Imagining the Voice in the Machine:

The Ontology of Digital Social Agents

BY

ANDREA L. GUZMAN
B.A., Truman State University
M.A., Northern Illinois University

THESIS

Submitted as partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Communication
in the Graduate College of the
University of Illinois at Chicago, 2015

Chicago, Illinois

Defense Committee:

Steve Jones, Chair and Advisor
Zizi Papacharissi
Adrienne Massanari
Clifford G. Christians, University of Illinois Urbana-Champaign
Jason Leigh, University of Hawai'i

This dissertation is dedicated to my husband who gave me the support and courage to step on the train that first day of school and to keep moving forward every day since.

ACKNOWLEDGMENTS

To my committee, thank you for giving your precious time to my scholarly development. Zizi, thank you for helping me to understand that being successful is not about being perfect but about being persistent. Adrienne, our discussions regarding navigating qualitative research have been invaluable as have our chats regarding succeeding in academia as an emerging scholar. Jason, you went above and beyond as an outside member and have taught me not only about AI but also about working across disciplines. Cliff, thank you for sharing your vast knowledge and for challenging me to think about the even bigger questions. Steve, I cannot list all of things you have done for me as you have guided me through grad school. Above all, Steve, thank you for being patient with me as I struggled, for continuing to push me, and for believing in me. All of you have shown me that being a scholar is not a solitary pursuit but a path in which we all learn from one another. I will do my best to pay forward everything you have done for me.

I also want to thank my peers and colleagues. Emilie, Adriane, Fede, Will, Jenny, and Renee, thank you for your support. To Miao, I am glad to have made this journey with you. Thank you, Catherine, for your help in reaching the "other side." Sabrina, thank you for supporting me on the bad days and helping me find the good days. Kelly, thank you for keeping your door open. Christina and Mamie, your help is greatly appreciated.

To my participants: thank you for giving a few moments of your time to a stranger.

This dissertation would not have been possible without my family who supported me emotionally, physically, and spiritually. It was hard not seeing you much, but knowing you were pulling for me kept me going. Helga, I wish you were here to see this.

ALG

TABLE OF CONTENTS

CHAPTER		PAGE
1.	INTRODUCTION: DIGITAL SOCIAL AGENTS IN OUR WORLD	1
2.	BACKGROUND: DIGITAL SOCIAL AGENTS & THEIR COMPLICATION OF COMMUNICATION	9
2.1	The Dual Nature of the Computer	9
2.2	Complicating Communication	12
2.2.1	Challenging Technology's Role in Communication Research	13
2.2.2	Challenging Conceptions of Mass and Interpersonal Communication	15
2.2.3	Challenging the Definition of Communication	20
2.3	Taking on the Challenge of Digital Social Agents	22
3.	LITERATURE REVIEW: COMING TO KNOW THE SELF AND OTHER THROUGH COMMUNICATION	24
3.1	The Meaning of Things	26
3.2	The Meaning of People	28
3.3	The Meaning of Digital Social Agents	30
3.4	A Sense of Presence	31
3.4.1	Presence, with Humans	32
3.4.2	Cultural Presence, of Technology	35
3.4.3	Presence, of New Media	37
3.4.4	The Presence of Digital Social Agents	43
3.5	Our Construction of Digital Social Agents	45
3.5.1	Forming Impressions	46
3.5.2	The Self and Others "in Everyday Life"	51
3.5.3	Seeing One Another	54
3.5.4	Impressions of Technology	55
3.5.5	Impressions of Presence	60
3.6	Giving Digital Social Agents a Voice	62
3.7	Investigating the Voice in the Machine	66
4.	METHOD: OUR INTERPRETATIONS OF AGENTS	70
4.1	A Qualitative Approach	70
4.2	Qualitative Methods	72
4.3	Study Population	79
4.4	Observation and Interview Protocol	80
4.5	Documentation and Storage of Data	84
4.6	Coding and Analysis	85
4.7	Ethics	89
4.8	Terminating Data Collection	92
4.9	Overview of Interview and Observational Data	92

TABLE OF CONTENTS (continued)

CHAPTER PAGE

PART I: VOICES IN AND OF THE MACHINE 97

5. SPEAKING WITH AND THROUGH THE PHONE 98
   5.1 The Voice Of the Machine 99
   5.2 The Voice In the Machine 101
   5.3 Grasping at the Disembodied 104
   5.4 Choosing Between Voices 109
   5.5 An Entity Unto Itself 113

6. EPHEMERAL BEINGS AND LIFELESS THINGS 114
   6.1 Being-with 115
   6.2 Unwelcome Presence 116
   6.3 Party Line 117
   6.4 Shifting Presence 121
   6.5 Lifeless Tools 125
   6.6 Social Things 126
   6.7 Different States of Being 130
   6.8 Changing Experiences of Presence 132

7. THE IDENTITY OF DIGITAL VOICES 138
   7.1 A Crowd of Voices 139
   7.2 Competing Voices 140
   7.3 A Known Voice 142
   7.4 Merging Voices 146

PART II: THE ARTIFICIAL FRONT 149

8. WHAT WE HEAR IN AGENT VOICES 152
   8.1 Demographics of Digital Voices 152
   8.1.1 Gender: Pervasive Female Voices 153
   8.1.2 Nationality & Race: White, American Voices Speaking "Good English" ... 157
   8.2 Human Voices 160
   8.3 Artificial Voices 161
   8.4 Converging Voices 163
   8.5 Vocal Mash-ups 165
   8.6 Schizophrenic Voices 167

9. WHAT WE SEE WHEN WE HEAR AGENTS 169
   9.1 White Women 170
   9.2 Woman on the Line 172
   9.3 Humanoid Robots 174

TABLE OF CONTENTS (continued)

CHAPTER PAGE

9.4 Talking Screens 177
9.5 The Unimagined 178
9.6 Dueling Senses, Dueling Images, Dueling Natures 179

10. WHAT WE THINK OF AGENTS 185
10.1 Alternative Tools 185
10.2 Vague Voices 187
10.3 Social Interactions 189
10.4 Personal Assistants 190
10.5 Tools and Beings at Our Service 192
10.6 Congruence and Contradiction 194
10.7 Rise of the Machine 196

PART III: OUR LIVES WITH DIGITAL SOCIAL AGENTS 199

11. THE AWESOME WEIRDNESS OF SPEAKING WITH MACHINES 200
11.1 Awesome Impressions 200
11.2 Weird Encounters (of the agent kind) 201
11.3 Awesome Weirdness 204
11.4 Typing is for Machines 205
11.4.1 Old-Fashioned Googling 207
11.4.2 High-Tech Gimmick 209
11.4.3 Learning to Speak with Machines 210
11.4.4 Life On-The-Go 213
11.4.5 Convenient Laziness 214
11.5 Meeting of the (Artificial & Biological) Minds 217
11.5.1 Miscommunication 218
11.5.2 Empty Dialogue 220
11.5.3 Effective Communication 221
11.5.4 Artificial Communication 223
11.6 Shifting Senses of Communication 224

12. ONTOLOGICAL UPHEAVAL 226
12.1 Confusion and Instability 227
12.2 Our Sense of Things 229
12.3 Our Sense of Self 237
12.4 Humans: The Machine-Speaking Animal 242

13. CONCLUSION: NEW WAYS FORWARD 249
13.1 A Multitude of Images Within the Machine 250
13.2 A New Understanding of the Artificial 254

TABLE OF CONTENTS (continued)

CHAPTER PAGE

13.2.1 Establishing the Artificial Front 254
13.2.2 An Awareness of Presence 258
13.2.3 Coming into Being Through Communication 260
13.2.4 The Importance of Talking to Humans 262
13.3 Limitations 264
13.4 A New Agenda for Studying Agents and HMC 266

APPENDIX 269

REFERENCES 276

VITA 299

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
CMC	Computer-Mediated Communication
CS	Computer Science
HCI	Human-Computer Interaction
HMC	Human-Machine Communication
ICD	Informed Consent Document
ICT	Information and Communication Technology

SUMMARY

In 2011, Apple introduced Siri, a voice-based, artificial intelligence application that functions as a type of virtual "assistant." Although digital and automated voices already had been part of people's lives in Western cultures in the form of GPS systems, phone answering services, and public address systems, Siri was the first program available to the general public that combined natural language vocal capabilities with AI. Since then, other major technology companies have developed their version of a virtual assistant. These programs along with numerous other applications developed for a variety of devices, including emerging home-based systems, are part of a class of technologies that I label "digital social agents." The proliferation of digital social agents and our interactions with them are part of a larger cultural transition in which artificial entities play a greater role in our lives. We now regularly engage in Human-Machine Communication, or HMC, with numerous devices and programs. In this dissertation, I focus on our conceptualizations of our new digital interlocutors, specifically agents. The overarching question guiding this research was, "What, or who, are voice-based digital social agents to users and non-users?" This dissertation explores the ontology of digital social agents.

My exploration of digital social agents proceeds from the epistemological position that our understanding of our world, including objects and people, is formed in and through communication. Consistent with this perspective, I adopted a qualitative approach and sought to understand the ontology of digital social agents from the perspective of people and their lived experiences. I observed people's public interactions with digital social agents and conducted 51 field interviews, following the specific method of active interviewing (Holstein & Gubrium, 1997), with people about their use and understanding of digital social agents and themselves. Concurrent with my observations and interviews, I qualitatively coded and analyzed the data.

SUMMARY (continued)

From my findings emerge not only answers to my larger research questions but also new insights into communication and life inside a culture populated by biological and artificial entities.

Our understanding of digital social agents is highly complex and is formed through our direct and indirect interaction with agents. We assess agents through a concept I refer to as the artificial front, an extension of the personal front (Goffman, 1959). We take into account their appearance, which largely consists of how they present themselves to us through their voice and their manner, how they communicate with us, and how they perform specified tasks. Many people do not have a single image of who or what the agent may be but multiple conceptualizations depending on whether the person is focusing on an agent's voice or the agent in its totality. Participants perceive both human and machine-like characteristics in agents, and people's interpretations of these characteristics both emerge from and guide their interaction with the agent. People also take into account how they have interacted with machines previously, usually through typing in requests, when deciding whether to engage with agents and the roles that agents perform in their lives. Based on their interactions with agents, including the program's voice and how it communicates, some participants perceive themselves as being in the presence of a life-like entity while communicating with the agent.

But agents are more than digital programs that may or may not offer us a better way of controlling our digital devices, usually mobile, or finding information. They are a new way of "sensing" computers and machines. We speak with and hear agents (oral-aural communication) instead of typing with them (haptic-visual communication). This shift in the senses we use to interact with agents has brought with it a shift in our understanding of what computers and machines are to us. Individually and collectively we often think of agents in contradictory terms

as we are confronted with a technology that is unrecognizable and recognizable at the same time. I argue in this dissertation that the ontology of agents marks an evolution in the overall ontology of machines.

Our interactions with other people influence who we understand ourselves to be, and our communication with agents also brings with it a new sense of who we are in light of talking, sentient machines. Most participants decide whether or not to integrate agents into their lives based on technological parameters. Many of the benefits and drawbacks for individuals and society overall that participants discuss in relation to digital social agents mirror those of other technologies i.e. efficiency versus laziness. Participants think life-like machines and artificial intelligence can affect who we are as humans; however, they do not think agents are the type of radical technology that can shape our ontology. But, as I also argue, our ontology does change along with the ontology of the machine: we are now machine-speaking animals. The implications of this shift are harder to grasp, however, but they are no less important.

I conclude by discussing the theoretical, epistemological, and methodological implications of this dissertation's findings. Of key importance is that communication is at the center of what digital social agents are to us and what we become in light of them. The study of agents and HMC is just beginning. I explore possibilities for future studies that build on this dissertation, and I also advocate for a research trajectory for HMC that focuses on our humanity, not just technology.

1. INTRODUCTION: DIGITAL SOCIAL AGENTS IN OUR WORLD

In news reports and pop culture portrayals, digital agents such as Siri become social actors who possess varying human and machine characteristics and engage, to different degrees, in relationships with human interlocutors. While the anthropomorphization of a digital application serves in news media accounts as a heuristic for explaining the technology (Guzman, 2013) and in pop culture as entertainment, with a side of social commentary, the portrayals also evoke legitimate questions underlying communication between humans and digital entities: "When people engage with voice-based, digital social agents with what or with whom do they think they're communicating?" My dissertation explores the ontology of voice-based, digital social agents from the perspective of both users and non-users as formed though human-machine communication, or HMC. Theories and concepts regarding presence – our awareness of other beings and our sense of closeness to them – and the "personal front" Goffman (1959) – our interpretation of an other's appearance and manner – inform this study. I employ qualitative research methods blending observation and interviews to engage with our personal interpretations of digital assistants such as Apple's Siri, Microsoft's Cortana, and Google Voice Search and to better understand the ways we come to see ourselves in light of these increasingly life-like technologies.

Some mass media portrayals of voice-based digital social agents, most notably Siri, suggest that these programs have a dual nature. When Siri was released with the iPhone 4s in 2011, news media accounts anthropomorphized the digital assistant (Guzman, 2013). Journalists described *her* as a personal assistant, servant, or even idealized intern *who* is, among numerous personality traits, "smart," "funny," and "sassy." Siri also was transformed from digital entity to human companion in popular culture. In Milgrim's (2012) book, *Siri & Me: A Modern Love*

Story illustrations accompanying the story of infatuation with technology initially represent Siri as text lines on a mobile phone screen. As the male protagonist draws emotionally closer to Siri, he begins to imagine *her,* now depicted in illustrations as the bust of a blonde female inhabiting the mobile phone screen, as his "guardian angel" and, finally, his lover. Siri also is the object of sexual desire for Raj, a male character on the U.S. television comedy *The Big Bang Theory* (Cendrowski, 2012). When introduced, Siri is aurally portrayed as a female voice emanating from a mobile phone, but, by the episode's conclusion, Siri takes the form of a flesh-and-blood brunette offering to perform sexual favors for Raj. In the movie *Her,* a lonely man falls in love with a female OS that quickly evolves from a virtual assistant to intimate partner. However, just as quickly as a technology is positioned as human in pop culture, *it* becomes a program once again. News accounts that refer to Siri as a *she* with a human personality in one sentence, describe *its* technological attributes and shortcomings in the next (Guzman, 2013). Male characters in television shows, books, and movies, eventually realize that the objects of their overt sexual desires are nothing more than a machine. In mass media portrayals, digital social agents oscillate between human and machine. But what about in the minds of individuals?

My research comes at a crucial cultural juncture as we are transitioning from a society accustomed to computers that we type with to a culture interacting with sentient entities in human-like ways. As Turkle (2007) explains, the United States and many other industrialized countries are transitioning from a "culture of the machine" to "the culture of the robot." Although images of talking, sentient entities have had a continuous presence in popular culture for more than a century (Sconce, 2000) and scientists have developed and interacted with life-like digital entities and robots within labs, it is only recently that the general population has had this technology in the palm of their hand or their back pocket, purse, or backpack. When Apple

released Siri in 2011, it marked the first time that an advanced, general use AI technology was widely marketed and readily available to consumers (Guzman, 2013). Since Siri's release, other technology companies have developed their own versions making these technologies available to an even wider audience: Google Voice Search, Microsoft's Cortana, Samsung's S-Voice. In addition to mobile phones, personal assistants are now available on laptops and tablets, and voice-based applications, although not necessarily agents, are being integrated into other ambient technologies. And so, we are becoming aware of these technologies and using them at increasing rates, but, as I explain throughout this proposal and other scholars have argued (e.g. Wang & Nelson, 2014; Zhao, 2006), our understanding of our interactions with computers and software and their use in everyday life is nascent. Part of the reason for this lack of research is that, logistically, we as researchers cannot begin to study people's interactions with technologies in daily life until they have adopted a technology. The study of technological transitions, then, is an important moment for researchers – and society – but as Jones (2010) observes, one that has been largely overlooked. This dissertation documents people's early understanding of digital social agents and forms a foundation for ongoing studies that are anticipated as we move further into a society populated by both robots and people. A key aspect of investigating the ramifications of intelligent machines is the exploration of the nature of the devices from both technological and social perspectives. My dissertation furthers knowledge of the social nature of digital agents.

The ontology of advanced digital entities not only raises questions for society in general but also communication researchers. As robots and digital programs have begun to act in increasingly social ways, communication scholars have started to rethink the discipline's approach to conceptualizing and studying machines (e.g. Gunkel, 2012; Jones, 2014). Although

some of the most prolific and influential researchers in HCI have been Communication scholars, notably Nass, Reeves, and Sundar, HMC has largely been overlooked within the study of Communication more generally (Gunkel, 2012; Guzman, 2014; Jones, 2014). We have defined technologies as media through which messages pass, not as sources of communication (Gunkel, 2012; Guzman, 2014). This dissertation is part of an emerging research movement to bring the study of HMC into Communication and to advance new concepts and theory for the study of HMC. Much of the existing HCI research, including studies conducted by Communication scholars, has explored our interactions with devices and interfaces in labs (Wang & Nelson, 2014) with a focus on behavior toward a singular trait emphasized in a particular technology, such as gender or personality. I approach the complexities of our understanding of the characteristics and attributes of digital entities through people's own interpretations of their experiences with machines, and I demonstrate how what we know of agents, and ourselves in light of them, emerges in and through direct and indirect communication. From my findings, I stake out new theoretical and methodological approaches to the study of digital social agents as well as HMC.

Beyond its contributions to Communication scholarship, an understanding of the social nature of digital agents can contribute to the advancement of knowledge in multiple disciplines and fields including Computer Science and HCI. This study's findings provide CS and HCI scholars with insight into the multiple characteristics people assign to programs and how these traits comprise people's overall understanding of agents. It also provides a glimpse into how people incorporate agents into their daily lives and why they do or do not interact with them at all or in certain places. CS and HCI scholars can use this information to design the next generation of agents and other social technologies.

A crucial aspect of any research project is to clearly and succinctly define all concepts and the subject of study, but selecting a term for the class of artificial intelligence programs in which I was interested proved complicated. In this dissertation, I am focusing on voice-based, artificial intelligence programs that function as personal assistants. The study of artificial intelligence programs and how they relate to humans spans numerous fields including computer science, HRI, HCI, psychology and communication with disagreement regarding concepts across disciplines and within them. As von der Pütten et al. (2010) et al. explain, researchers often use multiple terms interchangeably to refer to virtual entities including avatar, embodied conversational agent, and virtual assistant. Within the social sciences, terms such as "humanoid" (e.g. Zhao, 2006) and "social robot" also take on a variety of meanings (Fortunati, 2013; Höflich, 2013; Linke, 2013)

Communication, anthropology and sociology researchers stress the social nature of devices and programs in their naming of specific classes of software and hardware. Zhao (2006) delineates between human-computer interaction and human-humanoid interaction with the former referring to people's use of machines optimized for humans and the later to communication with machines standing in for humans. Zhao employs the term "humanoid social robots" to denote "user friendly computers that operate as humans" (p. 403). Building on Zhao's (2006) work, contributors to the inaugural issue of *Intervalla* drop the humanoid adjective as they extend the concept of social robots to simultaneously refer to "ICTs turning into a human-like entity as well as humans turning into ICTs" (Sugiyama & Vincent, 2013, p. 3). In this context, social robots encompass autonomous, physical entities such as PARO and also software such as Siri (Linke, 2013). While this definition of social robot is novel – and, importantly, stresses the merging of humans and machines – its broad application renders it imprecise.

Concepts from computer science and artificial intelligence stress the design and function of software or hardware. According to Balakrishnan & Honavar (2001), an entity can be classified as an "intelligent agent," or agent, for short, if "it demonstrates behaviors that would be characterized as intelligent if performed by normal human beings under similar circumstances" (p.1). Here human-like behavior is the autonomous processing of information, and the term agent refers to both robots and programs (Balakrishnan & Honavar, 2001). Lieberman and Selker (2003) equate "agent" with software that perform functions normally assigned to humans in assistive roles: "The image of an agent or agent-oriented system as acting in a helping role like a butler, secretary, or service organization is most vivid when that helping role is reflected directly in interaction with the user" (p. 1). "Agent" adequately captures both the AI and assistive qualities of the programs I am investigating here, but it does not fully account for their social nature. In their research on the social presence of agents, Skalski and Tamborini (2007) employ "social agent" to refer to software that simultaneously "functions in an 'intelligent' way" and is designed to engage socially with human users. However, "social agent" also can refer to human actors within a particular system (e.g. Zia, Riener, Farrahi, & Ferscha, 2012). To differentiate between human and machine agents, I use the term "digital social agent" throughout this dissertation to generally refer to the class of software encompassing the programs I am studying.

In the coming pages, I simultaneously build my argument for the importance of this research while laying out the direction of this study before discussing its findings and the implications of these findings. I begin by explaining how the increasingly social design of machines and programs challenges the ontology of both machines and humans as Turkle (1984) and other researchers have argued. Because communication has been and remains to be an

integral aspect to who we are as humans, I argue that the ability of machines to communicate in human-like ways is a crucial aspect of this renegotiation of the biological and the mechanical. And so, our interactions with machines are of critical importance to communication scholars. Indeed, digital social agents and our interactions with them are the latest extension of the "crisis of new media" (Lievrouw, 2009) raising questions of how we define communication.

After laying out the cultural and communicative importance for this study, I argue that our communication with and about these technologies holds the key to our cultural and personal perceptions of them. What follows is a review of how we come to see humans through communication, and the theories and concepts we have started to form regarding our interactions with machines, with the former – theories of human communication – informing the latter. Although research has been underway for several decades in HCI, I argue that we still do not have a clear understanding of people's interpretations of digital social agents – noting, of course, that we can never fully understand the thoughts of another person. I then argue how a qualitative approach to how people conceptualize digital social agents can address the information that has eluded us in laboratory experiments and begin to provide us with a greater understanding of exactly who or what these entities are to us as they become a greater part of our daily lives.

Once I have set the epistemological, theoretical, and methodological groundwork for this dissertation, I explain how I carried out the research. I observed people's use of technology in public places within a large Midwestern city and engaged 51 participants in active interviews (Holstein & Gubrium, 1995) regarding their use of digital social agents, their understanding of agents, and their conceptualizations of them. I also talked with people about their overall perceptions of technology, including the difference between humans and computers, as well as

how their use of technology and digital social agents figures into who they are as individuals and who we are as humans. Qualitative coding and analysis were concurrent with data collection.

From this study's findings emerge a complex and nuanced picture of how people think of digital social agents and themselves. I present these findings in three sections: "Voices *In* and *Of* the Machine," "The Artificial Front," and "Our Lives with Digital Social Agents." In the first section, "Voices *In* and *Of* the Machine," I discuss the many different ways people decipher agent voices including whether they think of the agent as a device or a separate entity that can be a social thing or a sentient, social entity. Once I have explained how people perceive agents as digital entities, I then explore the specific traits and attributes participants assign to agent voices and agents overall in "The Artificial Front." Next, I discuss how a shift in the senses we use to interact with digital social agents is an important aspect of how we understand agents and ourselves in "Our Lives with Digital Social Agents." Finally, I bring all of these separate findings together and discuss new research directions in the conclusion, "New Ways Forward."

2. BACKGROUND: DIGITAL SOCIAL AGENTS & THEIR COMPLICATION OF COMMUNICATION

2.1 The Dual Nature of the Computer

The challenges that artificial intelligence actors pose for society generally and for the study of communication in particular are rooted in their nature. According to Turkle (1984), computers are marginal objects – devices that defy ontological categorization. The computer is at once a physical thing and a psychological entity. Computers are physical in that they are tangible objects that we use to accomplish tasks: they are tools created and controlled by humans. Yet, Turkle continues, people think of a computer as if it is something more than a thing. It has a certain liveness and serves as a site of exploration and reflection for who we are as humans. Turkle (1984) explains: "The computer is a 'metaphysical machine,' a 'psychological machine,' not just because it might be said to have a psychology, but because it influences how we think about our own" (p. 16). The seemingly opposite natures of the computer – the physical and the psychological – are connected, with each informing the other. Neisser (1966) explains this entanglement: "The notions that the brain is like a computer, that man is like a machine, that society is like a feedback system, all reflect the impacts of cybernetics on our idea of human nature. This metaphoric status of the computer is closely bound up with its use as a tool" (p. 72). We build ourselves tools and then interpret ourselves through them (Hayles, 2005; Neisser, 1966; Turkle, 1984), and we have been engaging in this process long before the introduction of computers (Hayles, 2005; Neisser, 1966). Since antiquity, we have sought to better understand ourselves through comparisons with other living things and inanimate objects (Berryman, 2007) and built automata to study life (Husbands, Holland, & Wheeler, 2008; Riskin, 2007)

What sets today's computers apart from their mechanical predecessors is that they can "think" and – more importantly – interact in human-like ways. In 1966, when computers were rudimentary, Neisser (1966) argues that machines have become even more like humans, and humans appear to be more like machines. People think of computers as life-like because they can process information – a task once thought exclusively to be in the realm of humans. The ability to communicate, however, is more crucial to our perception of machines as intelligent and alive. Gunkel (2012) argues that Turing's "test" of machine intelligence goes beyond the computation of information to the ability to communicate: "It is, therefore, evidenced and decided on the basis of behaviors that are considered to be a sign or symptom of intelligence—communication in general and human-level verbal conversation in particular" (p. 5). To be perceived as intelligent or, more accurately, as possessing a *human*-like intelligence, machines must be able to communicate in a way we recognize as life-like.

