders to digital assistants. Although digital assistants may exhibit some human qualities, like a semi-realistic voice, these attributes are not enough to influence external human-to-human interactions, indicating artificial intelligence has a ways to go before becoming entirely human-like in characteristic and in influence. However, as shown by the statistically significant relationship between politeness towards children and politeness towards digital assistants, digital assistants are likely being personified, at least partially, as intellectual non-peers. Though this study revealed the relative weakness of digital assistant personification, as digital assistants become more complex and come to better mimic human behavior, a repeat of this study may be appropriate.

Acknowledgements

We would like to acknowledge Sheri Burton for helping us to revise this script.

REFERENCES

- Axia, G., and Baroni, M. R. 1985. "Linguistic Politeness at Different Age Levels," *Child Development* (56), pp. 918-927.
- Ayduk, O., Mendoza-Denton, R., Mischel, W., Downey, G., Peake, P. K., and Rodriguez, M. 2000. "Regulating the Interpersonal Self: Strategic Self-Regulation for Coping with Rejection Sensitivity," *Journal of Personality and Social Psychology* (79:5), pp. 776-792.
- Baig, E. C. 2018. "Kids Were Being Rude to Alexa, So Amazon Updated It." Retrieved 1/23/2019, 2019, from <https://www.usatoday.com/story/tech/columnist/baig/2018/04/25/amazon-echo-dot-kids-alexa-thanks-them-saying-please/547911002/>
- Beckner, C., Rácz, P., Hay, J., Brandstetter, J., and Bartneck, C. 2015. "Participants Conform to Humans but Not to Humanoid Robots in an English Past Tense Formation Task," *Journal of Language and Social Psychology* (35:2), pp. 158-179.
- Bentley, F., Luvogt, C., Silverman, M., Wirasinghe, R., White, B., and Lottridge, D. 2018. "Understanding the Long-Term Use of Smart Speaker Assistants %J *Proc. Acm Interact. Mob. Wearable Ubiquitous Technol.*" (2:3), pp. 1-24.
- Blaber, A., and Harris, G. 2011. *Assessment Skills for Paramedics*. Open University Press.
- Bland, B. 2018. "Alexa, Hug Me: Exploring Human-Machine Emotional Relations." Retrieved 1/23/2019, 2019, from <https://medium.com/@ben.bland/alexa-hug-me-exploring-human-machine-emotional-relations-1f0f6e04e1db>
- Burgoon, J. K., Bonito, J. A., Lowry, P. B., Humpherys, S. L., Moody, G. D., Gaskin, J. E., and Giboney, J. S. 2016. "Application of Expectancy Violations Theory to Communication with and Judgments About Embodied Agents During a Decision-Making Task," *International Journal of Human-Computer Studies* (91), pp. 24-36.
- Buser, J. K., and Kearney, A. 2017. "Stress, Adaptive Coping, and Life Satisfaction," (20:3), pp. 224-236.