The connection between communication and our perception of computers as alive is captured in Bennahum's (1998) *Extra Life*, a memoir of growing up during the cultural transition to the Information Age. Bennahum (1998) recounts how the introduction of toys that could interact with him raised his awareness that something was different about digital machines:

> Part of the success of digital toys lay in their nature: they were not just toys, but *playmates*. I never realized how lame my toys were until I saw Merlin. My old toys – Star Trek dolls, plastic guns – were dead things . . . [Digital toys] played back, reacting to what you did. And in this was something entirely new: an experience in communication – dialogue – with an inanimate object. (p. 25)

The difference between a dead, mechanical toy and an alive, digital toy is communication. Several years later, Bennahum (1998) again experiences the computer as being almost life-like through his communication with it. This time, the communication is more human-like than the blinking lights and robotic sounds of toys. Bennahum programs his computer to greet people --

"Hello there. What is your name?" – and to personalize a response – "Nice to meet you, Michael." He then records the reaction he and family members had to seeing the computer return this personalized reply over and over: "We stared at the screen as the text flew by in an endless loop. They were mesmerized" (p. 75). Bennahum and his family are awed by the computer because it communicates with them in a way no machine has before. As Turkle (1984) argues, the "evocative nature" of the computer rests "on the fact that people tend to perceive a 'machine that thinks' as a 'machine who thinks'" (p. 25). The machines first described as life-like by Neisser are rudimentary by today's standards, as are the computers programmed by Bennahum and studied by Turkle. Suchman (2009), drawing on Turkle's concept of the marginal object, argues in the early oughts that the divide between machines, as tools, and humans, as the only social beings, is further eroding: "Although the distinction has been relatively nonproblematic to date, now for the first time the term *interaction*, in a sense previously reserved for describing a uniquely interpersonal activity, seems appropriately to characterize what goes on between people and certain machines as well" (p. 34). Today's social digital agents are programmed with gender, occupational and personality cues and speak in human-like voices with the goal of more completely replicating human communication.

Because they do not have a fixed nature, marginal objects call ontological boundaries into question, according to Turkle (1984): "On the lines between categories, they draw attention to how we have drawn the lines. Sometimes in doing so they incite us to reaffirm the lines, sometimes to call them into question, stimulating different distinctions" (p. 31). Since their introduction, thinking (and communicating) machines have challenged our definition of living and dead and what it means to be human. In addition to arguing the future intellectual capability of machines, Turing's (1948, 1950) foundational works also address cultural concerns regarding

the now contested division between humans and machines. Regarding advances in intelligent computers in the 1960s, Diebold (1966) asks, "What, we must now seriously ask, are the characteristics that are truly, uniquely human?" (p. 6). This question remains relevant as developers cloak digital actors with human qualities. One human characteristic that is being challenged is the ability to communicate. For communication researchers, computers and increasingly sophisticated artificial intelligence agents that interact with us in human-like ways challenge the way we have approached the study of technology in communication and our very definition of communication itself as I discuss in the next section.

2.2 Complicating Communication

A full appreciation of the challenges that digital social agents pose for communication requires an understanding of the current state of communication study. Digital entities are not challenging uniform definitions and well-accepted theories in a cohesive discipline. Instead, they are upsetting what has been and continues to be a fractured area of academic research (Entman & Steinman, 2008; Herbst, 2008; Lievrouw, 2009; Schramm, 1997; Simonson, Peck, Craig, & Jackson, 2013). The divisions in communication studies are drawn numerous ways: by subject of inquiry, such as mass versus interpersonal communication (Entman & Steinman, 2008; Lievrouw, 2009; Schramm, 1997); along professional organizational affiliation, NCA, ICA, and AEJMC (Entman & Steinman, 2008); and by philosophical approach to research (Anderson & Baym, 2004). The discipline, or field — yet another point of contention (Shepherd, 1993) – also lacks a unifying definition of its key concept, communication (Dance, 1970; Entman & Steinman, 2008; Littlejohn & Foss, 2008; Peters, 2012). The questions that digital social agents raise regarding existing theories and concepts, therefore, vary among the numerous divisions within communication studies; however, there are overarching questions and challenges that

span these fractures. Computers and, particularly, digital interlocutors challenge the role of technology in communication research, the dividing line between interpersonal and mass communication, and the definition of communication itself. Some of the ideas presented in the following sections I have discussed in in my paper "From Channel to Communicator: Rethinking the Role of Technology in Communication" (Guzman, 2014).

2.2.1 Challenging Technology's Role in Communication Research

Computers and other ICTs that function as digital interlocutors challenge the human-centric focus of communication scholarship. A key aspect of any field or discipline is what qualifies as a subject of study, and research regarding communication has largely been restricted to the exchange of messages between and among humans. Cooley (1897/2004), whose works provide part of the foundation for mass communication research (Peters & Simonson, 2004), states that society is formed through communication in and among humans. Later scholars carried forward this human-centric approach in theory and practice (c.f. Schramm, 1973). From the Progressive Movement through today, communication scholars have focused their research on the development of society and self; media effects; media production; the medium itself; and interactivity (Guzman, 2014). And the vast majority of this scholarship, including media effects studies that represent the largest body of mass communication research (Jensen, 2012), positions technology as a channel, or medium, through which messages pass from human-to-human. Communication is largely conceptualized as a human-centric process occurring through technology, not with it; although, there are exceptions that I will discuss later.

This focus on humans in communication research is not surprising given how we, as a species, have recently attempted to define ourselves. The opening lines to Peters (2012), *Speaking into Air*, exemplify the importance of communication to our concept of humanity:

"Though humans were anciently dubbed the 'speaking animal' by Aristotle, only since the late nineteenth century have we defined ourselves in terms of our ability to communicate with one another" (p. 1). We have conceptualized communication as human-centric because we believed that we, humans, were the only ones who could intelligently take part in this process.

The challenge to communication posed by computers has been percolating since their introduction. In the mid-twentieth century when electronic computers were introduced, scholars within the field of cybernetics defined communication as a process that not only humans but also machines engaged in (e.g. Wiener, 1954). The models these scholars developed regarding the transmission of messages within machines would become the foundational models of human communication research (Littlejohn & Foss, 2008), but, ironically, these paradigms positioned machines as media through which people communicated with one another. Other scholars acknowledged the communicative process between humans and machines, but viewed it as limited or of lesser importance than human communication. In the *Nature of Communication Between Humans*, Schramm (1971) gives a nod to communication between humans and animals as well as between humans and machines and from machine to machine: "Humans communicate quite successfully with machines (e.g., computers); and machines, as Shannon points out in his definition, can communicate effectively with each other within the limits of capability designed into them" (p. 14). Given the limited nature of the input and output of early computers, scholars could easily distinguish between human communication and machine processing. Humans used an evolved language, machines processed information on a system of open and closed, 1s and 0s. In forecasting how humans and computers could enter into a symbiotic relationship, Licklider (1960) identified "the language problem" – the inability of computers and humans to communicate with one another on human terms – as a key hurdle to be addressed.

In the past half-century, advances in technology and its design have made great progress in overcoming the language barrier (Gunkel, 2012; Suchman, 2009). Users can enter a query into a search engine, such as Google, and receive information back that makes sense to them. Computers respond to typed human inquiries or commands with text and nonverbal messages, and, more recently humans and digital social agents, such as Siri, began to vocally speak with one another, even exchanging jokes. As this language barrier has eroded, some scholars have begun to approach computers not as media but as interlocutors. Nass, along with Reeves, adapted theories of human-to-human communication to human-computer interaction and demonstrated that people's behavior toward machines parallels social interaction with humans (Reeves & Nass, 1998). The coupling of social agents with advancements in AI also has attracted attention from scholars interested in our relationships with social robots (e.g. Halpern & Katz, 2013; Höflich, 2013) and humanoids (Zhao, 2006). Given the role of ICTs as interlocutors in the communicative process, scholars such as Gunkel (2012) have argued for a shift in the way we approach technology away from a CMC model. And so, thinking machines that interact with us challenge the premise that only humans can communicate, and, in doing so, call into question how communication scholars have defined our object of study and approached technology in research. While communication scholarship within the past two decades has started to address the role of technology as interlocutor, work in this area is still developing.

2.2.2 Challenging Conceptions of Mass and Interpersonal Communication

Computers and social digital agents also raise questions regarding the division between mass and interpersonal communication, the largest schism traditionally segregating communication research (Entman & Steinman, 2008; Lievrouw, 2009). The interpersonal side of communication studies has encompassed scholarship regarding face-to-face interaction, while

mass communication has involved some form of technology acting as mediator (Lievrouw, 2009). The division is the result of evolution of communication and the tools we developed to interact with one another. Interpersonal communication, which encompasses public speaking, can trace its origins to early world religions and the Greco-Latin rhetorical tradition when oral communication was the dominant form of communication (Simonson et al., 2013). Mass communication research, however, is newer, emerging with the development of communication technologies during the Industrial Revolution and has as its focus those media (Pooley, 2008; Simonson et al., 2013). Schramm (1997) explains, "Communication differs from other social sciences in that an industry – the mass media – stands behind the academic field" (p. 155). The dividing line is not exclusively drawn based on technology and often incorporates the number of people involved in communication, the degree to which they can interact with one another, and the characteristics of the people or entities involved. Schramm's (1971) classic model defines mass communication as the sending of messages from a single source to multiple receivers at the same time where feedback is limited. Mass communication also has been conceptualized in terms of what is sending the message – large media entities – and who is receiving it – heterogeneous audiences (Chaffee & Metzger, 2001). In contrast, interpersonal communication in the general sense is conceptualized of as communication between a limited group of people in the same space, such as public speaking, or in direct contact with one another, face-to-face interactions.

The boundary between interpersonal and mass communication is not static and has been and continues to be challenged by emerging theories as well as technologies, argues Lievrouw (2009). In an examination of potential intersections of interpersonal and mass communication research and theory, Lievrouw (2009) points to "the 'crisis' of new media" as a "moment" in the

trajectory of communication studies that pushed both interpersonal and mass media scholars to rethink how they defined their areas of study and to look for ways across the theoretical divide (p. 308). Computers and new media challenged previous conceptualizations of mass and interpersonal communication because they could be employed for both types of communication: computers could deliver mass messages and facilitate person-to-person messages. Entman and Steinman (2008) elaborate: "Burgeoning new media emphasize the changing boundaries among subfields. Is Internet messaging interpersonal communication? Is phone texting? Can media communication limit itself to broadcast media as mass media texts morph with individuals' interventions on YouTube, where the size of audiences for popular videos rival that for CNN or PBS?" (p. 3). Moving beyond the categorization of communication based on technology and audience size, Beniger (1987) argues that technology enables mass communication to masquerade as interpersonal communication. Examples of the illusion enabled by advanced technologies include the personalization of mass mailings and telephone calls.

The "'crisis' of new media" in communication and its challenge to both mass and interpersonal communication and the dividing line between them was met with a multiplicity of responses. Interpersonal Communication – capitalized here to denote a subfield of the more general interpersonal communication – now includes mediated communication among individuals (Roloff & Anastasiou, 2001). Walther's (1996) "Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction" is an example of the blending of interpersonal theory and new media technologies, and Lievrouw (2009) explains, the subfield of CMC itself is an outgrowth of the renegotiation of interpersonal and mediated communication. Mass communication scholars also were debating the relevance of the mass communication label. Chaffee and Metzger (2001) proposed that "mass communication" be

redefined as "media communication" to account for the emerging communication practices afforded by new media: "In short, the argument to be made is that contemporary media are 'demassifying' mass communication. Some examples of today's new demassifying technologies include handheld devices such as cell phones or video games, but most important, Internet-based communication, including e-mail and the World Wide Web" (p. 369). While scholars on both sides of the interpersonal-mass (or mediated) divide were reconceptualizing their areas of study and forming new ones, other researchers were developing new approaches. Beniger (1987) argued that the mass or interpersonal nature of a technology could not be determined a priori: instead, the dividing line rested with how people perceived of the messages and technologies with which they were interacting. Some scholars, including Lievrouw (2009), advanced mediation as an approach that bridged mass and interpersonal communication.

Despite their introduction more than a half-century ago, new media still continue to challenge our conceptions of mass and interpersonal communication. Almost three decades ago, Beniger predicted that the illusion of interpersonal communication via mass communication had the potential to grow stronger as technology evolves: "Although technologies for voice recognition, speech synthesis, and real-time conversation seem much further in the future, how many years before a computer on the line can pass a restricted Turing test with an appreciable number of voters or consumers?" (p. 355). The answer to Beniger's question is "not long." Nass's CASA paradigm is modeled after interpersonal communication: a person and a digital entity interact with one another face-to-face, or face-to-computer screen. Reeves and Nass (1998) state: "Everyone expects media to obey a wide range of social and natural rules. All these rules come from the world of interpersonal interaction, and from studies about how people interact with the real world. But all of them apply equally well to media" (p. 5). For Reeves and Nass'

(1998) computers can take on an interpersonal role but simultaneously are *media* – they are a form of technology albeit one with which people are communicating as if they would a human.

The computer programs involved in early HCI research such as Weizenbaum's ELIZA and even the applications used in Nass's work could only interact with humans in limited ways. ELIZA functioned as a "Rogerian psychotherapist," a role Weizenbaum said he selected because it involves only basic responses on behalf of the agent: "The Rogerian psychotherapist is relatively easy to imitate because much of his technique consists of drawing his patient out be reflecting the patient's statements back to him" (Weizenbaum, 1976, p. 3). Although ELIZA and other applications used in early HCI research were social, they lacked the ability to fully adapt and respond to their human interlocutors. In other words, their agency was limited. The digital social agents I am interested in, however, are designed with increasing levels of autonomy meant to get closer and closer to the experience of interacting with a human. Take for example, Siri. The aspect of Siri that people are most likely to interact with is its human-like voice, usually female, emanating from the mobile phone in a manner identical to that of a human caller. Siri also is programmed with human-like personality characteristics, and Apple provides Siri with human backstory: it is a type of assistant. The program is described as a virtual assistant, and Siri's actions are modeled on those of a human administrative assistant. Furthermore, Siri is an artificial intelligence application that is programmed to learn from and respond to the individual user. Siri functions as a type of interface to a device, carrying out tasks and finding information. Siri and agents aren't the only programs designed to push the human-machine divide. There is a whole other class of technologies, within the area of captology, that are intended not merely to assist humans but to persuade them (Fogg, 2002) Verbeek argues that we are reaching a point in human-machine relationships with ambient and persuasive technologies where "the question

looms of who or what is ultimately the actor here" (2009, p. 234). Digital social agents as well as other technologies continue to push this boundary between human and machine further and further as they gain greater agency. In doing so, they also continue to blur the distinction in their status between media and interpersonal interlocutor.

The interpersonal versus mass communication divide also hinges on messages, namely that an audience receives the same message from a single source. Some of the messages and information that social digital agents provide to their human interlocutors do not vary by user, similar to mass communication; however, these programs are interfaces and provide information specific to a user. For example, if I were to ask Siri to find the restaurants nearest to me, the results of this query would likely differ from those of another user. Likewise, Google Voice Search offers suggestions of events or locations tailored to individuals. Some social digital agents, including both Siri and Cortana, offer a more personalized experience, similar to Beniger's (1987) prediction, by calling users by their preferred names and seemingly recalling social information about them such as partner contact information. Digital social agents then possess attributes of both mass and interpersonal communication and further challenge our conceptions of these areas in communication study.

2.2.3 Challenging the Definition of Communication

The high-stakes question arising from the creation of social, intelligent machines and programs is whether our interaction with them qualifies as communication. The multiple divides within the study of communication and the lack of agreement on what qualifies as communication, even before throwing machines into the mix, complicate any attempt to examine the issue, let alone answer this question. Here, I focus on the complication arising from

computers and digital social agents for Carey's (1989) definition of communication, which informs my own research.

Carey (1989) explains that in the relatively short history of the concept of communication, two definitions have emerged: the transmission view and the ritual view. The transmission view, which denotes the term's past connections with transportation, is the most prominent, according to Carey. Here communication takes on the connotations of "'imparting'" or "'sending'" and is defined as "a process whereby messages are transmitted and distributed in space for the control of distance and people" (Carey, 1989, p. 15). The ritual view, by contrast, assigns a more intimate meaning to communication. In the ritual view, according to Carey, communication is "a process through which a shared culture is created, modified, and transformed" (p. 43). Here, communication is more closely related to the religious concept of communing, of a transcendent connection to one another. In other words, communication, as Carey (1989) concludes, is culture.

These definitions of communication, however, were developed with a focus on human communication. What happens when computers and social digital agents supplant humans in this process? The argument that interaction between humans and computers qualifies as communication from the transmission view is not difficult to make, particularly with digital social agents that interact using natural language processing. It is the transmission view upon which cyberneticists argued that humans and machines communicate with one another, and so there is precedent for the inclusion of human-computer interaction or human-humanoid interaction (Zhao, 2006). The ritual view, however, is more complex. Do man-made machines enter into communion with Homo Sapiens who evolved through nature? Are these digital entities now part of this larger social world – a community of machines and humans? How do we come

to understand ourselves, our world, and our relation to others through communication with computers or social digital agents? These are the larger questions emerging from the evocative nature of computers.

2.3 Taking on the Challenge of Digital Social Agents

Within the study of communication, scholars have approached computers primarily as tools, focusing on these technologies as physical objects through which messages pass (Gunkel, 2012; Guzman, 2014). Yet, technologies designed to interact with humans as social actors challenge our positioning of technology as a medium, our delineation between the different forms of communication, and, most pressingly, our understanding of what it means to communicate. No dissertation could adequately address all of these questions and challenges at once, or even one of them; however, the study proposed here can inform these issues by further investigating the psychological aspects of these technologies. In *The Second Self*, Turkle (1984) explains the computer as psychological machine:

> Because they stand on the line between mind and not-mind, between life and not-life, computers excite reflection about the nature of mind and the nature of life. They provoke to think about who we are. They challenge our ideas about what it is to be human, to think and feel. They present us with more than a challenge. They present us with an affront, because they hold up a new mirror in which the mind is reflected as a machine. (p. 308)

As conceptualized by Turkle (1984), our psychological engagement with machines is not only how we come to make sense of and define digital technologies but also, and more importantly, about how we view our relationship to them and how we come to view ourselves in light of them. It is these aspects of digital interlocutors that I focus on in this dissertation, and what I mean when referring to the "conceptualization" of digital social agents.

This dissertation that focuses on the ontology of digital social agents helps us to better understand and address the challenge of new media to communication in several ways. It furthers

our understanding of the possible psychological aspects of these technologies, moving beyond a narrow definition of them as tools. Beniger (1987) proposes that interpersonal and mass communication may be better approached through the perspective of individuals or audiences involved in an interaction, and this study provides scholars with an understanding of how people interacting with digital social agents view their digital interlocutors. This information illuminates that people perceive digital social agents as one type of communication over another. The study of people's conceptions of these interlocutors also involves the exploration of how people see their connection to them, of the similarities and differences, and an understanding of who the programs are to us. These aspects can help inform whether and to what level we see ourselves communing, or entering into oneness, with digital social agents, and, most importantly, this dissertation helps us to understand the emergence of culture produced between humans and machines, not just humans.

Although I am focusing on what Turkle (1984) refers to as the psychological aspects of machines, this is not psychology dissertation (although, its findings might well inform research within that discipline). What Turkle (1984) missed – or, more likely, wasn't focused on given her own area of study – and is picked up by Gunkel (2012), who is a communication scholar, is that computers are communicative machines. It is in their capacity to process information and in their ability to communicate this information that they evoke these psychological questions. A review of Turkle's ethnographic work for *The Second Self* reveals a focus on how people communicated about and communicated with computers and how they perceived the digital entities as communicating back. As I discuss in the next section, the study of how we conceive of the nature of digital social agents is the study of communication and has implications for it.

3. LITERATURE REVIW: COMING TO KNOW THE SELF AND OTHER THROUGH COMMUNICATION

We come to know and define ourselves and our social world in and through communication – an epistemological position associated with the Chicago School and its early theorists, Charles Cooley, Robert Park, John Dewey, and George Herbert Mead as well as more recent scholars such as Herbert Blumer and James W. Carey. Our sense of who we are is not wholly internal, but external. Mead (1934) states: "We have presented the self from the side of experience; it arises through co-operative activity; it is made possible through the identical reactions of the self and others" (p. 317). This development of the self occurs in how we interpret messages others convey to us about ourselves and in our own performance of the self to others (Goffman, 1959). That the self is social does not mean that we do not think about who we are; we do, by engaging in interaction with ourselves (Blumer, 1969), what is now referred to as self-communication. Yet, even this self-interaction is influenced by our understanding of the world around us. Others also come to know us in how we present ourselves in interactions with them, as Goffman (1959) argues: "In analyzing the self then, we are drawn from its possessor, from the person who will profit or lose most by it, for he and his body merely provide the peg on which something of collaborative manufacture will be hung for a time" (p. 253). But, one self is not mutually being created in any given interaction. Instead, in each communicative exchange, the selves of all people present are involved and negotiated. Mead (1934) explains the interconnection, "The ideal of human society is one which does bring people so closely together in their interrelationships, so fully develops the necessary system of communication, that the individuals who exercise their own peculiar functions can take the attitude of those whom they affect" (p. 327). Self and society are co-created.

Furthermore, they are co-created through communication. But even some of the symbolic interactionists, in which this epistemology is fundamental, overlook the centrality of communication, according to Denzin who argues: "A neglected term connects the words 'symbolic' and 'interaction.' That term is 'communication'" (1992, p. 96). Denzin credits Carey's (1989) focus on the ritual aspects of communication as bringing the symbolic back to the fore in his work in cultural studies. Carey (1989) argues that communication and culture – both the constitution of the social world and what we know of it – are connected: "But whatever the details of the production and reproduction of social life, it is through communication, through the intergraded relations of symbols and social structure, that societies, or at least those with which we are most familiar, are created, maintained, and transformed" (p. 110). The implication of the intertwining of self, society and communication is that we can gain an understanding of the meanings we assign to things or people, including digital social agents, through an investigation of the communication surrounding and with them.

Although the Chicago School was namely concerned with how we relate to one another in society and communication research has focused only on human-human interactions, scholars working from a constructionist epistemological position also argue that our knowledge of things, both tangible and ephemeral, arise through interaction or communication (Blumer, 1969; Carey, 1990; Denzin, 1992; Marvin, 1990). Within the symbolic interactionist paradigm grounded in Mead's work, everything within the physical and social world from nature to technology to people is an object, understood in and through social interaction *about* the object and *with* it (emphasis author's, Blumer, 1969; Hewitt, 2003). Blumer states, "The meaning of the objects – chairs, trees, stars, prostitutes, saints, communism, public education, or whatnot – is formed from the ways in which others refer to such objects or act toward them" (1969, p. 69). Here, the term

"others" equates with humans: The symbolic in symbolic interactionism stresses the use of symbols as well as a focus on shared meaning among the only entity – or what was once thought to be the only entity capable of shared meaning through symbols – humans (Blumer, 1969; Denzin, 1992; McCall, 2003). A focus on interaction as a human process was laid out by early theorists of the Chicago School, chiefly Mead. McCall (2003) explains that according to Mead "a gesture becomes a significant symbol when it evokes within oneself the same incipient response (i.e. meaning) that it does within the other(s) who observe that gesture" (p. 328). For Blumer (1969), building also on Mead, our use of symbols to come to shared meaning requires the ability to take the role of the other: "Such mutual role-taking," explains Blumer, " is the *sine qua non* of communication and effective symbolic interaction" (p. 10). This sense making process, then, occurs among entities that have the capability to take on the role of another and has been restricted to humans. However, while some theorists argue we come to know all objects in the same way, the symbolic aspects of interaction lead to a qualitative difference in how we come to assign meaning to things (both natural and man-made, including technology) versus humans.

3.1 The Meaning of Things

Because things themselves traditionally cannot engage in communication, we assign meaning to them in our communication with others about them as well as in their use, according to the classic symbolic interactionist perspective. Blumer (1969) uses an ordinary chair as an example of how things do not have intrinsic meaning: "Readiness to use a chair as something in which to sit gives it the meaning of a chair; to one with no experience with the use of chairs the object would appear with a different meaning, such as a strange weapon" (p. 69). The chair is open to interpretation, and we, as humans, do the interpreting. This argument that we project

meaning onto all things is in-line with the perspective of technology as neutral, an assemblage of parts that are given meaning by humans (Pacey, 1983; Verbeek, 2005).

What is problematic with this perspective of the ontology of technology for cultural studies scholars, such as Carey (1990), Denzin (1992), and Marvin (1990) as well as philosophers of technology like Pacey (1983) and Verbeek (2005) is that it overlooks the role of the form and function of technology in its meaning. Scholars such as Carey (1990), Marvin (1990) and Pacey (1983) agree that we assign meaning to things in use and in communication with others, but they also argue that things themselves are representations of how we see the world: Their creation is an expression of meaning. In speaking specifically of technology, Carey (1990) argues that both the production and use of technology are part of this sense-making process. According to Carey, technology "embodies concrete life ways and anticipates that which it pretends to mirror. In this sense technology is a symbol *of* (it represents how the world works) and a symbol *for* (it coerces the world into working in terms of the representation)" (p. 245, emphasis Carey). Verbeek (2005) puts forth a philosophy of technology that focuses on how technology mediates our interactions with the world around us: "In fulfilling their functions, artifacts do more than function – they shape a relation between human beings and their world," states Verbeek (2005, p. 208). Marvin (1990) locates the meaning of technology in the cultural aspects embodied within it. Here Marvin (1990) takes on Heidegger's famous example of technology's exploitation of the natural; in this example, Heidegger argues that a footbridge is not as disruptive to a river as a turbine that draws power from the water, transforming it into a standing reserve. Marvin rebuts this assertion pointing out that the fallacy in Heidegger's logic: the philosopher assumes the "essence" of a river is to provide energy. If people conceived of the

river as separating two masses of land, then the footbridge is more exploitative, Marvin argues. Marvin (1990) states:

> The river cannot be consulted in any case. Only man's notion of the nature of the river, the footbridge, and the turbine can be negotiated among men. The same is true of artifacts which are interpreted both in creation and application, but not identically in every exchange. There is no technology that does not place those arranged around it in social relations to one another, and there is the no uncommunicative technology or technological practice (224-225).

There are two consequences to the preceding arguments of the cultural nature of technologies (Carey, 1990; Marvin, 1990) and their mediation of our lives and culture (Verbeek, 2005). The first is that the ontologies we assign to them are intertwined with their material aspects as well as their use (Houkes & Meijers, 2006). And the second consequence is that the meaning we assign to things within our world cannot be divorced from our understanding of the world, or our culture, that, according to Carey (1989) preceded and was reified or transformed in the encounter. And because of this connection between things and culture, things also are political (Carey, 1989; Denzin, 1992).

3.2 The Meaning of People

As outlined by Mead, both people and things are objects and the meaning of each emerges through communication (Blumer, 1969; Hewitt, 2003). The way in which we come to understand things, then, is identical to how we come to know humans. We assign meanings to other humans based on our interactions with them as well as our conversations with different people about them. What is key to meaning within this theoretical perspective is not how another object – human or otherwise – presents itself but how we interpret it (Hewitt, 2003). However, in lumping humans and things together for the purposes of constructing a social theory, a fundamental difference between the two is overlooked in the assignment of meaning (which is ironic given the focus of many symbolic interactionists): humans engaging in communication

with one another can arrive at meaning together; things themselves – while they are thoroughly cultural – cannot partake in this process in the same way and to the same degree as humans, or at least, were thought not to until the digital age (an argument I am building toward).

Here Marvin's (1990) example of the river is again instructive. In discussing how we interpret and assign meaning to rivers and surrounding technologies, Marvin makes a statement that stresses the obvious to the point that it seems almost unnecessary: "The river cannot be consulted in any case" (1990, p. 223). Marvin's aim presumably is to explicitly make clear why humans are the only ones who can assign meaning to the natural or technological; yet, her statement leaves open a challenge to this epistemological position: What if the river could be consulted? What if it indicated that it sees its purpose as provider of energy or as neither separator of land nor energy provider but instead as a woodland goddess? Would this make a difference to the meaning assigned to it by men (and women)?

And this is the qualitative difference in how we come to know humans versus things – humans present themselves to us and can advocate through communication a particular understanding of who they are as well as who we are. This can be done explicitly through statements of identity or, more implicitly, as Goffman (1959) has shown, in the "presentation of self": "The others find, then, that the individual has informed them as to what is and as to what they *ought* to see as the 'is'" (1959, p. 13). The meaning of people, however, is not limited to how we see the other and involves how we come to know the self. As I will discuss later regarding presence, we develop the Self in our communication with others (Goffman, 1959; Ong, 1967). We do develop a sense of the Self in our use of things or through encounters with them, but again, it is people who directly state who we are to them.

To be clear, I am not stating that because other humans can articulate who they think they are or who they think we are that we will adopt this "performance" outright. Our understanding of humans, like things such as technology, is, as Goffman argues (1959), "bolted down in social establishments" (p. 253), in culture. What I am saying is that people have the capability of advocating for a particular view of who they and we are; things cannot. Furthermore, as Goffman (1959) explains, we can continue to refine this presentation again and again in response to others, or they, to us; things, again, cannot. This is not to say that the stuff of technology does not matter: materiality of technology is consequential to its ontology (Houkes & Meijers, 2006; Marvin, 1990; Verbeek, 2005). But because humans have greater agency than things, they have the potential to play a more pronounced role in the co-creation of meaning.

3.3 The Meaning of Digital Social Agents

For the past few pages, I have departed from talking specifically about digital social agents to focus on how we come to know our world and to consider the meaning of things, including technology, and humans. This entire epistemological and ontological discussion serves several purposes. It primarily stakes out a particular philosophical position on which this dissertation is based: We come to know digital social agents in and through communication. But communication with whom or what? If we look at how we make sense of, assign meaning to, things, then we could approach the conceptualization of digital social agents by focusing on how we have represented them in our culture and their symbolic qualities. However, digital social agents are not static things; they can process information, responding to input and often have been programmed to give the appearance of a sense of self. Digital social agents – to state the obvious implied by their name – have the appearance of and operate as if they had agency. Siri, for example, will give a response if you ask Siri what it is, or, as most people express, "Siri, what

are you?" The crucial difference, though, between digital social agents and things is that users employ symbols in interacting with these technologies; the mode of communication with them is similar to that with humans. In turning a critical eye to the proliferation of ambient and persuasive technologies, Verbeek (2009) argues that technologies, things, powerfully convey intent: "Their lack of consciousness does not, however, alter the fact that technologies can have intentions in the original, literal sense of the Latin word intendere, which means to 'give direction': technologies give direction to someone's actions or consciousness" (p. 235). What's more, we humans pick up on and respond to this intent as we would with a human (Reeves & Nass, 1998).

Here the qualitative difference I just discussed between things and humans becomes paramount: the crossing of the symbolic divide may bring new ways of understanding parts of our world and because the symbolic is not just about transmission but more so ritual, new ways for the creation and maintenance of culture. The progression in logic is that we do not just impart meaning on these entities; as Verbeek (2009) explains, the mediation of technologies programmed to cross the divide is greater than their technological predecessor. The ontology of digital social agents, as a result, is now inching closer to a level of co-creation between human and machine that previously would have only been thought of between humans. The implications for my dissertation is that the nature of digital social agents can be approached not only through how we culturally conceive of them but also through how we assign meaning to them as they take the role of interlocutor in communicative exchanges. It is this second aspect that I focus on.

3.4 A Sense of Presence

"Society is organized on the principle that any individual who possesses certain social characteristics has a moral right to expect that others will value and treat him in an appropriate way. Connected with this principle is a second, namely that an individual who implicitly or explicitly signifies that he has certain social characteristics ought in fact to be what he claims he

is. In consequence, when an individual projects a definition of the situation and thereby makes an implicit or explicit claim to be a person of a particular kind, he automatically exerts a moral demand upon the others, obliging them to value and treat him in the manner that persons of his kind have a right to expect" – Erving Goffman (1959, p. 13)

In the above quote, Goffman (1959) lays out a central aspect of communication theory: In entering into communication with other people, we signal to them who we are, and likewise, they to us. It is this projection that we weigh in our understanding of another person in communication. But people aren't the only ones making this demand in the course of conversation. By communicating in human-like ways, digital social agents also place this demand on their users. The question that has been driving this research is how we interpret the human-like demands by machines. In this section, I discuss two concepts that I will focus on in the study of the nature of digital social agents: presence and the personal front, or our impressions of others. Together these concepts explain our sense of being with another, our relationship to another, and our perception of another's characteristics and attributes. Both concepts have been adapted for mediated experiences within the CMC literature and, to various degrees, in the HCI literature. I begin my discussion of each concept with its meaning in human-to-human communication followed by a review of literature as it applies to human communication with digital entities.

3.4.1. Presence, with Humans

There is no precise conceptualization of presence in either human-computer communication (Biocca, Harms, & Burgoon, 2003) or human communication; yet, similarities can be found among the different iterations that we can employ moving forward in the exploration of the presence of digital social agents. At its most basic level, the term presence can be understood as being in the same space or place ("Presence," n.d.); however, social and communication theorists often argue that presence goes beyond co-location. For Ong (1967) and

Goffman (1959) presence is conceived of as both "coming to have meaning for" and, at a higher level, "a feeling of being with another human" in which the former encompasses both objects and humans and the latter, only humans. The first line of Goffman's *The Presentation of Self in Everyday Life* directly links presence to communication and our sense-making of another person in and through communication: "When an individual enters the presence of others, they commonly seek to acquire information about him or to bring into play information about him already possessed" (1959, p. 1). Here "presence of others" refers not only to entering the same physical space but also as to coming to occupy a mental space. For Ong (1967), presence is a recognition of our shared status as humans:

> Being-in-space is not of itself presence in the full sense of presence, that is, the sense of simultaneous at-oneness and otherness which another human being can bring to me. A presence is an interiority bearing toward and calling to another interior, an inwardness which is simultaneously an utterance or 'outerance' or 'outering' insofar as the other is outside (p. 309).

In the first part of this statement, we see the tenet that it is not enough to be present together physically to be in the presence of someone or to have them perceive our presence; instead, presence is a sense making process through which I, at the most basic level, seek to consider my interiority in conjunction with your's. It is not a solitary process, but a social one.

In other words, the presence of others is intimately tied to the Self and, conversely, the presence of Self is interlinked with the presence of others (Goffman, 1959; Ong, 1967). Ong (1967) states, "To be present to himself, man must find the presence of another or others…In presences we mature. Each individual I finds himself by dealing with a thou, and another thou, and another" (p. 295). It is important to note that presence does not necessarily equate to a fondness for or agreement with. Indeed in seeking the interiority of another we might not see in them ourselves – we recognize their human status but not their humanity – and focus on the

contrast of Self to Others, as Ong explains (1967): “Flight from other groups only involves one with them more” (p. 297).

Things also can have presence, but Ong (1967) delineates between the presence of things versus humans. Things, or what Ong calls objects, only have presence when we imbue them with meaning, and in doing so, they enter into our thoughts and our world. Ong gives the example of his father’s chair. It is separated out from other chairs because his father, who presumably died before Ong wrote these words, used it. Likewise, I have a mug of pens on my desk, and one of the pens is green, older, and doesn’t write. I keep it because my grandmother used it to complete crosswords and word games when she was alive (the pen’s holder is also my grandmother’s “Are we Having Fun Yet?” mug). To other people entering my office and seeing the mug with a pen, the items would just seem like ordinary things, but to me, they stand out, have presence, because of the importance I have placed on them based on their use by her. Ong stresses the human-to-human connection in the presence of his father’s chair that is “invested with his being” (p. 306). Likewise, when I used my grandmother’s pen before it went dry or look at it, I recall or even feel being with her. In these moments, I am not with a pen, I am with my grandmother. My connection in that moment to her could be what Jones (2010) refers to as “imagined presence” (p. 207). The point that I can feel as if I’m in a moment with my grandmother exemplifies, as Jones (2010) explains, that the past can be made present.

Presence is a turning of attention toward, an occupying of mental space, and a simultaneous comparison and contrast to Self, a connection to our humanness. But a focus on presence in an interpersonal sense doesn’t fully grasp its implications. If we see as Cooley did that “society is a matter of the incidence of men upon one another” (2004, p. 21), then presence is an entrance of someone or something into our social world. Whether he, she, or it, has a

fleeting presence or establishes more of an "inhabitance" in our community, "becoming *a part of* that place," not merely in it, is a function of communication (Jones, 1997, p. 16). Presence also transcends time and space (Ong, 1967). This is the conception of presence as it relates namely to people; the presence of technology, as we will see, at times takes a different bent.

3.4.2 Cultural Presence, of Technology

The cultural presence of machines also can be defined as a turning of attention toward – an awareness of the technology and an effort to make sense of what it means. The difficulty in discussing the cultural presence of machines and technologies is that scholars do not always center their research around the specific concept of presence, but there are numerous works on the entrance of machines into our world including Marx's (2000) *The Machine in the Garden* and Marvin's (1988) *When Old Technologies Were New.* Marx traces how the United States wrangled with the presence of industrial technologies and the development of the railroad against a culturally idealized pastoral nation. Incorporating Nathaniel Hawthorne's piece on the interruptions of the locomotive to a quiet, pastoral scene, Marx highlights how the machine forcefully makes itself known in the United States. But this machine does not retreat from consciousness; instead the railroad – the last physically tied form of communication (Carey, 1989) – becomes a national obsession and focal point (Marx, 2000, p. 191). The locomotive is no longer just a new technology to take note of; for Americans, it is an entity now inhabiting a geographical and mental space (Marx, 2000). Marx explains the presence of the locomotive and other industrial technologies: "During the nineteenth century, therefore, no one needs to spell out the idea of progress to Americans. They can see it, hear it, and, in a manner of speaking, feel it as the idea of history most nearly analogous to the rising tempo of life" (p. 193). These technologies are not mere things but part of our lived experiences.

But, it would be the communication successor to the railroad, the telegraph, and the technologies to follow that would bring with them a presence that furthered a sense of connection to or "being with" (Biocca et al., 2003) on a more life-like level, as explained by Sconce (2000) in *Haunted Media: Electronic Presence from Telegraphy to Television*. Like the railroad, each new innovation of electronic media from the nineteenth through the late twentieth century received widespread attention raising their cultural salience (Sconce, 2000). In addition to being accompanied by attempts to make sense of words and voices floating along wires or through air, these technologies forced a renegotiation of how we understand our world and our own bodies (Marvin, 1988). Sconce (2000) explains that what was different about electronic technologies, however, was that currents pulsed through them, giving them, in the minds of many people, a certain "liveness" and even sentience. From the advent of the telegraph through the computer, people have perceived electronic media as more than inert technologies. Electronic media are alive in that they are inhabited by the other worldly, are portals to transport us into the machine and other worlds, and appear to have minds of their own, according to Sconce (2000). Unlike the locomotive or other industrial or mechanical technologies, electronic media work their way into the home first with the telephone, followed by recording technologies, televisions, and then the computer. They become inhabitants and are themselves, according to Sconce (2000), inhabited in our minds. As a result, the presence of these technologies wasn't only experienced at a larger, cultural setting, but also at a more personal level. Although the machines of the Industrial Revolution also carved out their place in our communities, electronic media furthered the migration of things into our social spaces.

What this admittedly brief discussion of the cultural presence of technology demonstrates is that the presence of machines and media can be occupy the minds of an entire culture, giving

people a sense that something is new in their world, fundamentally changing it (Marx, 2000; Sconce, 2000). This presence, however, can take the form of a more intimate sense of being with as technology moves into more personal, and social, spaces. For Marx, Marvin, and Sconce, technology and people's conceptions of it and their experiences of presence are the result of social process, and as such, are thoroughly cultural. Sconce stresses this point by stating that in the first few pages of his book "that electronic presence, seemingly an essential property of telecommunications media, is in fact a variable social construct, its forms, potentials, and perceived dangers have changed significantly across media history" (2000, p. 6). Here Sconce is pushing back against the dominant approach to media studies that I will discuss in a moment. From a cultural perspective, people also do not have to directly use the technologies to experience their presence; it is all around them in the form of cultural discourse. Turkle (1984) explains, "Computers call up strong feelings, even for those who are not in direct contact with them. People sense the presence of something new and exciting" (p. 13). While it is important to understand how presence of machines and electronic media were perceived at a cultural level, this research does not provide as much insight into the individual experiences of users of these technologies and their conceptualizations of these machines. In the next section, I discuss research regarding digital agents and social computers that focuses on the individual.

3.4.3 Presence, of New Media

Presence as it relates to people's personal experiences using ICTs is a multidimensional concept that has been employed by scholars across multiple fields and disciplines including communication, psychology, HCI, and HRI (Biocca et al., 2003; International Society for Presence Research, 2000; K. M. Lee, 2004a; Lombard & Ditton, 1997). Given the broad application of presence, its definition varies across these fields and within them (Lombard &

Ditton, 1997), including communication and media scholarship. Research of presence in HCI predominantly takes place within a positivist paradigm that conceptualizes of presence as a psychological phenomenon. The International Society for Presence Research (2000) defines presence, a shortened form of "telepresence," as "a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience" (par. 2). Presence is the "illusion of nonmediation" (Lombard & Ditton, 1997). Some scholars have argued that these definitions of presence are normative and have excluded the aspect of failure or misperception from their own definitions (e.g, Lee, 2004a).

Presence researchers stress that although feelings of presence accompany the use of technology, presence is not a technological phenomenon (International Society for Presence Research, 2000; Lee, 2004a). Instead, these scholars argue, presence is a psychological phenomenon because feelings of nonmediation and behavior toward the machine as if it were human are internal to the user. The presence a person experiences is not necessarily static (International Society for Presence Research, 2000), and some scholars explain that our feelings of presence are best understood as a continuum (e.g. Biocca et al., 2003; International Society for Presence Research, 2000; Lombard & Ditton, 1997; Nowak & Biocca, 2003).In contrast to cultural scholars who argue the presence of machines can be felt without technological interaction, scholars positioning presence as a psychological phenomenon argue that it can only arise during technology use (International Society for Presence Research, 2000).

In addition to developing different definitions of presence, scholars also argue there are various types of presence (e.g. Biocca et al., 2003; International Society for Presence Research,

2000; Lombard & Ditton, 1997; Nowak & Biocca, 2003) . For example, Nowak and Biocca (2003) trace out three distinct types of presence defined based on user experiences with technology: telepresence is a sense of immersion and being transported through space via media; copresence, which the author's attribute to Goffman, represents a "psychological connection to and with another person" in which each party perceives of the other (p. 482); and social presence, is the degree to which people using a technology thought they could interact well via the medium. The different types of presence also are defined based on the role of ICTs in an interaction: ICTs can be positioned as either media through which people engage with one another or as interlocutors with which people interact (International Society for Presence Research, 2000; Lombard & Ditton, 1997).

Presence in human-machine communication is often categorized as a type of social presence, but the definition of social presence also varies widely (Biocca et al., 2003). In addition to the definitions of social presence provided by Nowak and Biocca (2003) above, Lee (2004a) defines social presence as "a psychological state in which virtual (para-authentic or artificial) social actors are experienced as actual social actors in either sensory or nonsensory ways" (p. 45). The International Society for Presence Research (2000) categorizes presence in human-digital agent communication as a category of social presence, termed "medium as social actor," in which people "fail" in some sense to acknowledge that they are communicating with a device or program. This "failure" usually comprises humans behaving toward machines as if they were human or indicating a sense of a social connection with media. In their call for a more robust theory of social presence, Biocca et al. (2003) also found that social presence is often vaguely defined as "being together" or a "sense of being with another" where the other is not restricted to a human but can also be an intelligent agent (p. 456). Despite differences, definitions

of social presence share common elements including a sense that technology has life-like qualities and that people can develop a closeness or connection to one another or the technology itself (Biocca et al., 2003; Nowak & Biocca, 2003).

At the beginning of this section, we took up the question of how humans would respond to the moral demand of a machine that could communicate in human-like ways. Existing and emerging research seems to indicate that we do respond in kind to this demand, to an extent. Suchman (2009) explains, "As soon as computational artifacts demonstrate *some* evidence of recognizably human abilities, we are inclined to endow them with the rest" (p. 41). A full review of the history of people's perceptions of life-like machines is not possible here. First, there is a long history of the development of life-like machines, called automata, and people's reactions to them that can be traced, at least, to ancient Greece (Berryman, 2007; Biocca et al., 2003; Husbands et al., 2008; Riskin, 2007). Second, the current body of research regarding people's perceptions of and behavior toward robots, ICTs and other digital actors is voluminous and spans multiple fields. And so, this brief review focuses on overarching themes in research findings and, when relevant, incorporates literature involving digital or social agents.

Research across multiple disciplines and platforms stemming back to the earliest computer systems has found that people often behave toward and respond to machines that exhibit human characteristics in the same way that they would humans (Fogg, 2007; e.g. Höflich, 2013; E.-J. Lee, 2010; Nass, Steuer, & Tauber, 1994; Nass, Steuer, Tauber, & Reeder, 1993; Reeves & Nass, 1998; Suchman, 2009; Turkle, 1984; von der Pütten, Krämer, Gratch, & Kang, 2010; Weizenbaum, 1976). After introducing ELIZA, Weizenbaum (1976) observed that people often requested time alone with the machine containing the program that functioned as an interlocutor. Weizenbaum (1976) was surprised by this behavior from people who regularly

interacted with computers and machines and should have known that ELIZA was not "real": "What I had not realized is that extremely short exposures to a relatively simple computer program could induce powerful delusional thinking in quite normal people" (p. 7). Turkle's (1984) extensive ethnographic work, particularly in *The Second Self,* also documents how people, namely children, behave toward digital machines and speak of them as if the devices were human. Turkle found that people not only anthropomorphized technology when it was working but also when it had technical problems. Turkle (1984) describes an encounter between children and a Speak & Spell that would not respond properly or turn off; the machine startled and perplexed children, and they treated it as if it were alive because they could not shut it off. Waytz et al. (2010) also found that when computers crashed or behaved in unpredictable ways, adults also were more likely to perceive a computer or speak of it as having a "mind of its own."

Within the past two decades, researchers have increasingly focused on how people interact with and respond to social cues from computers, avatars, embodied conversational agents, and robots. Because my research is focused on social digital agents that are not embodied or visually represented in a life-like way – as a robot, avatar, or embodied conversation agent would be – the literature reviewed here is limited to text or voice-based social cues. One of the most prolific researchers in this area was Clifford Nass and his fellow colleagues at Stanford. In the early 1990s, Nass began empirically testing whether people would treat computers in interactions the same way they would other humans and whether their responses to machines would mirror those of humans (e.g. Nass et al., 1994; Reeves & Nass, 1998). Nass and his team found that computers could replace humans in multiple theories they tested from both sociology (Nass et al., 1994) and communication (Reeves & Nass, 1998) and developed the "Computers Are Social Actors" research paradigm (Nass & Moon, 2000; Nass et al., 1994; Reeves & Nass,

1998). Reeves and Nass (1998) adapted theories of interpersonal communication to human-computer interaction finding that "People's responses to media are fundamentally social and natural" (p. 251). In human-computer interactions, people follow the social norms of politeness observed in human-human conversation (Nass, 2004) and also pick-up on politeness cues from the machines themselves (Nass et al., 1994). We also identify more readily with machines that exhibit personalities similar to our own: in experiments in which researchers programmed computers to exhibit specific personalities, participants whose personalities matched those of the machines reported feeling an increased sense of social presence, as a person normally would with a human who is similar to them (Lee & Nass, 2005). People also will self-disclose personal information to a computer that is programmed to provide its own self-disclosure, creating a communicative pattern between human and machine that is analogous to that of communication among humans (Moon, 2000). And when researchers program computers with voices, people will approach the machines as if they are distinct entities (Nass et al., 1994). It should be noted, however, that people's social responses to computers are highly complex and can be dependent on factors internal to the user, such as personality, and external factors, including message type (E.-J. Lee, 2010).

As demonstrated in the literature, most of the social presence in human-computer interaction is conceived of as "behaving *as if* one were with another human." But, there is a complication. Scholars have repeatedly found that, despite the behavior of study participants, the participants maintain that they know the machine is not a human (Kim & Sundar, 2012; e.g. Nass & Moon, 2000; Nass et al., 1993). Nass and Moon (2000) explain that "of the thousands of adults who have been involved in our studies, not a single participant has ever said that a computer should be understood in human terms or should be treated as a person" (p. 82).