- Edwards, C., Beattie, A. J., Edwards, A., and Spence, P. R. 2016. "Differences in Perceptions of Communication Quality between a Twitterbot and Human Agent for Information Seeking and Learning," *Computers in Human Behavior* (65), pp. 666-671.
- Feltz, D. L., Forlenza, S. T., Winn, B., and Kerr, N. L. 2014. "Cyber Buddy Is Better Than No Buddy: A Test of the Köhler Motivation Effect in Exergames," *Games for Health Journal* (3:2), pp. 98-105.
- Fichman, P., and Peters, E. 2019. *The Impacts of Territorial Communication Norms and Composition on Online Trolling*.
- Fogg, B. J. 2002. *Persuasive Technology: Using Computers to Change What We Think and Do*. Morgan Kaufmann Publishers Inc.
- Gartenberg, C. 2017. "Should You Say 'Please' and 'Thank You' to Your Amazon Echo or Google Home?," from <https://www.theverge.com/circuitbreaker/2017/12/10/16751232/smart-assistants-please-thank-you-politeness-manners-alexa-siri-google-cortana>
- Greene, T. 2018. "Review: Anki's Vector Is an Always-on Robot Companion for the Whole Family." Retrieved 1/23/2019, 2019, from <https://thenextweb.com/plugged/2019/01/18/microsoft-is-euthanizing-windows-10-mobile-in-2019/>
- Hair, J. F., Black, W. C., and Babin, B. J. 2010. *Multivariate Data Analysis: A Global Perspective*. Pearson Education.
- Holmes, J. 1993. "New Zealand Women Are Good to Talk To: An Analysis of Politeness Strategies in Interaction," *Journal of Pragmatics* (20:2), pp. 91-116.
- Holmes, J., and Wilson, N. 2017. *An Introduction to Sociolinguistics*. Taylor & Francis.
- Inagaki, K., and Hatano, G. 1987. "Young Children's Spontaneous Personification as Analogy," *Child Development* (58:4), pp. 1013-1020.
- Ingraham, C. 2017. "Not Only Are Americans Becoming Less Happy -- We're Experiencing More Pain Too," in: *The Washington Post*.
- Knote, R., Janson, A., Eigenbrod, L., and Söllner, M. 2018. "The What and How of Smart Personal Assistants: Principles and Application Domains for Is Research," *Not Sure . . . Is it Alexandria?*.
- Koestier, J. 2018. "Smart Speaker Users Growing 48% Annually, to Hit 90m in USA This Year." Retrieved 1/23/2019, 2019, from <https://www.forbes.com/sites/johnkoestier/2018/05/29/smart-speaker-users-growing-48-annually-will-outnumber-wearable-tech-users-this-year/#3ec1907a5dde>
- Kwon, M., Jung, M. F., and Knepper, R. A. 2016. "Human Expectations of Social Robots," 2016 11th ACM/IEEE International Conference on Human-Robot Interaction (HRI), pp. 463-464.
- Lopatovska, I., and Williams, H. 2018. "Personification of the Amazon Alexa: Bff or a Mindless Companion," in: *Proceedings of the 2018 Conference on Human Information Interaction & Retrieval*. New Brunswick, NJ, USA: ACM, pp. 265-268.
- Murph, D. 2016. "Iphone 4s Hands-On!," from <https://www.engadget.com/2011/10/04/iphone-4s-hands-on/>
- Nass, C., Moon, Y., Fogg, B. J., Reeves, B., and Dryer, C. 1995. "Can Computer Personalities Be Human Personalities?," in: *Conference Companion on Human Factors in Computing Systems*. Denver, Colorado, USA: ACM, pp. 228-229.
- Nass, C., Steuer, J., and Tauber, E. R. 1994. "Computers Are Social Actors," in: *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. Boston, Massachusetts, USA: ACM, pp. 72-78.
- Ogiermann, E. 2009. "Politeness and in-Directness across Cultures: A Comparison of English, German, Polish and Russian Requests," in: *Journal of Politeness Research*. Language, Behaviour, Culture. p. 189.
- Ough, T. 2018. "When Should I Say Thank You? A Field Guide." Retrieved 1/23/2019, 2019, from <https://www.telegraph.co.uk/men/thinking-man/should-say-thank-field-guide/>
- Piotrowski, D., and Hoot, J. 2008. "Bullying and Violence in Schools: What Teachers Should Know and Do," *Childhood Education* (84:6), pp. 357-363.
- Plante, T. G. 2016. "Is Civility Dead in America?," in: *Psychology Today*.
- Purinton, A., Taft, J. G., Sannon, S., Bazarova, N. N., and Taylor, S. H. 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*. Denver, Colorado, USA: ACM, pp. 2853-2859.

- Rosenthal-von der Pütten, A. M., Schulte, F. P., Eimler, S. C., Sobieraj, S., Hoffmann, L., Maderwald, S., Brand, M., and Krämer, N. C. 2014. "Investigations on Empathy Towards Humans and Robots Using Fmri," *Computers in Human Behavior* (33), pp. 201-212.
- Salem, M., Ziadee, M., and Sakr, M. 2014. "Marhaba, How May I Help You?: Effects of Politeness and Culture on Robot Acceptance and Anthropomorphization," in: *Proceedings of the 2014 ACM/IEEE international conference on Human-robot interaction*. Bielefeld, Germany: ACM, pp. 74-81.
- Schnitker, S. 2012. *An Examination of Patience and Well-Being*.
- Sterling, G. 2018. "Smart Speaker Sales Grew 103% Last Year." Retrieved 1/23/2019, 2019, from <https://searchengineland.com/smart-speaker-sales-grew-103-last-year-289626>
- Suler, J. 2004. "The Online Disinhibition Effect," *CyberPsychology & Behavior* (7:3), pp. 321-326.
- Truong, A. 2016. "Parents Are Worried the Amazon Echo Is Conditioning Their Kids to Be Rude." Retrieved 1/23/2019, 2019, from <https://qz.com/701521/parents-are-worried-the-amazon-echo-is-conditioning-their-kids-to-be-rude/>
- Zwass, V. 2016. "Speech Recognition," in: *Encyclopædia Britannica*.