People's treatment of computers as social despite their knowledge that the computer is not human is referred to as ethopoeia (Nass & Moon, 2000; Nass et al., 1994). Computers provide a sense of presence, but one that is not human (Kim & Sundar, 2012). Kim and Sundar (2012) explain of people's conceptions of computers "regardless of their non-human form, they serve to enhance the sense of another intelligent being's presence, not a real person (e.g., programmer) behind the machine" (p. 242).

3.4.4 The Presence of Digital Social Agents

As this review demonstrates, presence is not a singular concept and varies in its meaning when applied to humans and technology at the cultural and personal levels. Some similarities do exist among the conceptualizations: presence is not constant and can change over time. But scholars diverge along epistemological lines as to whether presence is a cultural or psychological phenomenon. As a result of these epistemological differences, they also disagree as to whether presence can be experienced without actual interaction with the technology in question.

But how do we reconcile the different definitions of presence? With human-human communication, we saw how presence is the turning of attention to, the occupation of a mental space, and a connection to. We compare and contrast the Self to others for whom we have granted presence (Ong, 1967). And in presence, we inhabit mental spaces (Jones, 1997); we gain entry into social life. If we examine the cultural presence of technologies, we see similar trends (which is not altogether surprising in that some of these perspectives share common philosophical groundings): trains take over geographical space while also entering our thoughts about the world around us and our place in it (Marx, 2000), and subsequent ICTs also have asserted their presence as they have thoroughly inhabited our lives and challenge us to think about what they are and who we are in light of them (Turkle, 1984). More recent research

regarding ICTs and social technologies has restricted presence to a psychological phenomenon in a technological setting. But, I argue, that underlying these difference conceptions of presence is the turning of attention to a human, machine, or entity (Kim & Sundar, 2012), a sense of "being with" (Nowak & Biocca, 2003) some sort of entity, and potentially a connection to (Nowak & Biocca, 2003) one another or a thing. In their presence, machines like humans have the potential to enter our social world. The questions I am most interested in here regarding presence is whether we perceive a certain "liveness" or "sense of being with" regarding the agent and, more broadly whether we have turned our attention to digital social agents, formed connections with them, and conceived of them as inhabitants in our world.

HCI scholars and presence researchers also have established repeatedly that while people treat machines as they would humans, or at least, intelligent beings, they still maintain that these technologies are not human (Kim & Sundar, 2012; Nass & Moon, 2000; Nass et al., 1994); participants stress that they know they are interacting with machines. How then can this apparent paradox be explained? Although scholars have asked participants about their interactions, these studies were focused on behavior toward machines and psychological explanations for it, and so researchers were focused more on people's behavior than participants' own explanations for their actions. Furthermore, from the published results of this research, which often do not include the research questionnaires, scholars have focused on a human-machine dichotomy. My dissertation seeks to add to the existing literature by engaging with people's own interpretations of their digital interlocutors to better understand how they perceive agents, allowing for the possibility that the entity that they conceptualize may be neither entirely human nor entirely machine. Although the concept of presence accounts for awareness of and the various levels of "being with" an entity when using a the technology, it only partially addresses the question of how

people conceptualize of digital social agents. To fill in the "what" or "who" aspects of the research question, I now turn discuss our conceptualizations of others in and through the communication process.

3.5 Our Construction of Digital Social Agents

As discussed previously, we come to know both others and ourselves in and through communication. We make sense of others in the way they present themselves to us, in the way others communicate about them, and in how we, ourselves, weigh this information with all of these processes occurring within and influenced by a cultural context (Denzin, 1992; Goffman, 1959). In this section, I move beyond an awareness of or sense of being with another to how we come to perceive our digital interlocutor – human or otherwise. For communication theorists, our perceptions of other people – the characteristics we assign to them and our understanding of our relationship to them – are important because they influence how we interact with others (Goffman, 1959; Schramm, 1971). Schramm (1971) explains: "One is unlikely to communicate, looking at a burglar over a gun barrel, in the way one might communicate looking at a pretty girl over a martini" (p. 28). Likewise, I would add, a person would perceive a message differently from the robber versus the "pretty girl." (I use what is arguably a borderline sexist example clearly intended for a male audience for reasons that I will elucidate later). This assignment of characteristics to others in a communicative exchange is not only a fundamental concept within communication (Litt, 2012; Marwick & boyd, 2011) but also in related fields such as social psychology (e.g. Stemplewska-Żakowicz, Walecka, & Gabińska, 2006; Zajonc, 1960). The divide between interpersonal and mass communication as well as between constructionist and positivist research paradigms within each area of study has produced alternative theories and

approaches to addressing how we construct our image of another person; although, as with presence, these differences are not without similarities.

3.5.1 Forming Impressions

The design of digital social agents and the way they function allows them to be categorized under mediated/mass communication or interpersonal communication. Literature on parasocial interaction in mass communication (e.g. Horton & Wohl, 2004) addresses how we can perceive mass media messages as being directed toward us personally or how we may imagine ourselves as engaged in an interpersonal relationship with a person or character in the mass media but does not address our direct interaction with a person or entity. Mass communication theories, then, are an inexact fit for digital social agents. Theories of interpersonal communication address our one-on-one interactions with others, and are a better fit, but still have to be adapted to digital social agents. Within interpersonal communication, the study of how we think of others in our interaction with them has been approached from two epistemological positions: scholars interested in impression formation have focused on the cognitive aspects of how we make sense of others (Burgoon & Hoobler, 2002; Pavitt, 2009) while researchers within the tradition of the Chicago School and symbolic interactionism have looked to how our views of others are shaped through our social world (e.g. Goffman, 1959).

An integral aspect of interpersonal communication is the link between the way we think about the people we encounter and the way we, in turn, communicate with them (Knapp, Daly, Albada, & Miller, 2002; Roloff & Anastasiou, 2001). Although this connection between thought and behavior permeates multiple theories and research agendas under the umbrella of interpersonal communication, social cognition scholarship in particular engages with the various aspects of our mental conceptions of others (Knapp et al., 2002). Impression formation, one of

the research areas within social cognition, focuses on how we come to assign characteristics to and make judgments about others, particularly in our initial interactions with them (Burgoon & Hoobler, 2002; Delia, Clark, & Switzer, 1974; Pavitt, 2009). This scholarship is grounded in psychology and social psychology, specifically the works of Solomon Asch and Fritz Heider (Delia et al., 1974; Pavitt, 2009) but has always had a communicative element. Although Asch does not use the term "communication" in his foundational work *Social Psychology* published in 1952, he asserts in his argument for an approach to psychology derived from gestalt theory and focused on our relations to the world around us that we form "impressions" through our interactions with others (Asch, 1962). As communication became a field in its own right, scholars integrated impression formation into interpersonal communication research. Two decades after Asch published *Social Psychology,* Boyd and Perry (1972), made the case for adding "impression communication" – the conveyance of impressions to others – to the field of person perception (an overlapping area of social cognition research). Jesse G. Delia, a communication scholar at the University of Illinois at Urbana Champaign, drew on Asch (1962), Kelly (1991), and Crockett (1965) in research regarding impression formation in interpersonal and speech communication (Delia, 1972; e.g. Delia et al., 1974). Communication scholars continue their investigation of how we perceive others in interpersonal interactions (Burgoon & Hoobler, 2002; Pavitt, 2009) and have given considerable attention within the past twenty years to how we can form impressions of others through computer-mediated communication (e.g. Ellison, Heino, & Gibbs, 2006; Tidwell & Walther, 2002; Walther, 1992, 1993, 1996).

Impression formation is concerned with the "decoder perspective" of communication (Burgoon & Hoobler, 2002, p. 262). Our impression, or "image of another person" includes the characteristics we associate with others such as their personality, social roles, appearance and

behaviors (Pavitt, 2009, p. 203). According to Delia (1972), "an impression of another takes shape as aspects of the other's appearance and behavior are given meaning within the system of interpersonal constructs or dimensions of judgment which the perceiver brings with him to the interpersonal setting" (p. 285). Asch (1962) explains that although we assign multiple traits to other people, our overall conceptualization of others reflects the totality of these attributes: "Although he possesses many tendencies, capacities, and interests, we form a view of *one* person, a view that embraces his entire being or as much of it as is accessible to us. We bring his many-sided, complex aspects into some definite relations" (p. 206). Bierhoff (1989) clarifies the importance of this interplay among attributes using the example of someone described as "daring." The meaning of the word daring, according to Bierhoff, can vary from "courageous" to "reckless" depending on the other traits we associate with the person.

Foundational studies regarding impression formation across multiple fields as well as research overviews of the concept within communication by Pavitt (2009) and Burgoon and Hoobler (2002) lay out a research agenda focused on the process through which impressions are formed, not the impressions themselves. According to Pavitt (2009) impressions are the result of a multi-step process through which people observe someone's behavior, devise reasons for this behavior, assign characteristics to the person, and finally evaluate the person based on these characteristics. These steps occur in rapid succession so that our impressions are formed almost instantaneously (Bierhoff, 1989; Burgoon & Hoobler, 2002; Pavitt, 2009). A considerable amount of research has focused on better understanding how specific cognitive structures such as prototypes (Pavitt, 2009) and stereotypes (Burgoon & Hoobler, 2002; Collins, Biernat, & Eidelman, 2009; Delia, 1972; Ruscher, 1998) play a role in forming our impressions of others. Scholars also have established that our judgment of someone when we become aware of him or

her is integral to how we conceptualize her or him in future interactions (Bierhoff, 1989; Burgoon & Hoobler, 2002; Sunnafrank & Ramirez, 2004) but is not without revision (Pavitt, 2009). We also do not have to be physically present with another person to form impressions of others (Asch, 1962; Pavitt, 2009; Walther, 1993; Zajonc, 1960). For example, Zajonc (1960) demonstrated that even when people are not party to an exchange, as in the case of reading a letter that one person has written to another, people will develop a conception of the author's personality and traits, such as work ethic.

Because impression formation research is focused on the cognitive process through which we assign traits to others, it emphasizes the psychology of impressions over the content of the impressions – investigating the "how" instead of the "what." For example, Delia et al.'s (1974) research regarding the cognitive complexity of our impressions reports the amount and detail of attributes people assign to others in first-time interactions but does not detail what these impressions are. Often specific characteristics that we assign to others are investigated in connection with the cognitive aspect that can explain their assignment to a person. Researchers may focus a particular study on the role of gender (e.g. Bloom, Zajac, & Titus, 1999; Tyler & McCullough, 2009), race (e.g. Collins et al., 2009) or age (e.g. Hummert, Garstka, Ryan, & Bonnesen, 2004) stereotypes in our interactions with others. Scholars also may identify a singular attribute, such as online popularity, and study what communicative behaviors led people to make this determination (e.g. Utz, 2010) or how possessing a particular trait influences subsequent judgments of a person (e.g. Scott, 2014). One of the consequences of a research focus on select attributes, and an ironic one none-the-less, is that impression formation scholarship appears to have moved away from understanding the other as a whole – as Asch (1962) argued.

A research focus on specific cognitive constructs or singular attributes is the result of the epistemological assumptions underlying impression formation scholarship and its lineage in psychology and social psychology. Most of the theories of impression formation are the result of experiments focused on understanding the connection between one or several variables; however, this bias toward empiricism does not necessarily equate to a positivist or post-positivist epistemology in all impression formation research. In 1955, Kelly (1991) proposed a new paradigm in psychology that argued people did not simply react to stimuli, but rather, relied on personal constructs (cognitive structures) to understand the world around them. Kelly states that an individual "creates his own ways of seeing the world in which he lives; the world does not create them for him. He builds constructs and tries them on for size" (1991, p. 9). Kelly's theory of personal constructs had ramifications for not only psychology but also other disciplines including communication where constructivism in interpersonal theory gained increased attention in the 1970s and 80s (Berger, 2005). Delia (1977) draws on Kelly (1991) as well as the symbolic interactionism of Blumer (1969) in arguing for a constructivist approach to human communication to supplant the field's focus on "variable analysis." From a "constructivist perspective," Delia explained, "a person's understanding of others and their perspectives is understood as always in terms of construals, i.e., of images or impressions. The other's intentions, inner qualities, or attitudes are never apprehended directly" (1977, p. 71). There is interplay between what a person is experiencing in their world, their own cognitive structures, and the attributes they, in turn, assign to others.

Although the constructivism Delia proposed and the study of impression formation within this paradigm appears to share some similarities with a constructionist approach to research and symbolic interaction, even stressing the inclusion of "naturalist" observation as a

research method (Delia, 1977; Delia, O'Keefe, & O'Keefe, Daniel J., 1982), there are departures. Gergen (1999) explains the confusion between constructionism and constructivism and the crucial epistemological difference:

> …the constructivist perspective is similar to the constructionist in the emphasis it places on human construction of what we take to be 'the real.' It is largely for this reason that many scholars use the words 'constructivism' and 'constructionism' interchangeably. However, you can also appreciate a fundamental difference: for constructivists the process of world construction is psychological; it takes place 'in the head.' In contrast, for social constructionists what we take to be real is an outcome of social relationships. (pp. 236-237).

Impression formation research also does not fully engage with how our impressions of others come to influence the Self. Instead, the portrayal of Self is conceptualized separately in impression management (Burgoon & Hoobler, 2002). Furthermore, unlike the constructionist perspective that excludes normative judgments, some impression formation research takes up the question of the accuracy of impressions (Burgoon & Hoobler, 2002) or their quality (e.g. Delia et al., 1974). Overall, given the aims of psychological research and interpersonal communication's reliance on psychological theory, it is not surprising that impression formation remains focused on how our minds make sense of others.

3.5.2 The Self and Others "in Everyday Life"

Within a constructionist, interpretivist epistemology, the meaning we assign to people are rooted in the social (Blumer, 1969; Denzin, 1992; Goffman, 1959). Our personal conceptions of another person or thing with which we are communicating, then, are our own "imaginations" or "impressions" of another person or group of people. As Goffman (1967) explains, a person's social face "is only on loan to him from society" (p. 10). But what composes this social face? According to the communication theorists I discuss here, namely Goffman (1959), there are two

general areas that we consider in our conceptions of people: our relationship to them and their characteristics.

Who a particular person is to us, or their relationship to us, is an integral aspect of the communicative process (Goffman, 1959, 1967; Schramm, 1971). In mapping out the different models of communication, Schramm (1971) states that "all communication necessarily functions" within a particular framework determined by "social relations" (p. 27). What drives our different exchanges in Schramm's example of a robber versus a girl with a martini that we discussed earlier is our understanding that our relationship to someone threatening us is very different than that of a person with which we are friends, or possibly, romantic partners: We imagine who the robber and girl are to us. Goffman (1967) also stresses how relationships are integral to communication: "When a person begins a mediated or immediate encounter, he already stands in some kind of social relationship to the others concerned" (p. 41). For critical scholars, these relationships also are sites of power. Considering Schramm's example yet again in terms of power, the robber wielding a gun has considerable control in the relationship while the girl having a martini has equal, or given the time period in which this example was written, or less power.

Recent studies support the theory that relationships are a key aspect of how we see another in communication as well as the Self. Marwick and boyd (2010) found that some people who use Twitter identify their imagined audience as friends, followers, or fans – all three of which are examples of people's conceptions of another person's relationship to them. We assess our relationship to others, but we are not always cognizant that we are doing so. In fact, we consider these social relations even in imagined interactions (Rosenblatt & Meyer, 1986; Stemplewska-Żakowicz et al., 2006). Stemplewaska-Żakowicz and Walecka (2006)

demonstrated that when people are asked to communicate aspects of their life to different people they know, ranging from family members to romantic partners to teachers, in hypothetical scenarios, people alter their messages based on the intended receiver. These findings indicate we take into account our relationships with other people when communicating with them: our relationship to that other person is an aspect of who they are to us. But it also is part of who we are to ourselves. As discussed, the Self is always an integral aspect of communication (Blumer, 1969; Denzin, 1992; Goffman, 1959, 1967; Ong, 1975). The way in which we shift our portrayals of Self based on relationship demonstrates that we do not have a singular conception and projection of Self but multiple Selves (Goffman, 1959, 1967; Papacharissi, 2011; Stemplewska-Żakowicz et al., 2006). Indeed, conceptions of Self and our perceptions of people with whom we are communicating are entangled (Goffman, 1967; Marwick & boyd, 2011; Papacharissi, 2011, 2012). In taking into account our relationship to another person, we also must consider who we are within the dynamic: the relationship consists of who we are to another person, not just who they are to us.

We also assign characteristics to people we are communicating with (Beniger, 1987; Ellison et al., 2006; Goffman, 1959; Horton & Wohl, 2004; Merton, 2004) or encounter through the communication of others, including hypothetical fictional accounts or exchanges (Chatman, 1978; Zajonc, 1960). Our assessment of another person is an important aspect of communication because, as Goffman (1959) explains, it helps to "define the situation" in which we find ourselves as joint participants in communication. Goffman (1959) refers to these characteristics as a communicator's "personal front" or her or his "expressive equipment, the items that we most intimately identify with the performer himself and that we naturally expect will follow the performer wherever he goes" (p. 24). There are two parts to the personal front, according to

Goffman (1959): appearance and manner. Appearance includes both characteristics that we would normally associate with encountering someone in person – gender, race, style of dress, etc – as well as a person's social attributes including class or employment. Manner, in contrast, refers to how a person is carrying himself or herself at a given moment and is tied to the expression of personality. For example, radio viewers who listened to entertainer Kate Smith lead a war-bond drive in the 1940s came to view Smith as trustworthy and sincere (Merton, 2004). While some aspects of the personal front do not change, such as race, other characteristics are in flux over time including or even during a single performance, i.e. interaction (Goffman, 1959). Because characteristics are often situation dependent, constantly in flux, and product of our own internal sense making process, there is no limit to what attributes we can assign to others. Based on people's traits that we observe or are told about, we also may make additional assumptions about them (Chatman, 1978). And, as discussed previously, in assessing others we also engage with our sense of Self, evaluating our own personal front in light of how other people present themselves to us.

3.5.3 Seeing One Another

Our images of other people and the process through which impressions or personal fronts are created have been and continue to be of importance to communication scholars working in interpersonal communication from various epistemological and methodological positions. In an interpersonal paradigm, the bulk of research has investigated how we form the impressions, rather than the impressions themselves, and separated out the connection of Self from the process. Still other scholars have merged the cultural and interpersonal focusing on the fronts that emerge for Self and others through interaction with one another and an intricate interplay of these conceptions and relationships within a larger, cultural context. The key similarity these

research agendas share is an agreement that this image of another person exists and plays an integral part in the communication process and that our interactions with the world around us are part of how we come to see one another; they depart, however, on whether psychology or society play the primary role in influencing these images and the integration of the Self into the process. Goffman and constructionist perspectives of these images align most closely to my own philosophical position. With that being said, I still think valuable insights can be pulled in from these other bodies of scholarship, particularly when an aspect of the constructionist literature is silent.

In this dissertation, I draw primarily on Goffman's (1967) personal front; however, the term "personal front" is problematic in an HMC context. The adjective "personal" denotatively and connotatively refers to a person – a human. And so, there is a question of whether the term is appropriate to use in reference to an agent, particularly when the ontology of an agent is unclear. In what follows, I use terms such as image, conceptualization, and impression as shorthand to the characteristics and attributes we assign to agents and our relation to them. Part of the reason I retain the term impression despite epistemological differences with theories of impression formation, is that HCI scholars have extended the concept to their work that I explain in the next section. I realize, however, that the appropriation of this term is not optimal, and based on this studies findings I introduce a new concept that is more closely aligned with a constructionist perspective but acknowledges that an agent is not a biological person.

3.5.4 Impressions of Technology

Research regarding people's impressions, or images, of social computers has begun but is still in its early stages; however, clues to our mental images of these entities or the characteristics assigned to them also can be found in related research. From a cultural perspective, the presence,

or liveness, of electronic media, as described by Sconce (2000), has taken multiple forms: People have conceived of the ether, through which telegraphic messages were sent, TV and radio as being inhabited by the other worldly including ghosts and aliens. In some instances, people's perceptions that lost souls or aliens were floating through broadcast waves or living within televisions were the result of hearing unidentified voices or seeing a picture freeze on the screen, but for others, these conceptions were the result of hearing about these technologies These imaginations of "ghosts in the machine" weren't just science fiction plot lines, although they were definitely that, but also occupied the minds of individuals, according to Sconce. Likewise, computers and cyberspace also have been endowed with sentient qualities (Sconce, 2000) or as hosting living entities, as movies such as *Tron* illustrate.

My own research regarding press coverage of Siri's launch also provides an initial, cultural picture of digital social agents (Guzman, 2013). In keeping with Sconce's (2000) findings of the anthropomorphization of technology, I found that journalists endowed Siri with life-like qualities including personality and gender; however, they also, and often in the same sentence, positioned Siri as a machine (Guzman, 2013). Siri was simultaneously human and machine in news coverage. These media accounts also explained Siri's relationship to the user; Siri was not only a virtual assistant – as Apple marketed it – but also a servant at the beck-and-call of users (Guzman, 2013). At the beginning of this proposal, I also discussed several pop cultural portrayals of the digital social agents. On TV, in books, and in the movies, digital social agents also are imagined as human: they are, at some point, women who serve as the object of desire for their male users – or more accurately their male owners use them – and have amiable personalities. However, as with press accounts of Siri, the digital social agents portrayed in pop culture always return back to the position of machine. And so, culturally, the limited research on

news media coverage of these agents and a cursory glance of popular media reveal that we have imagined digital social agents as ephemeral women who serve to meet the sexual and everyday needs of their users, who are predominantly men in pop culture, with an agreeable attitude until they no longer can serve the needs in human-like ways and go back to being merely machines or as artificial in some way, as is the case with Samantha in *Her*. Within these depictions and imaginations can be found a view of human-machine relationship in which the human retains power over the machine, a servant.

Nass et al. (1995) extended impression formation research in Communication to HCI and found that people do assign specific traits, in this instance personality types, to programs exhibiting minimal social behaviors. Subsequent research directly focused on impression formation as well as related studies support Nass et al.'s (1995) findings and indicate parallels between how we conceptualize machines and humans. Gong and Nass (2007) found that we can delineate between humans and humanoids when we have a visual representation of an agent. In a series of experiments, participants were presented with a video of an actual human or a humanoid paired with either a human or humanoid voice. Participants preferred voices and images that matched but thought negatively of humanoids with human voices and humans with humanoid voices. Gong and Nass (2007) argue that our preference for voices that "match" the image of the producer shows that we prefer consistent traits in both humans and machines. Furthermore, although the ontology of agents is not entirely clear from textual or audio clues, when we can see and hear humanoids, we think of them as a separate class from humans. With that being said, we still will pick up on human-like traits in machines and respond to them as we would another human. In interactions with machines programmed with gender or other identity cues, people recognize and respond to these characteristics (Eyssel & Hegel, 2012; Nass &

Brave, 2005; Nass, Moon, & Green, 1997; Nass et al., 1994; Tamagawa, Watson, Kuo, MacDonald, & Broadbent, 2011). Participants communicating with machines or avatars with overt gender behavior or appearance perceived of the machines or programs as male or female (Eyssel & Hegel, 2012; Nass et al., 1997, 1994) and applied gender stereotypes normally observed in human-human communication to their communication with machines (Nass et al., 1997, 1994). People also assign national identity to vocal digital interlocutors speaking with specific accents (Tamagawa et al., 2011) as well as ethnicity to programs that speak in accents using words that are cultural markers (Nass & Brave, 2005).

In addition to behaving toward hardware and software as we would humans with specific characteristics, we also perceive machines and programs as possessing particular attributes, namely personality, based on cues in computerized text (Nass et al., 1995; Quintana, Crowell, Pryor, & Adamopoulos, 1982) and mechanized voice (Lee & Nass, 2005). Experiment participants have been able to identify the polar personality traits of submission/dominance (Nass et al., 1995) and extraversion/introversion in computers programmed with these traits (Lee & Nass, 2005). Furthermore, participants in these experiments exhibited preference for programs that were extroverted (Lee & Nass, 2005) or for machines that were similar to their own personality (Nass et al., 1995), behavior that is analogous to people's actions and preferences in human-human communication. Moon and Nass (1996) explain, "When computers are endowed with personality-like characteristics, people will respond to them as if they have personalities. In other words, given our results, we believe that computer personalities are *psychologically* real to users" (p. 669). These studies demonstrate that in interacting with programs, both textual and voice, people assign characteristics and attributes to them; however, much of this research has focused on a singular aspect – gender or race or personality— in isolation without taking into

account how we may perceive of the machine or program as a whole. Given that some HCI research has been modeled after impression formation scholarship in interpersonal communication, it is no surprise that similar to interpersonal studies, research in HCI also provides a limited view of our conceptualizations of machines and programs. As Wang and Nelson (2014) point out in making an argument for qualitative studies in HCI, much of what we know about HCI is based on experiments that cannot account for people's ongoing experiences with technology in their own lives.

Regarding our conceptions of relationships with devices, Wang and Nelson (2014) conducted in-depth interviews with tablet users to investigate users' impressions of these devices. They found that people develop different types of relationships with their tablets and associate corresponding personality types to tablets. For example, a female participant identified her tablet as "worldly person" that is "sophisticated" while a male participant likened his table to a "second girlfriend" with a "picky" personality (Wang & Nelson, 2014, p. 92). Wang and Nelson's (2014) results seem to support other research findings regarding the anthropomorphization of digital entities (e.g. Halpern & Katz, 2013; Sugiyama & Vincent, 2013); however, there is a significant limitation – Wang and Nelson solicited human-based responses specifically asking participants "'Imagine that your tablet was a real person. What kind of person would it be?'" (p. 83). When one participant described the tablet based on only its physical appearance, the authors concluded that the participant perceived the tablet as an "object" because "she did not have enough experiential information for generating an impression in which tablet attributes were freely transformable to internal human qualities" (p. 90). The fault in this logic is that the standard for our conception of machines is based in our human relationships. By eliciting a human response, the authors precluded any possibility that

relationships with machines can be other than human relationships and that some people just don't see machines in terms of humans but rather – ironically – as machines. Other scholars also have studied our relationships with devices, such as mobile phones (Katz, 2009; Sugiyama & Vincent, 2013; Turkle, 2008) and have also taken up the question of how our relationships with devices or our impressions of them are tied to sense of Self (e.g. Turkle, 1984, 2008). Turkle (1984) explains that the children she studies "defined themselves…by how they differ from computers" (p. 313).

Overall, however, researchers have yet to fully engage with the complexity of digital social agents. This dissertation will add to the existing literature regarding impressions of agents by simultaneously studying the multiple characteristics and attributes we assign to digital social agents and the relationship we have with them. And, because, our conception of other people cannot be disassociated from the Self, I also will take up the question of how these particular imaginations of digital social agent are incorporated into people's sense of Self.

3.5.5 Impressions of Presence

So far, I have presented the presence we experience in relation to others and our impressions of them as distinct processes, but, they are inextricably linked. I argued that the opening line of Goffman's (1959) *Presentation of Self in Everyday Life* stresses the importance of presence in how we come to know the other and ourselves. Equally, important, however, is what Goffman (1959) states next– a direct reference to impressions:

> When an individual enters the presence of others, they commonly seek to acquire information about him or to bring into play information about him already possessed. They will be interested in his general socio-economic status, his conception of self, his attitude toward them, his competence, his trustworthiness, etc. (p. 1)

The significance is that presence and our imagination of this presence are connected. For us to begin considering the nature of other people or digital entities, we must be made aware of them. When we acknowledge their presence, at least mentally, we then can begin to assign characteristics to them and our relationship to them. I experienced the connection of both concepts in an unexpected way while writing this proposal. As I was reading Schramm's (1971) discussion of different definitions of communication and foundational models, I was too engrossed with the material to give thought to Schramm, the author, but, when I happened upon his example of how we communicate differently with the robber versus a pretty girl over drinks — what I perceived as a sexist passage stereotypical of the sixties — the example brought Schramm as the author to the fore. Looking back, I immediately began to assign qualities to Schramm. I imagined him as the type of academic who wears a white shirt with tie and pressed slacks (a picture probably tied more closely to Blumer's portrait on the front of his book sitting on my desk) and who discusses the relevant theories of the day with other male academics – a type of university Mad Men set, if you will. These images, however, only came to me after I was made aware of his presence as the author.

When an entity, human or technological, enters our social space, we assign characteristics to it, and, as a result, its presence can remain in its current state or become stronger or weaker. For example, Lee and Nass (2005) found that when they programmed computers to portray certain personality traits, particularly that of an extrovert, people who picked up on these traits described a greater sense of social presence with machines. Likewise people who perceived a computer as exhibiting a personality similar to their own had a greater affinity for the it (Y. Moon & Nass, 1996). And so, the relationship of presence to our impressions of another person is not linear; the two concepts inform one another. For the past few pages, I have focused on

presence and impressions without referencing the ontology of agents directly. Here, I want to make clear, that I'm approaching the nature of digital social agents through presence and impressions. Our feelings of presence with and the characteristics and attributes we assign to agents comprise their ontology.

3.6 Giving Digital Social Agents a Voice

So far, I have discussed the complication of life-like agents for communication and laid out the different ways we relate to and think of humans and what little we know of our perceptions of machines. In these explanations, I have discussed some of the implications of the technological design of digital social agents for how we interact with the programs and ultimately come to think of them. Here I take a more detailed look at how the agents are presented and programmed to communicate with humans. Although technologies are often portrayed as neutral tools (Pacey, 1983), scholars from multiple disciplines and fields including communication (e.g. Carey, 1989; Innis, 2007; McLuhan, 2011; Mumford, 2010), HCI (e.g. Fogg, 2002; Reeves & Nass, 1998), STS (e.g. Suchman, 2009; Wajcman, 1991) and software studies (e.g. Berry, 2011; Manovich, 2001) argue that technology, its form and function, are of individual and social consequence. The digital social agents I am interested in here have two design elements that emphasize their sociality: their artificial intelligence capabilities their and their vocal interface. I already have discussed AI at length and the implications of the agency of the technologies I am studying, and so, I will focus more on voice in this section.

The ability for computers to understand and reply to vocal commands has long been considered a way to make digital devices more approachable and easier to use particularly for people with little technological knowledge. Licklider (1960) argued that speech recognition in computers would help to erase the language barrier between humans and machines because it

would allow people to interact with computers without being trained in advanced programming languages. One way of narrowing the divide between humans and computers is natural language processing, or NLP, that allows programs to process more complex human queries via text or speech (Martinez, 2010). Part of the success of IBM's Watson on Jeopardy was its NLP that enabled the program to understand the game show "answer" and reply with the "question" (Kroeker, 2011). Likewise, one of the reasons people were initially wowed by Siri was that they could speak to it and get a response similar to an exchange with a human (Aron, 2011). And so, voice-recognition paired with NLP and other AI features has the potential to make the user experience more intuitive and life-like. At the same time, as we have seen with Siri, there are limits to NLP and voice recognition that can impede use and frustrate humans.

But the vocal capabilities of digital devices are important beyond their pairing with AI. In fact, the presence of a voice in a machine, period, has significant implications for how people interact with the technology and the characteristics they assign to it (Nass & Brave, 2005). Voice can have a profound effect on how we interact with and conceptualize technology because it is an integral aspect of who we are as humans (Nass & Brave, 2005). In fact, a person's voice is first and foremost a signal to other people that she or he is human, that we are of the same species (Nass & Brave, 2005; Ong, 1967). Ong (1967) states, "But the mystery of sound is the one which in the ways suggested here is the most productive of understanding and unity, the most personally human, and in this sense closest to the divine" (p. 324). As Gong and Nass (2007) demonstrated in their experiment pairing human and humanoid images with corresponding voices, people recognize when a sound is or is not human.

The importance of speech in communication is often lost to a literate culture (Innis, 2007; McLuhan, 2011; Ong, 1967). When we engage in oral versus written communication, we use

different senses (McLuhan, 2011). We sense the world differently. Writing and, later, typing enabled words – and thus thoughts and knowledge – to move across time and space (Innis, 2008). I am neither physically present with my committee while I write this nor when committee members will read it. But to communicate in an oral society is to be immediately present with another (Innis, 2007; Ong, 1967). Ong (1967) argues that oral communication is "word as event," an action, in which participants – speakers and listeners – must simultaneously engage with one another. As a result, vocal communication – the speaking and hearing of sound – involves both being physically present and a sense of presence. As we have discussed, we can experience presence with and through modern ICTs that transmit audio or both audio and picture. And so, Ong (1967) argues, "the live human voice on telephone or radio creates a sense of presence and the present which goes far deeper than the transcribed telegraph message ever can. Voice is 'real'" (p. 298). Furthermore, voice "reveals interiors" (Ong, 1967, p. 309): in hearing someone's voice, we assign characteristics and attributes to them that go beyond the content of their message. From the rate, tone, pitch, and other aspects of vocal communication we gain clues to a person's age, gender, ethnicity, regional residence, education, and the list goes on. We also judge people (Aronovitch, 1976; Bloom et al., 1999; Pittam & Gallois, 1986) and their message (V. Smith, Siltanen, & Hosman, 1998) by the characteristics and the quality of their voice.

We also form impressions of digital voices as Nass and Brave (2005) explain in *Wired for Speech*, a book that synthesizes Nass's multiple studies on human interaction with voice-based programs and machines. People behave toward different digital voices as if each voice were its own entity and disassociate the voice from the computer producing it as Nass et al. (1994) found. We also assign specific characteristics and attributes to humanoid speech

including gender (Nass et al., 1997, 1994) ethnicity (Nass & Brave, 2005), and personality (Lee & Nass, 2005; Nass & Brave, 2005) and communicate with these voices in ways similar to how we would respond to humans. Nass and Brave (2005) argue that we respond to digital voices as if they were human because voice is such an integral part of who we are. Giving a program or machine a voice, then, is to instill in it a quality that is intimately human (or, at least, was intimately human until we started building talking machines). When voice and AI are coupled, the technology even more powerfully mimics the human condition.

Although we can form impressions of people or agents based on speech alone, there is only so much information we can glean from a person or thing's vocal characteristics. Voice, then, also has its limitations, as does any communication medium. Humans are, however, adept at finding alternatives avenues of information. For example, Walther's research demonstrated that contrary to claims that CMC impedes impression formation, people interacting via an electronic channel will engage in hyperpersonal communication to make up for the lack of nonverbal cues (Tidwell & Walther, 2002; Walther, 1996). And so, in human-machine communication people potentially could glean more information about the agent to the extent that the agent is programmed to provide it. How humans seek out information about a digital social agent and what they seek out in this process, however, has yet to be studied.

As Litt (2012) explains, the fewer cues we have regarding our unknown audience the more we have to rely on our imagination to fill in the missing pieces. With humans, we employ what we know through our lived experience. If I hear a man's voice over a telephone, I can fill in traits that I associate with men, including a particular mental image, to make up for the lack of visual information about him. For many people, however, the first time they use Cortana or another agent will be their first time interacting with this type of technology. Furthermore, the

programs are embodied within a device: They have never had a form of their own because they exist as lines of code. The existence of agents as only "voices in the machine" then may require human interlocutors to fill in even bigger gaps, but we cannot even begin to understand how we fill these gaps because we do not have a clear picture as to who or what these voices are to people.

3.7 Investigating the Voice in the Machine

Since inventing thinking and communicating machines, computers, we have simultaneously wrestled with the nature of these "marginal objects" as well as our own definition of what it means to be human (Turkle, 1984). With increased autonomy and human-like communication that far exceeds their technological predecessors, digital social agents have the potential to further blur these ontological lines already in negotiation. As Communication scholars, we are at a crucial historical moment as the general public is learning about these technologies and coming into contact with them in an everyday context for the first time. The social and communicative design of these technologies and our interactions with them are challenging not only how we have conducted our research but also how we have defined the very concept of communication.

Existing research across multiple disciplines and fields has helped us to better understand human behavior toward social machines. Researchers have established that people can distinguish between humans and humanoids, considering them in separate ontological categories in laboratory experiments (Gong & Nass, 2007). But we also know that people behave toward computers and other digital devices in ways that they would other humans (Reeves & Nass, 1998) and that we pick up and respond to specific human characteristics and attributes that are part of the technology's design, such as gender (Nass et al., 1997, 1994) and personality (Y.

Moon & Nass, 1996). We also form relationships with our devices and can equate our use of these devices with human relationships (Wang & Nelson, 2014).

Still there is much we don't know. A paradox exists in people's behavior toward machines and their explanations of these interactions: Yes, people know the difference between humans and machines and maintain computers are not human, but people still interact with digital devices as they would humans (Kim & Sundar, 2012; Nass & Moon, 2000). Kim and Sundar (2004) argue that this disconnect between behavior and attitude is mindless, in that people do not realize they are acting toward machines as if the machines were human. Scholars also know less about interactions with technology in the context of everyday life because much of the research to date has taken place in a laboratory with programs and devices designed for a particular experiment (Wang & Nelson, 2014); although there are exceptions, notably Turkle's work. As with studies of impression formation in interpersonal communication, HCI research has focused on testing whether people pick up on individual characteristics or attributes of machines without engaging with how humans conceive of these entities as a whole. Furthermore, this research has been focused on attitudes and behavior toward machines without engaging with how the users compare and contrast their own being in relation to intelligent machines. The largest piece missing right now in HCI and Communication research regarding interactions with devices is the interpretation of these technologies as articulated by the humans themselves.

To address some of the lingering questions in HCI, the challenges of agents for communication, and gaps in existing literature, my dissertation addresses our interpretations of digital social agents. Unlike quantitative research that proceeds from a set of operationalized concepts or hypotheses, qualitative and ethnographic studies, including this dissertation, begin with an overarching question or area of interest informed by theory and existing literature that is

further refined during the course of study (Boellstorff, 2010; Janesick, 2000). My research then is focused on the exploration of the ontology of digital social agents, or more accurately given the theory underpinning this research, the ontologies – plural. Put into a question, I am concerned with "What or who are these technologies to us?"

Our conceptualizations of technologies are informed by our perceptions of their presence ranging from an awareness of another entity to a sense of inhabitance within our world. Interrelated to presence is the form that this other – human or digital – takes in our mind: a mental image consisting of our relationship to another as well as their characteristics and attributes. Scholars disagree as to whether we can experience presence with a technology outside of its use, with cultural theorists arguing technologies occupy our minds as we learn about them (e.g. Marx, 2000; Sconce, 2000) while scholars focused on the psychology of this experience of nonmediation argue presence only occurs during use (e.g. International Society for Presence Research, 2000). Researchers do agree that our conceptualizations of others can shift over time including the sense of presence we experience (International Society for Presence Research, 2000; Lombard & Ditton, 1997) as well as our impressions, or imaginations, of others (Litt, 2012; Pavitt, 2009). How our perceptions of technologies shift over time is less clear. And so, to better understand our conceptualizations of digital social agents, I focus on our perceptions of presence as well as our mental images of the devices and how we assess the personal front. Given the disagreement regarding when we experience presence, I will investigate how both users and non-users make sense of these technologies. And because we never hold a static impression of another, I also will explore how our conceptualizations shift through communication about an agent or with the agent.

A research focus on a particular set of technologies alone, however, is not enough to fully engage with the ontological questions and complications raised by digital social agents. As Turkle (1984) explains, the psychological aspect of computers is that we begin to renegotiate how we see ourselves. And as Goffman (1959) argues, our perceptions of others are inextricably intertwined with our own sense of Self. A questioning of the ontology of digital social agents is also an inquiry into our own ontology. My dissertation then also will seek to better understand not just our interpretations of these technologies but how we also interpret ourselves.

4. METHOD: OUR INTERPRETATIONS OF AGENTS

4.1 A Qualitative Approach

My dissertation employs a qualitative approach to the investigation of our interpretations of the nature of digital social agents and ourselves. Method is not simply a way of doing research but is an extension of a scholar's philosophical position and hinges on the questions the scholar is seeking to answer as well as the theories informing a particular research project. Markham and Baym (2009) explain that "one must match the appropriate method to the question, retaining consistency among one's ontological, epistemological, and methodological practices" (p. xv). I follow a qualitative approach in this dissertation because its methods and aims are informed by the same theories and philosophical positions underpinning my research, and it enables me to engage with my subject of study – interpretations of digital social actors and the Self.

The epistemological position of this dissertation is that knowledge is social, formed through interactions with others and the world around us (Blumer, 1969; Carey, 1989). A qualitative approach to research also holds that culture and meaning are intertwined (Clifford & Marcus, 1986; Denzin & Lincoln, 2013; Geertz, 1973; Vannini, 2009). Defining ethnography, Geertz (1973) argues, "that man is an animal suspended in webs of significance he himself has spun, I take culture to be those webs, and the analysis of it to be therefore not an experimental science in search of law but an interpretive one in search of meaning" (p. 50). According to Denzin and Lincoln (2013), one aspect of research that qualitative scholars stress, among others, is "the socially constructed nature of reality" (p. 17). From the perspective of Geertz, Denzin and Lincoln, and other qualitative researchers, our understanding of the world cannot be uncoupled from our social networks that comprise our culture. And so, a qualitative approach is an epistemological and theoretical fit with this study because both focus on how participants' views

of their world are intertwined with their interactions with others – biological, mechanical, and digital – and the context in which these interactions unfold.

The central aim of qualitative research is the study of interpretations, as Christians and Carey (1989) state: "The task of social science, the basic task of qualitative studies, is to study these interpretations, that is, to interpret these interpretations so that we may better understand the meanings that people use to guide their activities" (p. 359). This dissertation explores our conceptualization of digital social agents and the Self, the presence we experience with these entities, and how these perceptions shift with continued communication with or about them from the perspective of participants. Therefore it also follows a phenomenological approach. As Kvale and Brinkmann (2009) explain, phenomenology is concerned with "understanding social phenomena from the actors' own perspectives and describing the world as experienced by the subjects, with the assumption that the important reality is what people perceive it to be" (p. 26). My focus is participants' interpretations of digital social agents and the Self based on their lived experiences.

Qualitative research also provides a methodological fit for this study that is focused on participants' perspectives because of the emphasis it places on the agency of participants (Becker, 1996; Christians & Carey, 1989). As Becker (1996) has noted, building on Blumer's work, both quantitative and qualitative approaches to social science are concerned with interpretations at some level, but they differ as to whose interpretations are the primary focus: the researchers' or the participants'. Qualitative scholars stress the agency of participants and attempt to understand the world, and their interpretation of it, from participants' perspectives (Blumer, 1969; Christians & Carey, 1989; Denzin & Lincoln, 2013). This is not to say that the findings of qualitative research do not involve the interpretations of scholars, as well; they do

(Emerson, Fretz, & Shaw, 2011; Geertz, 1973; Van Maanen, 2011). However, researchers employing a qualitative approach are reflexive of their role throughout the research process, including the final write-up, in an attempt to separate out, as far as possible, which interpretations belong to them instead of participants (Emerson et al., 2011; Van Maanen, 2011). Becker (1996) states that "epistemologically, then, qualitative viewpoints insist that we should not invent the viewpoint of the actor" (p. 60), and to this end, according to Tedlock (2000) "a key assumption has been that by entering into firsthand interaction with people in their everyday lives, ethnographers can reach a better understanding of the beliefs, motivations, and behaviors of their subjects than they can by using any other method" (p. 470). A qualitative approach enables me to address people's conceptualizations of digital social actors and themselves from their own perspectives in a holistic way that accounts for the complexity of our social lives.

4.2 Qualitative Methods

I employed the qualitative research methods of observation and active interviews to gather data for this study. Observation is the process of "gathering impressions of the surrounding world using all human faculties," according to Adler and Adler (1994, p. 378). To watch and examine how people interact in a specific situation or with the world around them has been and continues to be an integral part of research from the hard sciences to the social sciences (Adler & Adler, 1994). Because the philosophical and theoretical assumptions underlying these paradigms can vary greatly, so to does the practice of observation and the standards it must meet (Adler & Adler, 1994; Angrosino & Mays de Pérez, 2000). Qualitative researchers, particularly those who align themselves with the theoretical perspectives of the Chicago School, emphasize observation in "natural settings" that allow researchers to better understand the daily practices of

the participants as well as the context in which these interpretations unfold (Adler & Adler, 1994; Christians & Carey, 1989).

Observations can occur at many levels from general to specific (Adler & Adler, 1994; Angrosino & Mays de Pérez, 2000) and within HMC research includes observing both the human interacting with the technology and the technology itself. General observations included watching and documenting the overall setting in which the interaction is occurring including the type of space, how it is being used, the people within the space, and how the space relates to technology use. These general observations provide context for people's experiences in their daily lives, albeit in my case only a brief glimpse, as well as their engagement with, or disengagement from, technologies within these spaces. As I explain in further detail in the protocol section, I also observed how people were interacting with their technologies in these spaces. At this level of observation, I focused on people's broad technology use that provided me insight into how they have integrated different technologies into their lives as well as their proficiency with them. Adler and Adler (1994) state, our interaction with the world around us and our observations through our senses are an integral part of the human experience: even when we are not engaged in formal research we are, in fact, observing and reacting to what is happening. The people inhabiting these spaces I'm observing are not always interacting individually but also collectively. Observations of how people interact with or react to someone using a technology also are important.

If we think of our communication with machines as a dyadic interaction, then two entities are involved in the process: the human and the machine. As Pinch (2009) argues, studies of material culture and our interactions with technologies need to consider the "non-human" elements. Observing what the technology is doing in response to a user is difficult without

conspicuously looking over their shoulder and invading their personal space and whatever privacy they may have tried to establish in a public space. To account for this difficulty, I asked people to explain to me their interactions with their digital social agents and devices and how these digital entities respond. In some cases, people modeled these behaviors for me. I also interacted with many of the agents outside of the field, borrowing phones and devices from friends and family members to understand how the agents interact with humans. This approach, while it provides some context, has its own limitations because agents often tailor answers to individual users. Although this is a potential limitation, I think it is important to think about this limitation in terms of my study's goal – how *humans* conceptualize agents. The aim of the technological observations, then, is to better understand the participant's interpretations of these devices. Exploring how these agents work either in direct communication with the participant or with me still can provide valuable information that can help to contextualize the user experience and their conceptualization of agents.

The goal of my dissertation is to engage with people's interpretations of digital social agents, and in order to understand their conceptualizations of these applications, I need to consult directly with participants. This point may sound obvious, but in much of the existing impression formation research, grounded in positivist or post-positivist paradigms, researchers often have not provided participants with the opportunity to discuss their own perspectives on social technologies in their own terms. In discussing the quality of qualitative research, particularly in internet studies, Baym (2006) forcefully puts forth the argument that we cannot make claims about other people without consulting them: "I cannot say this too strongly: if researchers do not interview participants or have other access to their points of view, they have no grounds for claims about how online phenomena are understood or how they influence those who engage in

and encounter those phenomena" (p. 85). In speaking with people, I am able to collect information regarding interpretations at the locus of their existence, with people.

My decision to use interviews – and to take up the question of people's interpretations of digital social agents – also is an issue of ethics. As Christians (2013) argues, our epistemologies, our research practices, and our codes of ethics guiding these endeavors are entangled. A focus on objectivity and neutrality in empirical and positivist research – such as many of the existing studies on human communication with machines – is a reflection of Enlightenment philosophy, while a more recent turn in qualitative research that focuses on the production of knowledge to empower the disenfranchised and actively engage with study participants is tied to critical and feminist frameworks, according to Christians (2013). This view of research, and social relations, through critical and feminist frameworks focused on power "erases any distinction between epistemology, aesthetics, and ethics, " according to Denzin (2002, p. 484).

In discussing how to balance ethics and privacy in online research, Stern (2009) recounts that in focusing on how to get her research approved by an IRB, she focused more on the method of what she was doing instead of interrogating the reasons behind these methodological decisions and how she could have approached them otherwise. In taking a step back to think about why I have selected interviews, I realized that one of the reasons why I wanted to focus my research on participants' understanding of digital social agents was because I felt that their perspectives had been overlooked within the literature. For example, Wang and Nelson (2014) report in their research regarding people's relationships with tablet computers that one of their participants gave a description of the way the machine looked instead of personifying it. They conclude from her description that she did not have enough experience with a tablet to establish a relationship to it in human-like terms. But this aspect of their research made me wonder: "What if she thinks it's

just a machine?" The researchers do not provide enough information regarding whether or not they asked follow-up questions, but the anecdote made me realize that focusing on participants' perspectives was not only something I could do, but, rather what I should do. This is a research decision informed by ethics (and one I explain in more detail later in a section dedicated to ethics). Interviews with participants allow me to gather data directly related to my research questions and provide a means for participants' voices to be heard.

Interviewing is one of the most common methods of data collection used in both qualitative and quantitative research, but its format varies greatly as do scholars' perspectives of what takes place or should take place during an interview (Fontana & Frey, 2000; Holstein & Gubrium, 1995). The epistemology underlying this dissertation is that we gain knowledge of our world through communication. On one hand, the goal of my qualitative interviews is to explore that knowledge and understanding of digital social agents that people have developed through their direct interactions with the devices themselves or communication about these technologies. However, at the same time, all instances of communication are sites where knowledge of our world is created or revised (Carey, 1989), including interviews. As scholars have argued, particularly following the critical and feminist turns, information during interviews is co-created between researcher and participant (Fontana & Frey, 2000; Holstein & Gubrium, 1995, 1997; Kvale & Brinkmann, 2009; Murphy & Dingwall, 2001). Holstein and Gubrium (1997) explain: "Both parties to the interview are necessarily and ineluctably active. Meaning is not merely elicited by apt questioning, nor simply transported through respondent replies; it is actively and communicatively assembled in the interview encounter" (p. 114). The implications of this perspective of interviewing is that participants have agency and are no longer relegated to the position of subject from which data is simply extracted (Holstein & Gubrium, 1997; Kvale &

Brinkmann, 2009). Although scholars who focus on qualitative interviews as method do not necessarily use the word ethics, the perspective that participants have agency is also an ethical position (Murphy & Dingwall, 2001).

Holstein and Gubrium (1995) put forward the process of active interviewing in which the interviewer does not sit back and attempt to neutrally gather data, but, instead reflects on and responds to the participant's interpretation of both what is happening in the interview and the subject at hand. I adopted the active interview approach because it offers a nuanced means of addressing and interacting with the complexities of people's interpretations and aligns with the epistemology of my research and my own ethical position toward participants. One of the hallmarks of active interviewing is that interview participants are not restricted to a singular perspective, and in fact, Holstein and Gubrium (1995) encourages researchers to understand the different narratives through which people organize their experiences:

> Treating the interview as active allows the interviewer to encourage the respondent to shift positions in the interview so as to explore alternate perspectives and stocks of knowledge. Rather than searching for the best or most authentic answer, the aim is to systematically activate applicable ways of knowing – the possible answers – that respondents can reveal, as diverse and contradictory as they might be (p. 125).

Active interviewing accounts for the "messiness" of our world and research.

Active interviewing also provides a way to address a potential language problem in my research. Here the language problem is not the inability of machines and humans to interact with one another (Licklider, 1960) but, rather, how we communicate about social machines. In my analysis of media discourse on Siri, I found that journalists intermingled adjectives and descriptions used for machines (e.g. program, it) with words typically reserved for humans (e.g. assistant, she) (Guzman, 2013). We do not have specific words for social machines, at least not yet, and so we talk about them as either machines or life-like entities or intermingle descriptions.

Kim and Sundar (2012) also have found that when researchers use human terms to describe machines, participants may pick up on these cues and specifically deny these human attributes because they know the socially correct position is that machines are not human. The challenge then is to find a way to discuss digital social agents with interview subjects, first and foremost, and secondly, in a way that would not bias the data. Drawing on Holstein and Gubrium (1997), the biasing of data is moot because an interview is not a neutral exercise and participants are individuals who are capable of forming and articulating their own thoughts. Adopting an active interview approach allowed me to respond in-kind to participants' preferred terms for conceptualizing digital social agents and humans, as things, life-like entities, or an amalgamation. It also enabled me to engage participants in discussion of alternative perspectives.

Interview questions were derived from existing research, when possible, and developed to address the different areas I am investigating within this dissertation. Although I began with a list of questions, I did not have a set script as I would in structured interviews (Fontana & Frey, 2000). I did have content areas I covered with each participant, but initial and follow-up questions were dependent upon the participant, their familiarity with digital social agents, and their answers to other questions. Following boyd (forthcoming) and other qualitative scholars, I often followed up questions with "why?" to work toward a deeper understanding of participants' experiences. I also adapted questions and their wording during the data collection process based on participants' replies to or difficulties with questions. For example, early on I learned that people did not necessarily think of agents as a form of artificial intelligence, and so, I added several questions regarding AI to interviews so I could better contextualize participants' answers. The initial questionnaire that guided most of my interviews can be found in Appendix A. Researchers routinely couple observation with the interview process by observing a person's

nonverbal behavior while they are being interviewed (Angrosino & Mays de Pérez, 2000), and I continued to observe the participants while interviewing them.

4.3 Study Population

The eligible study population for this dissertation was adults, defined as people 18 or older, who could speak English. The age of participants was selected based on existing research regarding voice-based technologies and technology generally as well as federal research guidelines. Because social digital agents are new technologies, limited research has been conducted regarding people's use of these technologies. The most recent data available are from a survey of mobile voice search use commissioned by Google (2014). According to Google's media statement on the report (the full report is not available to the public), more than 50 percent of teens, ages 13-18, and 40 percent of adults, ages 19 and over, daily use mobile voice technologies such as Siri, Cortana, and Google Voice Search. The survey also found different uses for these technologies among the age groups. The fact that teens and adults use voice applications differently is not surprising given differences in how these groups engage with other ICTs. The implications of usage frequency and usage patterns by the two groups for this study is that teens and adults may have varying conceptualizations of digital social agents.

Given the time constraints for completing this research and the logistics of conducting a study in an emerging area of research, I decided to only focus on one group, adults. Although Google defined its adult population as starting at age 19, adults are defined as people 18 and over in this study. Defining people 18 and over as an adult is consistent with federal research guidelines and general practice in public opinion research. Federal research regulations defer to the state in which the research is being conducted regarding age parameters for consent, and in Illinois, an adult is defined as anyone 18 and older. This definition of adult also is consistent with

practices of public opinion research organizations, such as Pew. Consistency in study populations among research focused on the same subject allows for future results to be compared and contrasted more accurately.

The language that participants use regarding digital social agents is a crucial aspect of data collection and analysis, and the translation of interview questions or answers may result in the loss of meaning or nuance. The interview was designed in English, the predominant language within the United States, and only people who spoke English were part of the study population. It is important to note that this language requirement did not restrict the study to people who spoke English only or as a first language. Participants just had to be able to understand the questions and respond in English. As previously stated, this dissertation included both users and non-users of digital social agents. Eligibility to participate in the study was confirmed during the process of presenting the informed consent document that stated the study's population parameters.

4.4 Observation and Interview Protocol

I collected data through observation and active interviewing at field sites in a large Midwestern city. Every visit to the field began with observation of people's use of technology in public places in the central downtown area and tourist district that included public transportation and transit centers; places of recreation including parks and cultural centers; places of commerce including shopping centers and cafés; and places of higher education, including a large, public university. I selected locations that were likely to be populated by people of varying ages and economic and technological backgrounds. For example, many people use libraries or other city-run centers to access the internet because they do not own a device or have wifi. The majority of observation and interviews took place indoors because data collection occurred in late winter.

When arriving in the space, I often casually moved through it to get a sense of what people were doing in it as well as to find people engaged with technology, which was never a problem, and to find a spot from which I could observe people's use of technology. I often engaged in an activity to blend-in with the space, such as purchasing a drink at a coffee store or fiddling with my own electronic devices. I often positioned myself near people in a way that it would be more natural for me to have a conversation with them. For example, communal tables allowed me to observe people, and then turn to the person next to me to engage them in conversation. This allowed the subject and I to get "used to one another" being in the same space before I approached them for an interview. This technique seemed to work better than walking up to someone rather suddenly, invading their private space. My observations focused on the general setting, including the space and people in it, and how people were interacting with their technologies, and how people were not interacting with a specific technology.

After I had acclimated myself to a space, I began to look for people to interview. Factors I considered when selecting participants for interviews included technology use, demographic characteristics, and approachability. Technology use was a factor in selection because this study focuses on people's conceptualizations of digital social agents, a specific type of technology, and the way people conceptualize a technology is influenced by their use of it and, potentially, other technologies. Furthermore, technology use can be a factor in how people come to see the Self. Other technology use within the field site also may be an indicator of the person's likelihood of engaging with voice-based technologies. For example, I found that people who were multitasking, such as simultaneously using a mobile phone and a laptop, were more likely to use an agent or be knowledgeable about an agent. Use of older technologies, such as flip phones, or other mobile devices that are not smartphones conversely signaled that the person may not have

had the opportunity to use a digital social agent. Of course, these indicators were not always correct; it is impossible to know a person's experience with agents or technological proficiency until approaching them for the interview. I also considered the demographic characteristics in selection of participants for inclusion in interviews to avoid a homogenous sample and to make sure that groups previously underrepresented in technology research were given the opportunity to be included. These characteristics included age, gender, and race and ethnicity. Participant approachability was a pragmatic factor for selection. I observed people for cues that they may be more willing to participate in the research. These cues can take a variety of forms. For example, people who initiate small talk with people around them also may be willing to speak with a stranger and, thus, a researcher. Cues that indicate people may not be open to interviews or should not be interviewed include actions such as moving through the space as if in a rush.

These factors weighed differently into participant selection depending on the stage of the research. For example, at the beginning of data collection, I was seeking to speak with a variety of people and technology users, and focused primarily on technology use and pragmatic cues in participant selection. After my first few days of interviews, I discovered that I had primarily interviewed males. The next time I entered the field, I focused in my observations on why I had been interviewing predominantly men by focusing on the differences between men and women in certain spaces. I realized that women were more likely to immediately insert earbuds upon entering a space or use other techniques to wall themselves off from others. And so, I adjusted my protocol to walk up to women in a space even if they were wearing earbuds. As data collection progressed, I adjusted participant selection to address gaps in my research. For example, I initially interviewed multiple Siri users. To find users of other agents, I focused my participant selection on people who were using devices that were not Apple products.

I verbally recruited participants by approaching them at the field site, identifying myself as a researcher with the University of Illinois at Chicago, describing the study and its purpose as stated in the informed consent document, or ICD. Participants were not offered any form of monetary or other compensation. I provided participants with the ICD, and I verbally confirmed that participants were part of the eligible study population. I also obtained verbal consent from the participant. Interviews were recorded with a digital audio recorder for accuracy.

To protect participant confidentiality, I asked each participant to provide me with a pseudonym to use to refer to them in my research. When people could not think of a pseudonym, I provided them with a name. In instances when a participant selected the same pseudonym as another participant, and I realized it before we began the interview, I asked them to select a different name. Given the number of participants who were interviewed, I did not realize some duplicate names until after the interviews had taken place. In these instances, I renamed the participant using a pseudonym that was similar to person's first alias. I neither asked nor recorded the participant's actual name or any contact information. Therefore only deidentified data was documented. I also changed participants names a second time when reporting the findings to provide an extra layer of anonymity.

Once verbal consent for the interview was obtained from the participant, I turned on the digital recorder and again obtained confirmation from the participant that they had consented to the research and knew that they were being recorded. I then proceeded with the interview. The interview continued until we had covered all of the questions pertinent to the participant and their use or non-use of agents, the participant indicated via verbal or non-verbal cues that they were losing interest in the interview, or the participant ended the interview. At the end of each interview, I debriefed participants, turned off the tape recorder and thanked them for their time.

4.5 Documentation and Storage of Data

Data was recorded using two methods. I used Emerson et al.'s (2011) field "jottings" – or brief written notes of key phrases or descriptions – to record my observations in a research notebook. For interviews, I used both jottings and a digital voice recorder. I created jottings of the conversations so that I could produce fieldnotes and memos in a timely manner and would have a backup in case of technical failure by the recorder. Because I am interested in not only what was said but how it was said during an interview in a high level of detail, I recorded audio of the interviews on a digital voice recorder. Fieldnotes were created from the jottings following each day's data collection. Similar to Emerson et al. (2011), Clifford and Marcus (1986), and Van Maanen (2011), I view fieldnotes as constructions and interpretations themselves, not neutral recordings of a particular event. Writing fieldnotes, then, was also a reflexive activity (Emerson et al., 2011) that required me to interrogate my own assumptions and conclusions.

I securely stored all deidentified data, including jottings, fieldnotes, and voice recordings. All data was accessible only to the researcher with the exception of audio files for transcription. Handwritten notebooks were stored in a locked filing cabinet. Audio files from the digital voice recorder were transferred from the recorder via a USB connection to my password-protected computer. Digital voice files were deleted from the recorder. All data files including voice files, the written transcripts, and fieldnotes were stored in separate encrypted folders on my computer. Encrypted folders containing the digital voice data and the written data were backed up to secure cloud service providers and to an encrypted removable hard drive.

The analysis of active interviews required that the researcher consider both the content of what was said as well as how it was said and the interaction between both parties (Holstein & Gubrium, 1997). Therefore, verbatim transcription of the interviews was required. To familiarize

myself with the study data, I transcribed the first two interviews myself. After that, I employed a professional transcriptionist who completed verbatim transcriptions of each interview. To protect participant confidentiality, all deidentified data in the form of audio recordings and written transcripts were transferred between myself and the transcriptionist via a secure cloud-based service. Transcribed files were password protected during transfer. The transcriptionist agreed to encrypt all data on the transcriptionist's computer and destroy all recordings and text files upon completion of the work.

4.6 Coding and Analysis

I followed a grounded theory approach (Charmaz & Mitchell, 2001; Charmaz, 2014; Glaser & Strauss, 1967) in the collection and analysis of my data. Glaser and Strauss (1967) explain that in a grounded theory approach "joint collection, coding, and analysis of data is the underlying operation" (p. 47). Researchers review their data while they are still in the collection stage to begin making connections among the information, and, in turn, use the categories that have "emerged" from the data to further guide collection and analysis (Charmaz & Mitchell, 2001; Glaser & Strauss, 1967). This process allows the researcher to identify potentially missing areas that can be flushed out while research is ongoing. It also requires the researcher to reflect on the data in the form of memos (Charmaz & Mitchell, 2001; Charmaz, 2014).

For my dissertation, I collected, coded, and analyzed data concurrently. Following each visit to the field, I wrote fieldnotes from my jottings and submitted the interview audio files for transcription. I reviewed my notes for any observations or findings that may require me to adjust the interview protocol or who I was specifically targeting to interview and made changes as necessary. Once the files were transcribed, usually within a few days, I then immediately coded the interviews. Although not always possible, I attempted to keep pace with data collection and

coding by completing all coding for that week's interviews before beginning my interviews for the following week. This allowed me to reflect on the data after it was initially organized and make further adjustments to my interview questions or my observations.

Because of the large amount of data I was analyzing and the complexity of the subject, I used the qualitative analysis software program MaxQDA to assist me with coding and analysis. The program allows researchers to code, including in-vivo coding, assign variables to documents, create coding or other memos within documents or separately, and analyze the data using a variety of methods. As with other aspects of qualitative research, coding also is emergent, and I used different coding schemes to organize my data. Coding was continuous throughout data collection and analysis, and I used Saldaña's (2013) fundamental text as a guide to coding methods and the coding process.

In this dissertation I am seeking to answer specific questions regarding digital social agents, and I initially coded my data using the structural method that identifies data as answering or being relevant to specific questions (Saldaña, 2013). Because I was interested in participants' own words and descriptions of digital social agents, I also used in-vivo coding that creates codes from participants own words (Saldaña, 2013) in my initial coding. Other coding methods I used in initial and subsequent rounds of coding include subcoding that involves the creation of derivative codes for a larger category (Saldaña, 2013). For example, one of my questions asked participants to describe an agent's voice. I coded the initial passage from an interview related to voice as "SDA Voice" (social digital agent voice). I then coded people's descriptions of the agent's voice using in-vivo coding, and these codes became subcodes to SDA Voice. One participant described Siri's voice as "classic Siri," and this became one of the in-vivo subcodes under SDA Voice.

In addition to developing codes that referred directly to questions, I also created codes based on aspects of participants' answers that stood out, were repetitious, or related to existing theory regarding technology. For example, early in my interviews I noticed that participants referred to agents as "weird," "creepy," and "bizarre," and these became their own codes because they were repeated by numerous participants and reflect cultural discourse regarding AI. Initial coding proceeded through several rounds because as I interviewed people new trends emerged warranting new codes that had to be applied to previously coded interviews. For example, it was not until I was almost done with my interviews that I realized the act of "typing with a device" was an important aspect of how people perceived agents. I created a code regarding typing that had to then be applied to all the preceding interviews. Once initial coding was complete, I then went through subsequent rounds expanding and collapsing codes. Coding continued into the analysis phase.

Analysis occurred during data collection, coding, and then after data collection. Because my goal was to answer specific questions, I focused on the different codes and subcodes applied to each question and looked for trends that emerged from the data, including overarching themes within answers to specific questions as well as common themes that spanned multiple categories. Analysis is guided by the theoretical framework informing the study, and, in studies of new technologies, scholars also seek to find new trends and changes in cultural practices surrounding our use of the technology (e.g. boyd, forthcoming). I compared and contrasted the themes and trends within my data against existing literature and contemplated the bigger cultural questions and implications emerging from the data.

In ethnographic and qualitative research, scholars also must be careful to not misinterpret participants' actions or statements (Geertz, 1973), and our interpretations of other people's

interpretations requires that we consider the larger historical and cultural context in which people come to understand their world (Christians & Carey, 1989; Geertz, 1973). Christians and Carey (1989) explain: "The texture of a cultural system at large, the *Zeitgeist* of an era, must be understood for an immediate event to be appraised accurately" (p. 364). In conducting and analyzing my data, I also considered what was happening in the news and pop culture regarding digital social agents and related technologies such as AI and robots. However, as I learned from participants, people do not always watch the news or have an interest in technology. When time allowed, I also asked participants about what major technologies they were hearing about or their understanding of AI and agents more generally. In her research of teens, boyd (forthcoming) explains that to contextualize teens lives she engages with other aspects of their culture including television shows, books, etc., and Hine (2009) states that she also tried to understand a particular group of scientists by looking at the different ways this group's practice are made manifest. In many of my interviews, participants made references to mass media portrayals of robots and AI, and I familiarized myself with the movies and shows participants' were mentioning so that I could better understand the comparisons they were drawing between agents and fictional entities.

I also engaged in memo writing from data collection through analysis. As Charmaz (2014) explains, memo writing allows researchers to organize their thoughts and begin the process of developing theory as the research is ongoing. For this dissertation, I created method, coding, theoretical, writing, and reflection memos to help work through the data and the process of collecting it, analyzing it, and writing about it. Memo writing was crucial because it provided me with an outlet to document ideas and connections, no matter how nascent, that I could routinely revisit to identify trends or possible new directions. It also was important for identifying and keeping in-check my own personal viewpoints when trying to interpret other

people's interpretations. Qualitative research can be overwhelming because of the sheer amount of data collected and because of the physical and mental exertion of conducting field interviews while simultaneously coding and analyzing data, and I also used memo writing as a way of addressing frustrations and deciding how to handle those frustrations productively.

4.7 Ethics

Because I planned to interview people and collect only deidentified data, I applied for and was granted a Claim of Exemption from IRB review by the Office for the Protection of Research Subjects on February 7 (Research Protocol #2015-0123). With the postmodernist and poststructuralist turn in the social sciences and the humanities, a "crisis of representation" surfaced in which some scholars began to question the epistemologies underlying research, the position of the researcher in relation to their research "subjects," and the practice of representing culture (Flaherty, 2002; Van Maanen, 2011). At the heart of this crisis is the power wielded by researchers who determine the design of studies, how they will interact with participants, and ultimately how a culture is represented (Boellstroff, Nardi, Pearce, & Taylor, 2012; Denzin, 2002; Van Maanen, 2011). Denzin (2002) makes clear what is at stake in our research: "Our interpretive practices have a material effect on the world; there is a materiality to the text. Together they create the conditions that make the world visible. We change the world by changing the way we make it visible" (p. 483). For Denzin (2002), acknowledging and redressing these power differentials are not a mere academic exercise but an obligation.

But how do we mitigate power differentials that seem inherent to the research process? We do so by focusing on our humanity and the ethical obligations that extend out of it (Boellstroff et al., 2012). Christians (1997) lays out a universal ethics focused on what connects us at the most intimate level, our shared nature as humans, instead of a moral position in which

the individual is elevated above all. Christians explains, drawing on Freire, that we are connected to one another in and through communication where our interactions are "a double function – I-Thou or I-It – but never one element in isolation" (1997, p. 9). Social and feminist scholars have argued that this "common oneness" (Christians, 1997) creates an obligation to one another (Christians, 1997, 2013; Held, 2006). Out of this recognition for our shared humanity, feminist theorists have refined an "ethics of care" that positions "persons as relational and interdependent, morally and epistemologically" (Held, 2006, p. 13). Researchers who have made these ethics their own have developed an alternative approach to ethics that goes beyond the minimum set by Institutional Review Boards (Boellstroff et al., 2012; Christians, 2013; Denzin, 2002). Boellstroff et al. (2012) explain our obligation to participants given power differentials in research as well as benefits gained: "A key consequence of this asymmetry is the imperative that the ethnographer 'take good care' of informants. This notion goes beyond simply doing no harm; it means ensuring, to the greatest extent possible, that informants gain some reward from participating in research" (p. 129-130).

In this study, I adopt an ethical position that acknowledges and respects the humanity of my participants and keeps my obligation to them front-and-center. As discussed earlier, part of my motivation for focusing on people's own interpretations of digital social agents was that researchers largely have not provided people with the opportunity to share their own perspectives on these technologies in-depth. Researchers have done much of the interpreting on behalf of participants. With that said, qualitative research and ethnography are themselves an interpretation (Geertz, 1973; Van Maanen, 2011), and I am obligated to keep in mind this power and do all that I can to provide accurate representations of people's interpretations. The active interview format I chose also is reflective of an ethics that respects the agency of my participants

by giving back to them some power that traditionally they cede in more structured interviews. Participant privacy and anonymity also are key ethical considerations (Boellstroff et al., 2012; boyd, forthcoming; Fontana & Frey, 2000; Murphy & Dingwall, 2001), and as I described earlier, I collected deidentified data.

My ethical obligation to participants also required me to be cognizant of the fact that despite what would seem to be the outwardly benign nature of conversations about technology, my research, any research involving humans, has the potential to be stressful or uncomfortable for participants (Murphy & Dingwall, 2001). Digital social agents perform multiple functions, but one of their key roles is serving as a search engine interface. People turn to search engines for information on a wide variety of aspects of their lives both public and deeply private. I kept in mind that people may have engaged with digital social agents for serious or devastating purposes, and in asking them about these technologies, I could be asking them to recall a stressful event in their lives. No one indicated this to me when I interviewed them; however, I did encounter participants that did require me to make a decision in the field based on my ethics of care. For example, one participant would routinely go off track during our interview by speaking about their own qualifications for knowing information. Most of the questions seemed to return knowledge they had about something or how they used technology, particularly how they possessed special skills and knowledge. During the course of the interview, I learned this person was currently unemployed and was in the process of actively seeking a new position. It then became clear to me that being able to speak of their knowledge on an issue, even when it was tangential to my research, was important to them. The interview, which also yielded important usable data, took longer than it should have because I made the decision not to cut the person off but to allow them to continue to speak about their qualifications. I could tell from the

person's voice and their body language that they enjoyed the experience: they got something out of participating in the research. As Boellstroff et al. (2012) explain, when we engage in these kinds of interactions we are not only respecting people's humanity but also giving back to them.

4.8 Terminating Data Collection

A grounded theory approach can be particularly useful in qualitative or ethnographic research where the end point for data collection rests on the depth of the findings instead of a stopping point demarcated by statistical power at the onset of the study (Charmaz & Mitchell, 2001). Grounded theory sets saturation of theoretical categories, or themes, as the terminus (Charmaz & Mitchell, 2001), and categorical saturation served as the stopping point in this study. Saturation occurs when the data being gathered stops reflecting new theoretical aspects even after the researcher has sought out data to "stretch" the theoretical categories (Glaser & Strauss, 1967). One way I tried to stretch theoretical categories was to ask people a question about a perspective different from their own view of agents, to "challenge" what they had said, and to develop new questions that helped me understand a particular aspect further. I ended data collection when participants' responses became repetitious in a way that did not yield additional insight into the research questions.

4.9 Overview of Interview and Observational Data

I conducted observations and interviews at 13 different locations (libraries, transit centers, cultural centers, parks, shopping malls, cafés) in the central downtown area of a large Midwestern city from February 17 to April 1, 2015. I observed people engaging in a wide-range of interactions with technology in these spaces, but I did not observe anyone using a digital social agent outside of my interviews with participants. Technology use varied depending on the location with people more likely to place phone calls in outdoor spaces or in transit centers, such

as train stations, than in retail and restaurant settings that tended to be smaller with people in closer proximity to one another. People who were engaging with technology most often were typing or touching a device screen, and many people were using more than one technology simultaneously. I discuss the implication of these observations in the finding section.

I interviewed 52 people, but I had to discard one of the interviews because the participant did not answer the questions. The final number of participants for this study is 51, with each person interviewed once. Interviews were conducted at the field sites and ranged from 4 – 38 minutes, with a median length of 17 minutes. As described above, I used purposive sampling (Maxwell, 2013) and selected participants based on their technology use within the site and their demographic characteristics.

The purpose of this study is to identify the range of people's conceptualizations of digital social agents, and in reporting the results, I do not focus on the demographic characteristics of participants or compare and contrast among different groups; although these characteristics could be analyzed for future research. Gender representation in the study is nearly equal with 27 people, or 53 percent, identifying as male, and 24 people, 47 percent, identifying as female. Participants identified their own race and ethnicity as Caucasian, 26 participants (51 percent); Black, 13 participants (25 percent); Hispanic, 6 participants (12 percent); Asian, 3 participants (6 percent); Middle Eastern, 2 participants (4 percent); and one person identified as being of mixed race. Participants' ages ranged from 19 to 85, and I placed participants into four age brackets. Because people access agents via their mobile devices, I based the age brackets on those used by the Pew Research Center in its reporting on mobile devices (Duggan, 2013): ages 18-29, 24 participants (47 percent); 30-49, 13 participants (25 percent); 50-64, 10 participants (20 percent); 65-85, 4 participants (8 percent).

This dissertation focuses on both users and non-users of digital social agents, and 67 percent of participants reported directly using a digital social agent at some point in their lives while interacting with their own device or with someone's else's device. People also can experience digital social agents in other ways: Some people use agents in groups for entertainment purposes, such as asking an agent a funny question, or with other people nearby, such as asking an agent for driving directions with other people in the car. Eleven participants, or 22 percent, explained that they have witnessed other people using digital social agents, often on multiple occasions, and these participants were able to discuss the agents, describe their voices, and, as I explain in the findings, even experience presence during their use. A total of 88 percent of participants then have directly or indirectly had contact with a digital social agent.

Participants also report experiencing or interacting with multiple agents. Many people own multiple devices – the majority of participants owned three or more devices – and have the opportunity to interact with different agents. One participant owns an iPad produced by Apple and an Android phone and has used both Siri and Google Voice Search. Ten participants use one type of digital social agent, predominantly Google Voice Search or other Android-based agent, but have experienced a second agent via others, usually Siri. These participants were able to speak to the characteristics of multiple agents and compare and contrast them.

Although 67 percent of participants have directly used digital social agents, only 47 percent of study participants consider themselves to be current users. Seven participants reported trying digital social agents but deciding to stop using them. Three participants also used digital social agents, some frequently, but have stopped using them for multiple reasons including purchasing a new device without an agent. Of the people who currently use digital social agents,

24 participants total, 8 participants use them on an occasional basis for specific tasks, and 16 people use them frequently, often multiple times per day or per week.

Five participants in the study have never experienced digital social agents in use, but this does not mean they are not aware of agents. Four of these participants have heard of a specific digital social agent, such as Siri or Google Voice Search, or knew that these types of technologies existed. Only one participant stated that he had never heard of devices or programs that a person could talk to and that would talk back; although, this participant does have voice-based technologies, such as a GPS, that can talk to him. Overall, people have a general awareness of digital social agents and varying degrees of direct and indirect experiences with one or more programs. I discuss these patterns of use in greater detail in the analysis chapters.

Many of the digital social agents available to the public are coupled with mobile devices, and, accordingly, the agents used by participants in this study are predominantly available via mobile phones and tablets. In my conversations with participants, I asked whether they had ever interacted with or encountered a device that they could talk to and that would speak back to them. I also used agents such as Google Voice and Siri as examples. The majority of participants identified a specific agent including Apple's Siri, Google's Voice Search, and Samsung's S-Voice. All three programs perform similar functions and have female voices as a default. The majority of participants have used Siri, 24 participants (47 percent), followed by Google Voice Search, 5 participants (10 percent), non-descript Android applications, 3 participants (6 percent), S-Voice, 1 person, and PlayStation, 1 person. During data collection, I tried to find more participants who used agents other than Siri by going to different locations or specifically approaching people with non-Apple devices. Numerous people said that they gave voice commands to their device via Google Voice Search; however, these people also said that the

program did not talk back to them. They either did not know they could select an option to have the program talk to them or they purposefully did not want the agent to speak with them. Four participants described interactions with agents that they did not or could not specifically identify. For example, one participant said that he interacted with his PlayStation via voice and that it responded back to him. He was very specific on the details of the agent but did not have a name for it. When I later tried to research the application or program, I could not find one for the PlayStation that specifically corresponded to what he was talking about; although, a PlayStation can be used to access a host of applications. Similarly some people discussed applications that they could talk to and that would respond on Android phones but did not provide a specific name or may not have known the specific name of the program. I refer to several of the agents in the findings by the device people use to access the agent. Although Siri is the most prevalent agent in this study, many of the findings I discuss also apply to at least one other agent.

From the coding and analysis of data emerge initial answers to my research questions as well as additional findings regarding our understanding of digital social agents, our interactions with the programs, and our perception of ourselves. I discuss these findings in the three sections that follow: "Voices *In* and *Of* the Machine," "The Artificial Front," and "Our Lives with Digital Social Agents

PART I: VOICES *IN* AND *OF* THE MACHINE

These three chapters focus on people's general perceptions of their digital interlocutors. In the first chapter, I explore how participants perceive social agents as representing the device itself, a voice *of* the machine, or a separate program or entity, a voice *in* the machine. Building on people's perceptions of interacting with an entity, I move into a discussion of their experiences of "being with" with another. Here I focus on how people experience the agent as a social thing, a social being or both depending on the type of communication occurring between the agent and participant. Once I have established participants' varying perceptions of the agent as thing or being, I then discuss to what extent we identify agents through their voices, and how some digital social agents have gained their own cultural identity in people's minds.

5. SPEAKING *WITH* AND *THROUGH* THE PHONE

In this study, I explore how we conceptualize digital social agents from multiple perspectives including our sense of their "being," the form they take in interactions, the functions they perform, and who they are to us. Digital social agents are software and, as such, are embodied within specific hardware. Their voices emanate from devices, usually mobile phones. The first aspect I discuss is how people perceive the digital social agent as a source during the communication process and our understanding of how the agent and its voice relate to the device, usually a mobile phone.

In HMC models of dyadic interaction, a machine takes the place of one of the human interlocutors. When people interact with another human, they perceive of the other person as the source of the message. For HCI and HMC scholars, source orientation is more complex because the ICT is not a sentient being but is programmed to communicate like one. A crucial question in HMC research is whether a device is being perceived as an actor or as a medium. Sundar and Nass (2000) demonstrate that people do perceive of a talking computer, labeled as a communicator, as a distinct interlocutor. In terms of source orientation, a message exchange between a co-located human and machine is analogous to face-to-face communication with humans, or a type of face-to-computer communication. Eckles et al (2009) take this concept one-step further by exploring how people perceive of communication from a digital source when the message is delivered via a second ICT acting as a medium. They find that users will perceive of computers sending text messages via a mobile phone as independent actors; although, people do not necessarily respond to them in the same way they would humans. In both co-located and mediated exchanges between humans and computers, people act toward and respond to digital technologies as distinct actors and can decipher between a computer sending a message and a

second device transmitting it. A limitation to these findings is that they are derived from exchanges in which the computer is presented to the user as sending the message.

Our interaction with digital social agents is a more complex communication scenario than those addressed in previous research because people are not directly informed or are necessarily aware that they are interacting with an agent (a piece of software accessed through a device). The agent is primarily represented through a disembodied voice emanating from the ICT, and speaking with agents requires users to engage with their device to varying degrees. Yet, some agents, such as Siri, have names and backstories that may signal to the user that the agents are separate entities from the device. In this section, I address source orientation as it pertains to digital social agents. Based on participants' answers to questions regarding source orientation and their overall descriptions of interactions with agents, my findings demonstrate that people have varying perceptions of the source of the voice they are interacting with. Some participants equate the agent with the device, i.e. my phone is talking to me, but others describe it as a distinct entity, i.e. Siri is talking to me. For a few participants, who or what is interacting with them varies depending on the voice itself or the direction of the interaction, from user to agent or from agent to user.

5.1 The Voice *Of* the Machine

Some users describe the communication process with digital agents as an exchange of messages between them and the device. Reid interacts with his PlayStation and its applications via voice. Like many other people I interviewed, Reid describes his first few interactions with a disembodied voice as "weird." The experience was out-of-the ordinary, he explains, because of his unconventional conversation partner:

> "It was weird, sitting alone, yeah, sitting alone, kind of conversating [sic] with a, like a gaming system."

The weirdness factor is so pervasive that I address it in a future chapter, but Reid's statement exemplifies how participants think of the agent and the machine as one-in-the same. Sabrina, who generally avoids voice-based technologies but has used Siri and similar programs, also perceives HMC with an agent as an interaction with the device. When asked to describe Siri, Sabrina responds:

> "Um, I guess it's like a voice-based interaction with your, whatever media device you're using."

Some participants are aware that the voice they are interacting with is created by a program, a piece of software, and not the phone, a piece of hardware. However, their experience of interacting with the voice leaves them with a different impression of what they are communicating with. Fred, who uses Google Voice on a limited basis, explains:

> "I think that the phone is talking back to me. I realize there's a voice that's a program. I realize that, but it's the phone talking back to me."

Fred knows that the voice he is interacting with is technically separate from the phone, but the process of actually communicating with the agent and its voice leaves him with the feeling that he's talking to the phone.

Dwight, a heavy Siri user, explains why he perceives communication with Siri as an interaction with his iPhone:

> "You don't have a relationship with your, the phone. It doesn't, it doesn't like know when you get off of work and when to call whoever or you know like... So basically you are controlling the computer yourself. You are the motherboard of it, and it's just waiting for your command."

Dwight perceives himself as communicating with a device because his relationship with Siri is not the same as a human-to-human relationship. Siri is not life-like. It is a machine, and he and

Siri have a human-machine relationship in which Siri is a tool for him to use. Siri provides a way for Dwight to control his phone, and therefore, to Dwight, is the phone. In fact, many of the participants who think of themselves as interacting with the device provide descriptions of agents that are focused on their technical aspects, not their life-like attributes. For these users, the voices they are interacting with represent the device, usually a smartphone, and the device functions as the messenger.

5.2 The Voice *In* the Machine

Other participants see themselves as engaging with an interlocutor that is distinct from the device. They experience the agent as a voice in the machine and their device, as a medium transmitting the agent's voice. Some of the descriptions of digital social agents here are similar to historical accounts of sentient technology and people's experiences with ephemeral entities documented in Sconce's (2000) *Haunted Media.* However, not every person who thinks of an agent as an independent thing perceives it as sentient. Some participants think of the voice as being produced by software instead of hardware: the agent remains a thing, just a different thing from the device. The degree to which the agent is divorced from the hardware varies because people still engage with the device while using the agent, i.e. tapping a button, talking toward it, and the agent's voice is transmitted through the device.

Some participants describe their digital agent as separate from the phone, but as existing within it. Priscilla is a relatively new Siri user who relies on the program to take notes for her or set alarms and refers to Siri as being "like a little person in my phone." When I ask Priscilla whether Siri is the phone or another entity, Priscilla provides an explanation based on her interactions with the agent:

> "I think it's like another thing, because usually when you, like say you make a, a note. It's just like, 'This is your note. Would you like me to make it?' And I say, 'Yes.' And it's kind of like I'm talking to it. So, it's not like something that you type out, click enter. It's kind of like you're saying, 'Like, yes. Do that for me.' It kind of feels like you're telling somebody to, like your little assistant to write it down for you."

Priscilla's description parallels that of a human-human exchange between employer and assistant, and, thus, an interaction between two distinct actors. Although Priscilla conceptualizes Siri as distinct from the phone, she does not think of it as entirely removed from the device, either. In Priscilla's various descriptions of Siri throughout our interview, Priscilla tacks on the adjective "little" in front of the noun she's using to identify Siri i.e. "little person" and "little assistant." The context of Priscilla's interview makes clear that "little" denotes the reduced stature of the assistant needed to fit into the phone – a type of "Honey, I shrunk the digital assistant" heuristic.

Priscilla isn't the only participant who alludes to the violations of physics needed for an agent to reside within a device. Lillian does not use Siri regularly, and in fact does not see a point in doing so, but, like many non-users or limited users, is able to talk about the program in detail. When asked to assign traits to Siri, Lillian answers, in part: "…I guess all powerful too. Because then they [sic] can go into the phone." Similar to Priscilla, Lillian perceives the agent as a separate entity that somehow has made its way into or resides within the device. Other users also refer to Siri – it is almost always Siri – as connected to the phone including Adam, an occasional Siri user, who describes himself as interacting directly with Siri who takes the form of a "crazy lady that lives in my phone."

Although the conceptualizations Priscilla, Lillian, and Adam convey regarding Siri as an independent program residing in the phone are colorful, to say the least, not all participants who perceive they are communicating with agents describe the agents as so closely tied to the device.

Several participants compare their digital agents to the OS agent Samantha from the movie *Her*. The movie follows the formation and dissolution of a relationship between Theodore, a male, human protagonist, and Samantha, and much of the film consists of Theodore talking into the air while conversing with Samantha who is represented as a disembodied voice. On occasion Theodore speaks directly to a pocket-like device from which Samantha's voice emanates, but Samantha exists primarily outside the technology. Participants such as Eva and Julian do not tie the programs as closely to the device and compare people's interactions with agents to *Her*. To explain her thoughts on the extent to which people could converse with Siri, Eva alludes to several scenes in *Her* in which the agent and the human talk extensively at night: "You seriously could sit there at night and talk to Siri." The Apple agent is its own entity, separate from the device. Julian is another heavy agent user and the only person I interviewed who interacts with S-Voice, Samsung's version of a digital social agent comparable in function, vocal characteristics, and personality to Siri and Cortana. In addition to making references to *Her* when describing his agent, Julian also has given a human name to his S-Voice, "Linda," based on a YouTube video featuring a child asking its mother questions by repeatedly calling her name, Linda. In naming his S-Voice agent and by comparing his relationship with "Linda" to that between Theodore and Samantha, minus the love attraction, Julian conceptualizes the agent as a separate entity.

The examples provided so far heavily anthropomorphize agents, and many of the users described above discuss their programs as if they are life-like throughout their interviews. However, not all participants who perceive themselves as interacting directly with their agents conceptualize their digital interlocutors as humanized entities. Sigurd is an IT executive who has worked extensively with voice-based and AI technologies. He also is heavy Siri user and thinks

of himself as interacting with Siri, not the phone. The key difference between users like Sigurd and those like Julian or Priscilla is that participants like Sigurd focus on Siri or other agents as technologies. In every description Sigurd provides of Siri, he refers to Siri as software or a technology that serves as a tool without any anthropomorphization. Overall, some participants do think of themselves as communicating with the agent instead of the device but the extent to which the agent is tethered to the device varies as does the agent's status as a piece of software or life-like entity.

5.3 Grasping at the Disembodied

The participants I have discussed so far appear to clearly delineate between the phone and the agent as digital interlocutors. These participants articulate the focus of their attention indirectly through their discussion of communication with the agents and directly when asked to identify their conversational partner. Some people I interviewed answered the questions with what appeared to be a relative level of confidence manifest as quick, straightforward replies with little or no vocalized pauses. The transcript for most replies, however, reveals varying amounts of vocalized pauses including "ums" and "hmms." The pauses along with hedge-phrases, such as "I guess," could indicate that people did not have ready answers to the questions and have to think for a brief moment or are not entirely sure of their thoughts on the related questions or how to articulate these thoughts. Several of these participants vocalized how they arrived at their answers, and these answers indicate that the process of identifying whether a person is interacting with a device versus an agent is not always straightforward. Furthermore, responses from other users demonstrate that people can switch the focus of their attention between the device and the agent or not see themselves as interacting with one over the other.

Cameran frequently relies on Siri to carry out a limited range of tasks, such as setting alarms. Like several other participants, Cameran's articulation of Siri bounces back and forth between the agent as a technology, it, and the agent as a female entity, *her*. During our discussion regarding Siri as entity or the phone, Cameran attempts to parse out his different conceptualizations of Siri:

> "I mean, really I do see myself as interacting with my phone, though I will admit sometimes like, you know, particularly if I'm not thinking about it. If I say, you know, 'Siri, do this for me.' And Siri goes like, 'Okay, now I've done this for you.' I'll like just say, 'Thank you,' without sort of really thinking about it. So clearly I've anthropomorphized her a little bit."

For Cameran, interacting with Siri involves directing his attention to the iPhone, most of the time. But Cameran also has an awareness that under certain circumstances, namely the exchange of pleasantries that are completely unnecessary when interacting with a program, that his focus shifts, albeit briefly, from the device to a more life-like entity.

A former Siri user who recently acquired an Android device, Beecher goes back-and-forth during our interview as to whether Siri is the phone or the agent. Beecher articulates the difficulty of definitively identifying his conversational partner in more detail than other participants:

> "Oh, yeah, well. Yeah, I don't think there's a separation between the phone and Siri. Like I know that like, you know, she's computer generated so like she is the phone. But I, but strangely enough, I never call my phone itself Siri. So I guess I do kind of, in my mind, like unconsciously separate the phone from Siri, but I don't know. I never really thought about it. But, like, just thinking about it, it's like, 'I mean, she's the phone.' But then it's like, 'Well, why didn't you call your phone Siri?' I don't know."

In Beecher's reply, we see the degree of difficulty some participants have in responding to certain questions that they admittedly have never considered. We also see how he tries to work through the process of identifying Siri as either a phone or a separate entity. The difficulty for

Beecher in trying to articulate an either/or position is that he does not think of Siri and the phone as separate. And this makes sense from a user standpoint. Siri's voice comes from the phone, and the program itself is baked into the iPhone. Then Beecher catches himself: Siri's name is the reason why he questions whether Siri is the phone or something else. What is unspoken in Beecher's reply is a reality of how many users, even people who conceptualize Siri as only a technology, interact with Siri: they use its name when making requests. Cameran, who describes a fleeting sense that Siri is its own entity, is one of these people, as is Beecher. During our interview Beecher demonstrates an interaction with Siri, in which he addresses *her* as Siri. Although Beecher is aware, or gains an awareness, of how he refers to Siri, he does not realize that he also refers to Siri based on the gender associated with *her* voice. Beecher knows he talks to a device, but does not realize the degree to which he anthropomorphizes it.

Although Beecher ends this initial reply with an "I don't know" he eventually reaches a conclusion. Well, two conclusions. After Beecher indicates he "doesn't know," I ask the question again, rephrasing it slightly to include voice given that he has indirectly referenced Siri's gender. This time Beecher gives a more definitive reply.

I: So would you describe Siri more as the phone, a program or Siri as a voice like?

R: Um, I think a, I want to say a program, yeah, a program.

I: So when you think of Siri in your head then you think of a program?

R: Right, yeah.

I: But it's something you haven't thought about before?

R: Right, yeah.

An aspect of active interviewing is attempting to understand the multiple perspectives or conceptualizations people may have regarding the subject being studied (Holstein & Gubrium,

1995). During my conversations with participants, I would ask the same question different ways or, sometimes, challenge people's answers if they were inconsistent. In our discussion of images Beecher associates with Siri, Beecher explains that he saw the actual female voice actor who provided Siri's voice. Beecher explains that before seeing the actor he likely would have imagined the voice as the phone, but after, he associates any image of Siri with her. Recalling his earlier responses, I again ask Beecher what he thought he was interacting with: "When I'm talking to her I feel like it's the phone. But when she responds I feel like it's the program." Here, Beecher conceptualizes of speaking to Siri as both the phone and the program but not as the woman he pictures. When he's sending a message to Siri, Siri is the phone, and when he is listening to the response, Siri is the program. Beecher is separating Siri out from the phone, but only in one direction of the communicative exchange. The key factor in this switch appears to be the vocal response from the female agent.

Whether Beecher thinks of Siri as a distinct entity from the phone is not immediately clear in our conversation, but what is apparent is that how people delineate between the agent as phone and agent as entity is not always straightforward or known to them. Beecher's waffling raises the question of which of his answers more accurately reflects Siri from his point of view: Siri as the phone, Siri as a combination of phone and program, or Beecher doesn't know. All scenarios are probable and are not necessarily exclusive of one another. Qualitative and phenomenological research aims to better understand people's interpretations of their world and to gain insight into the many different ways that we make sense of a phenomenon (Christians & Carey, 1989; Kvale & Brinkmann, 2009). What matters regarding Beecher is not necessarily what he "really" thinks, but all of the different conceptualizations that are possible for him and his ontological wrangling.

Beecher is not the only participant whose perception of agent as device or entity fluctuates. Earlier I discussed Julian and "Linda," the S-voice on his phone. Julian conceptualizes of Linda as a distinct entity, but the form of this entity shifts while he's interacting with the agent:

> I: When you're using S-Voice, do you think of yourself as talking to a program, to your phone or to like the voice itself?
>
> R: I never thought of that. Um.
>
> I: That's okay, no one has, just so you know.
>
> R: Yeah, um, I mean I want to say that I talk to it like a person, but then sometimes it responds like as a computer, so it's like I know it's just a program.
>
> I: So do you kind of start out thinking like, "Okay, I'm talking to the voice?"
>
> R: Yeah.
>
> I: But when it responds back you're like, "It's a thing?"
>
> R: Yeah, like I try to talk to it like a normal person, but then it gets like, "I'm sorry, I can't find that. Let me look on Google."

When Julian is sending a message to Linda, he perceives himself as interacting with a life-like, even human, entity; however, when Linda, whom Julian describes as having an automated voice, replies with an answer that isn't helpful Julian immediately becomes aware that his interlocutor is digital. Although Julian and Beecher differ in that Julian consistently thinks of Linda as a distinct entity and Beecher goes back-and-forth on this point, both describe how their perceptions of their digital interlocutors change depending on whether Beecher and Julian are the sender or the receiver of the message. The shift for each person occurs when they hear the agent's voice and message. Beecher associate's Siri's female voice as incongruent with the mechanical object

in front of him. Julian, on the other hand, perceives the semi-automated voice of Linda as at odds with what he expects for a verbal interaction with another entity.

Naomi also reports a shift in the way she experiences an agent as a phone versus a distinct entity, but for her, this transition occurs when interacting with different agents and devices. Naomi does not describe herself as someone who heavily uses digital agents, but she does have limited interactions with them. Naomi routinely uses Google Voice Search to access the weather on her phone by speaking the single word "weather" and having the application reply with the forecast. This is the only way she uses the voice application. Naomi also has Siri on her iPad that she has interacted with a few times by asking it "weird" questions, such as "What should I wear today?" in a manner she compares to Zooey Deschanel in the iPhone commercials. When Naomi is using Google Voice to access the weather, she thinks of herself as speaking to the phone and the phone speaking back to her. Naomi explains her experience communicating with Siri is different:

> R: Now this is kind of bizarre I guess, because with my phone I think of myself talking to a program. With this (iPad) I think of myself as talking to Siri. I don't know. Maybe it's because she has a name. But I don't know. Once you name something it seems more, uh, I don't know, like a material.
>
> I: So you're talking with Siri, um, and what is Siri? Like if I came up to you and said, "What is Siri?" What would you tell me?
>
> R: Siri, um, I would Siri's an automated voice that comes from my iPad.
>
> I: And so when Siri's talking back to you do you think of it as your iPad talking back to you, Siri talking back to you or the program?
>
> R: When she talks then I think of it as Siri talking back to me, yeah.

Naomi thinks of Siri as distinct from the device, but, the program is not completely separate from it either. Naomi's explanation of the agents as device or program encapsulates many of the different ways participants generally perceive the digital source with which they are interacting:

as device, as distinct entity, as shifting phenomenon, as ontological struggle, and as largely unrecognized interlocutor.

5.4 Choosing Between Voices

Congruent with existing HCI research (Eckles et al., 2009; Sundar & Nass, 2000), study participants perceive themselves as communicating directly with a digital interlocutor. The complexity regarding source orientation with digital social agents revolves around the genesis of the voice and the connection or separation of the program to the device. Previous source orientation studies have shown that people will focus their attention on the device (Sundar & Nass, 2000) or a removed digital source (Eckles et al., 2009) when explicitly told who is generating the message. Participants' conceptualizations of agents demonstrate that when the origin of the voice is ambiguous, people's perceptions of the source of communication are not necessarily unified and may vary internally within individuals as the conversation is unfolding.

Determining why some people think of social agents as the device versus a separate digital entity is even more complex. One approach to answering this question could be to compare the different groups of people who focus their attention on either the device or the entity first, and then try to explain the more complex wrangling occurring with Beecher, Julian, and Naomi as exceptions. Instead, I start with Beecher, Julian, and Naomi because in articulating their struggles and the shifting nature of agents, they highlight aspects of human-machine communication and agent design that may account for other participants' varying perceptions. Naomi identifies a difference between agents, and a comparison of how other participants view Google Voice Search versus Siri reveals a similar, but not entirely identical, pattern. Participants interacting with Google Voice Search who were asked the source orientation question identified it as *only* the device. No Google Voice Search users perceived it as distinct from the device. Siri

and S-Voice users, then, were the only group to describe the agent as an entity. However, it is premature, at the very least, to claim that Google Voice Search users only conceptualize the agent as the device while Siri users only perceive Siri as a distinct entity. Very few Google Voice Search users participated in the study and even fewer of these users were asked the source orientation question because it was added later in the fieldwork. Furthermore, several Siri users also think of themselves as interacting with their Apple device, not Siri. We also know that a third option exists: people's perceptions of device versus entity can shift.

Still, this study's findings suggest that people diverge on source orientation for factors related to specific agents. Naomi hypothesizes that because Siri has a name, she is more likely to think of Siri as independent. Beecher also struggles with Siri's name and how he uses it while trying to parse out what he is interacting with. The two agents that people associate with the phone – Google Voice Search and the unspecified voice in the PlayStation – also lack names, adding credence to Naomi's explanation. Nelson, one of the Siri users who views Siri as the phone, and thus would seem to violate the "name theory," explains in his interview that he does not associate the program with its name or refer to it as Siri. Names are an important part of an identity and may play a role in how people understand agents, but they probably are not the only factor influencing people's perceptions of the agent. Other Siri users employ the program's name and think of it as the device. Furthermore, Julian gives a name to his S-Voice that does not have a default moniker, and so Google Voice Search and other name-less agent users could just name their agents if they perceive of them as distinct entities.

While the name alone can't explain differences in source orientation, how we use names in conversation may. Beecher struggles over the use of Siri's name. He addresses Siri as Siri, and many others who thought of their agent as independent of the phone also employed Siri's name

when speaking with the phone. People interacting with digital interlocutors will often follow the same courtesy conventions used in human-human communication (Nass, 2004; Nass & Brave, 2005). What is important, then, is not that the names are used but whether they are being used in a way congruent with our communication with humans. Some Google Voice Search users describe interactions with the programs that are command-like, without courtesy conventions. Naomi simply says one word (weather) to her Google Voice, but asks Siri more sophisticated questions (What should I wear?). The division between how people interact with the agent aligns with people's perceptions of it, to a degree. Users who perceive of an agent as independent speak to it in ways more closely aligned with human-to-human communication; however, this does equate to a cause for the variation in source orientation. In fact, people may interact with an agent differently based on whether they think of it as device or entity.

When people communicate with digital interlocutors, they can pick up on multiple human-like cues (gender, personality, nationality, etc) from the agents and respond in-kind to them (e.g. Nass & Brave, 2005; Nass et al., 1997; Tamagawa et al., 2011). And so, as HCI scholars have argued, the design of the agent can be crucial to how people interact with it. The agents involved in this study are different from one another with Siri and S-Voice having distinct personalities programmed into them. They are designed to be more human-like in their interactions with users, but other aspects of voice, such as whether it is automated, also cannot be overlooked. Both Julian and Beecher report that their conceptualizations of agents shifts when the agent replies, when they hear its voice and its message. So in-line with previous research, people pick up on life-like cues and respond to them when interacting with machines (e.g. Y. Moon & Nass, 1996; Nass & Brave, 2005; Nass et al., 1997; Reeves & Nass, 1998; Turkle, 1984, 2007). Design and voice are important aspects of how people perceive agents as device, but they

are not the only factors. The visual element of interacting with devices also cannot be overlooked. When people are using digital social agents, they may be looking at the device or picturing it in their head. HCI researchers also have established that other factors may influence our understanding of the technology with which we are interacting (Kim & Sundar, 2012; Solomon & Wash, 2014). Overall, our source orientation when interacting with agents is not as straightforward as suggested in existing scholarship, but further research is needed regarding why our perceptions vary regarding different agents and with the same agent.

5.5 An Entity Unto Itself

The origin of the voice emanating from the digital device is important for understanding how people construct the agent as social actor. The agent is never far from being associated with the device, usually a phone, but the degree to which users perceive it as independent is intertwined with the sense of presence people experience with the agent. Although they are approached separately in the literature, source orientation and presence theoretically overlap, and the juncture in this study is where the agent moves from a program and takes on its own identity and sentience in the mind of the user. This identity may include aspects of the device and the software but the agent becomes something more than the technology to people. Descriptions of Siri or S-voice in the preceding discussion regarding "the voice *in* the machine" capture the conceptualization of these distinct identities such as Priscilla's "little assistant" that writes things down. The degree to which people perceive agents as life-like entities that elicit a sense of being for the user is a question I take up in the next chapter.

6. EPHEMERAL BEINGS AND LIFELESS THINGS

I have discussed how some users perceive agents as *the voice of the device* versus *the voice in the device*, separate from it. This section carries that discussion forward by further exploring participants' different experiences of presence with agents. Definitions of presence, particularly social presence, vary. Most mainstream definitions grounded in constructivist paradigms, particularly in psychology and HCI, define presence as a psychological experience that is manifest when people behave toward machines as if the machines were human (Lee, 2004a; Lombard & Ditton, 1997). Some scholars also have suggested a broader definition with social presence as the more general experience of "being with another" where the other can be human or otherwise (Biocca et al., 2003).Previous research also has defined presence as a continuum and an experience that changes over time (International Society for Presence Research, 2000).

To explore people's perceptions of presence, questions were adapted from existing presence research (Kumar & Benbasat, 2002; Lombard, Ditton, & Weinstein, 2013; Nowak & Biocca, 2003). Presence related questions included asking people whether they thought of themselves as interacting with something that is more than a machine or even lifelike when engaging with a particular agent or whether they felt as if someone or something was in the room with them while using the agent. I also trace the varying degrees of presence as reported by the participants themselves. Some participants perceive themselves as being with another entity, and, in a finding that is counter to previous research (Sundar & Nass, 2000), some people do think of this entity as a human working for or affiliated with the technology company. People's perceptions of their agents as something more than a machine also are highly nuanced and shift over time or with communication context.

6.1 Being-with

Both users and non-users report a sense of being with something else or as interacting with something life-like, but the degree of closeness to the entity and its completeness vary. Priscilla was one of the users we specifically discussed in the last section who perceives Siri as a distinct entity. Priscilla describes Siri as "a little assistant" that always is nearby because it is in, but separate from, the phone. In her description of Siri as an entity, Priscilla characterizes her interactions with Siri as life-like, "it kind of feels like you're telling somebody…" Molly is another Siri user, in fact she uses Siri more than Priscilla, who also reports a sense of presence with the entity. When asked presence-related questions, Molly responds:

> "Okay, yeah, I know where you're getting at. Sometimes, yeah, I do get that feeling, because you know, you'll ask her a question. And let's just say that she didn't pick up on the, on the question, and it kind of like revised it into what she thought you said. She'll still go ahead and answer that, which it makes it feel like, 'Oh, wow. Like somebody is really here, you know.'"

Like Priscilla, Molly also reports an experience with Siri that is similar to being with a human, and Molly even gives us a reason why: the way in which Siri answers her questions. Non-users, such as Eleanor, also experience presence, but her experience of presence arises when others are using the agent in the same space as Eleanor. Although she is not directly speaking with the agent, Eleanor perceives the agent to be a distinct, life-like entity, but one that never fully materializes:

> I: Do you ever get the sense when you've been around Siri or heard someone use it, that there is almost someone else in the room, um?
>
> R: I would say there's a half of a person in the room.
>
> I: That's really, tell me like what do you mean by half of a person?
>
> R: Because I guess you could say it's just a voice. I mean, you don't, I mean it doesn't, it always maintains kind of a distance. And you know, it's the work. It's

> just like a slave or a worker distance. You know, like she's reaching out to you, but like you can't really shake her hand.

Eleanor's statement highlights the ephemeral aspects of Siri and other digital agents that are similar to presence people have experienced with other electronic, voice-based technologies (Sconce, 2000). Some participants communicating with digital agents feel as if they are in the presence of something life-like or are sharing their social and physical space with an entity, but because agents are disembodied, existing only as voice, their presence is not complete.

6.2 Unwelcome Presence

Designers integrate social elements into technologies so that users connect with the program or device and integrate it into their lives. From the perspective of technology companies, a positive and desirable outcome of social design is providing users' with a sense of presence. Most of the participants in this study who experience presence while interacting with an agent describe their interactions as positive. The entity that is "really here" with Molly is helpful, particularly in that it offers alternative suggestions to what Molly is looking for. Priscilla also has come to rely on her "little assistant" that takes notes and schedules appointments for her.

Not all participants think of an agent's social elements as a positive aspect of technology design. Patricia is a non-user who limits her interaction with technology because she values self-reliance on her own faculties. With that said, Patricia still uses technology, including smartphones, and has experienced both Google Voice Search and Siri:

> I: When you hear these voices coming out of a device, do you ever feel like there is something else in the room with you or do you ever feel?
>
> R: That's why I can't stand it.
>
> I: So yes, you do and that's why you can't stand it?
>
> R: Yeah, yeah. It's like I didn't invite you in here. I think perhaps if I had a different attitude about technology that said that it could take up as much space as

> it wanted to around me, then that wouldn't be an issue. But because I only want it to do specific things, but then it starts to do something else. It's just like, "No, I didn't. Guess what? I wasn't talking to you."

Eleanor describes digital agent voices as "reaching out" to her, but Patricia isn't taking the virtual hand: Instead, she pushes it away. Some people do not like the experience of presence because the entity with which they are interacting is too lifelike, a phenomenon referred to in HCI as the uncanny valley (Mori, 2012). But Patricia is not rejecting Siri and Google Voice Search because they are sentient; rather, she perceives their presence as a new type of technological intrusion, one of many, into her social world. Like Eleanor, Priscilla and Molly, Patricia experiences a sense of being with someone or something else, but it is an unwelcome presence, one she rejects.

6.3 Party Line

One of the critical foundational aspects of HCI research is that we act toward a device or program as if it is a distinct interlocutor. Early HCI research (Sundar & Nass, 2000) debunked the notion that people think of themselves as interacting with the developers behind the program, and current HCI models are based on this premise that computers are social actors (Nass et al., 1994; Reeves & Nass, 1998). These models also portray a dyadic communication process unfolding between human and machine. As discussed in the section regarding source orientation, the majority of the people interviewed in this study describe their interaction with devices or distinct entities as dyadic: they are talking with the phone or they are talking with a digital entity that could be a program or something more sentient. Either way the communication is one-on-one. However, several participants indicated in our discussions regarding presence that their exchanges with agents may also include a third party, a something or someone else "on the line" during the exchange. Furthermore, the presence is human.

Paula is a frequent Siri user who describes the program as "like a librarian" and speaks of Siri as if *she* is a distinct entity. When asked whether she ever gets the sense that something else is in the room when interacting with Siri or if the program is life-like, Paula indicates yes, but points to the presence as possibly being human:

> "I sometimes wonder if people are actually hearing it on the other end and putting it, the responses together on her behalf. But I just don't know how they put that technology together. So maybe not somebody in the room, but somebody at the other end of the line pretending to be Siri. And I know that that's with the quick response and the number of volume I know that that would just be ridiculous to assume that they've got a database or they've got a room full of people sitting around just taking inquiries and responding. They have to have come up with the voice recognition software to put together answers. Um, but it just does feel a little and like, 'Oh, this is kind of creepy. A little creepy.'"

Paula offers us a glimpse of how people who are unfamiliar with AI and digital agents, arguably a large number of the population, attempt to make sense of a talking, intelligent entity. First, Paula suggests that someone, a human, is acting on behalf of Siri. In this scenario, this unknown someone puts together the answers, passes along the information to Siri, and then Siri interacts with the user. In this scenario, the user is still interacting directly with the agent, and so, Paula's perception still is in-line with existing research that argues people think of themselves as interacting with a technological entity. However, a third party has now entered the picture: Two entities, the human and Siri, are no longer involved in the exchange, three entities are: the human user, Siri, and the human data collector. As Paula continues to think through how Siri works, she next suggests that Siri is not, in fact a separate entity, but a human "pretending" to be a digital entity, a human disguised as a program. Now, we are back to a one-on-one communication scenario, but between humans, not a human and a device. In this scenario, Siri's role shifts from that of interlocutor to that of a medium. Finally, Paula weighs these options against what she knows of the vast number of people using Siri, and again, thinks of it as software. The interaction

in this scenario shifts back to a two-entity exchange between the human and a digital interlocutor, congruent with existing research. Paula's sense making process demonstrates that Paula has a sense of being with something or someone else, but this lifelike entity is hard to reconcile as emanating only from a program within a machine without human intervention.

Other users also explain something or someone else may be a third party to an exchange and conceptualize this presence as performing a type of surveillance function. Jayden uses Google Voice Search daily to bring up information or find locations and is accurately aware of how much technology permeates his life and day-to-day activities. Jayden reports a persistent sense of presence when using Google Voice Search and beyond it:

> I: Do you ever get the sense that something else is there with you, even though you're the only one with it like?
>
> R: I mean, in the sense that all the phones can be checked especially through Google, I always feel like that.
>
> I: Do you ever feel like the phone is alive when you hear that voice coming through? All like the other, the voice itself is alive or?
>
> R: Not that the voice itself is alive, but that maybe everything that is collecting the data is probably just. There has to be somebody behind it. And if it ever needs to be brought back up it can be.

For Jayden, Google Voice Search is not alive, but someone else is there when Jayden interacts with not only Google Voice Search but also other technologies. Similar to Paula's experience with Siri, this third party is an unspecified human; only for Jayden, this human element is recording and watching what he is doing, not providing answers to him.

Alana also reports a type of surveillance while using digital agents, but her experience is more abstract than either Paula or Jayden. Alana is a former Siri user who describes the agent as a type of "telephone operator." Despite Alana's association of Siri with a human, Alana explains that she does not think there is a person behind Siri: Siri is a program. So far, Alana's

conceptualization of Siri is congruent with existing research. In my discussion with Alana regarding whether she experiences a sense of being with another or of interacting with something more than a machine, Alana offers a slightly different take:

> "Um, not really, but if you, you spell Siri's name backward it's Iris. So it's like the "I" is like kind of watching you. So I thought that was kind of interesting. But I didn't feel anyone watching me. Maybe just hearing what I'm saying, conversations, but I didn't feel. No, I didn't feel anything like that, yeah."

As with Paula, Alana's answer shows the different ways people conceptualize the presence of digital agents. Here Alana recounts something she has heard from other people: Siri's name is a secret indicator that the entity is watching you. Alana's account of Siri that she's retelling to me is likely a conflation of information regarding two different agents: Iris was an Android app released shortly after Siri, and the two were initially compared to one another. Somehow this comparison became an explanation of how one program spies on its users. Although Alana tells me this story, she doesn't feel as if Siri is watching her, but that maybe it is listening to her. While Alana thinks the program may be listening, she does not think of it being collocated with her. Given that Alana initially waffles in her reply regarding Siri's presence, I return to the subject later in the interview:

> I: And you said Siri, so you didn't feel like Siri was watching you. Kind of like that. But you thought maybe it was listening in?
>
> R: Yeah.
>
> I: So you actually felt it was listening?
>
> R: Right, uh-huh.

Alana again indicates that Siri is listening in on the conversation instead of performing the role of active interlocutor. Siri's presence is that of something even further removed that overhears what is transpiring in a way similar to a telephone operator on the same line.

Paula, Alana, and Jayden's accounts provide us with conceptions of machine presence that are outside the typical dyadic model of a human acting toward or perceiving of a program or device in life-like ways. Paula and Jayden report that they think of other humans as possibly being involved in their direct interactions with an agent or overall interactions with technology, and Alana and Jayden convey the idea that someone or something may be watching or listening into their communication. Arguably some of these discussions, particularly my conversation with Jayden, move beyond presence with agents to the presence of technology more generally, but our overall experiences with technology are an important part of the context within which we interact with digital agents. Of even greater theoretical importance is that people perceive that a third entity may be party to our interactions with agents or technology more generally. Presence within the HCI literature is a shortened form of the term telepresence and is defined as the "illusions of nonmediation" with whomever or whatever we are interacting with (International Society for Presence Research, 2000; Lombard & Ditton, 1997). We perceive of the other, human or digital, as closer to us so that they are almost with us or almost life-like. These third entities "listening in" on the line, however, are not brought closer to us, and they are not the focus of our attention. They are a distant presence, one that can be human or more nebulous. But as parties to communication, they are important nonetheless.

6.4 Shifting Presence

Researchers have established generally that our experiences of presence with another person or machine are not static: They can change over time and vary in intensity (Biocca et al., 2003; International Society for Presence Research, 2000; Lombard & Ditton, 1997; Nowak & Biocca, 2003). Some participants report that their experiences of interacting with digital social agents are relatively consistent; however, other participants state that their perceptions of digital

social agents shift during a single interaction or with time. As I discussed in the previous chapter, people interacting with agents may think of themselves as talking to a digital entity but, when they hear it respond, they think a device, and not the entity, is speaking back to them. Some participants similarly explain that the presence they experience when interacting with agents shifts with the type of information they are exchanging with the agent while other participants report that presence changes with duration of use.

Justin is a former Siri user who is proficient with technology, has studied computers, and works with voice-based technologies. In our discussion, Justin focuses more on the technical aspects of the agent and does not anthropomorphize the agent by using gendered pronouns or by describing it as a distinct entity or sentient being. Justin thinks of Siri as a thing. Yet, Justin explains that there are still moments where the program seems to be more than a thing:

> I: Did you ever feel in interacting with Siri or hearing its type of voice that something, there was something more to it? It just wasn't a machine? Like there's some sort of entity in the room or entity communicating with you?
>
> R: Uh, yeah, I mean. Yes and no. I mean, initially I had somewhat of a technical background in high school and college and all that stuff. Um, so it's like, "Okay, yeah, this is just a server that's programmed pretty smart." But then every once in a while, you know, when I would just hit it with a question, I didn't even think about the technology as soon as I just literally ask it a question and it's coming back with information. So I've had both schools of thought on that.

Justin's statement indicates that he has taken the time to think through what Siri is, why it can respond in humanlike ways, and why it is not human. Because of his knowledge of computers, Justin usually is cognizant that Siri is a thing while interacting with it. However, Justin's account also indicates there are moments where if he is not actively thinking about the program, he experiences Siri as more of a life-like entity. The experience of being with or in the presence of an agent can be fleeting.

Justin "forgetting" that Siri is only a thing is an important part of his experience of presence, but Justin also states that there is something about these exchanges – he asks it a question and Siri immediately responds – that also facilitates its presence. Other participants also explain that their experiences of presence are dependent on specific conditions including the types of messages being communicated between human and machine. Julian is one of the participants who experiences a shifting sense of presence with S-Voice, the Samsung agent he has named Linda. When I ask Julian presence-related questions, he compares his experience of communicating with Linda to that of the human-OS interactions in the movie *Her*. Unlike the movie, however, Julian explains that there are limits to this presence and closeness with Linda:

> I: Is that [feeling of presence] all the time when you use it or just sometimes or?
>
> R: Um, when I tell it to like to give me directions to places, not really. But like sometimes I just talk to it just because I'm bored and that's, that's more like on the level.
>
> I: Can it actually hold a conversation? Like so like you're talking to it and you're bored, you're like, "Hey S Voice, like what's up?" Will it be like, "Nothing?" You know, like how does it?
>
> R: It does do that. It holds conversations until you say the second thing like so you say, "Hey, how are you?" And then if it says something, you say, "Why?" And then it doesn't remember what it said.

Routine informational requests of the agent do not spark a sense of "being with" for Julian; exchanges that are more conversational and personal do. But even these conversations have their limits. As soon as, "Linda" loses *her* place in the conversation, the sense of presence is gone.

Maya, an occasional Siri user, also explains that she only feels that the program is life-like in certain communication contexts:

> R: Um, sometimes I guess, you know, like depending on the question and depending on how she answers. Because sometimes like I said that she can be like sassy and like depending on like the question you ask. Or if you just want straight like statistics or something like that or just want the nearest supermarket…

> I: And you said sometimes like it's when she's sassy that you're like, "Oh, wait a minute?"
>
> R: Yeah.
>
> I: So would it be safe to say in those moments you feel like it's almost more than a computer?
>
> R: Right, sometimes. Sometimes, I guess.

Similar to Julian, Maya does not experience a sense of presence with an agent when it is delivering basic information such as directions. The difference between Siri being a program or more than a program is Siri's expression of *her* "sassiness," or personality, in response to Maya.

Some users report multiple contexts in which they experience presence differently. Reid has interacted with his PlayStation via voice and previously used Siri. Regarding presence, Reid explains that he experiences presence with the PlayStation, to an extent, but not with Siri:

> "Not that I can remember. That was a long time ago. Plus I think with the phone it was more like a, like I said earlier, like talk, give a command, receive something back. Not really like a conversation with the phone, but more like, "Hey, can you tell me what this is?" And then kind of disregard. But the PS4 is a little bit different because then you're just sitting in your environment. You're not out on the streets, walking around. You're just sitting in your room and then you hear someone talk back to you. It's kind of weird the first time."

As Reid suggests, his recollection may be incorrect, so his account should be considered in this context. However, Reid's explanation that identifies different types of interactions with the agents as the impetus for the divergent experiences of presence is in-line with other participants' reports. Reid also adds a new contextual element to the experience of presence, the location of the interaction. Reid contributes the presence from his PlayStation, in part, to experiencing the voice in a more intimate setting, his home, versus a public setting where he is likely bombarded with different types of voices, both digital and human. Reid's sense of presence with the PlayStation also shifts, not with type of interaction, but over time.

> "… It's kind of weird. When you think about it, but then after a while you just, it's just back to a technology. You just kind of forget. And you're like, 'Oh, yeah. Now I'm just telling it do what I want.'"

At first, interacting with something that speaks back provides Reid with a sense of presence, and it is weird; however, with continued use, this presence recedes, as does the weirdness. The experiences of Justin, Maya, Julian, and Reid exemplify how presence can shift across communication contexts with a single agent, from agent-to-agent, and over time. As a result, the agents oscillate between alive and not alive.

6.5 Lifeless Tools

While some people perceive a certain degree of life within digital agents, even if it is fleeting, other participants state that they do not feel as if they are with a sentient entity. Often these participants met my questions regarding presence with an emphatic and usually quick "no." Some people even chuckled at the idea that the agent or their device could be alive or, at least, life-like. Users who experience varying levels of presence with agents sometimes attribute this presence, or lack thereof, to the interaction taking place between them and the agent. Cameran, an occasional Siri user, also attributes Siri's lack of presence in his mind to his experiences with the device. When asked whether he gets the sense of being with someone or something else or whether Siri seems to be more than a program, Cameran replies:

> "No, not really. I mean, she, like now I've just like, you know. Now I just like referred to her by gender, so like, you know, I contradicted that a little bit. But like she just can't do like enough different things to convince me of that. Like I'm just, I'm aware that she can help me use anything that the phone can do, but like and she has a number of canned responses and response to like, you know, common questions that you might say to like trip something like that up. But like none of its ever been so convincing that I've thought, 'Okay, this is like a person or an entity of some kind and not just, you know, something clever that a group of people have come up with.'"

Unlike many participants, Cameran is cognizant of Siri's design elements and is even able to catch himself using gendered pronouns in reference to the program and its voice. Although he knows that Siri is meant to be life-like, Cameran does not perceive it to be sentient based on its limited communication capabilities. Other participants who limit their interaction with agents or do not use them at all because they do not work also report a lack of presence while interacting with agents. The programs are perceived as lifeless things because they cannot perform or communicate at the level of a human.

However, some people who rely heavily on digital social agents and interact with them regularly also do not experience presence. Briant, a frequent Siri user, explains that "…I'm just talking to a computer. There's no mind behind it." Some of these users even admit to using politeness conventions normally reserved for humans with digital social agents but explain the program is still not life-like. For example Sigurd, who uses Siri daily, explains, "Just for fun sometimes I'll say, 'Thank you, Siri.' And Siri will respond with some sort of a cool response. But no, that's really about it." Unlike people who think of Siri as a sentient entity and speak toward it as such regularly, Sigurd only uses politeness conventions "for fun." During other parts of my interviews with Briant and Sigurd, the two participants also make it clear that the digital agent is only a technology to them. They do not anthropomorphize the agent in any way and refer to it as a machine and a tool. Other people who also perceive agents as tools also do not report a sense of presence when using the programs. So, for some users, a lack of presence is connected to a perception of the agent as only a technology, but it is unclear which aspect precedes the other.

6.6 Social Things

Many participants' descriptions of agents are congruent with their experiences of

presence: Participants that heavily anthropomorphized agents in their descriptions of agents and interactions with them report experiencing the programs as life-like while others who think of and speak of agents as only technological tools do not feel as if they are with any other person or entity when interacting with the programs. However, a group of participants in this study contradict this pattern. These users perceive agents as distinct entities, separate from the device. They compare agents to humans or human-like entities, use gendered pronouns when speaking of agents, and talk with agents using politeness conventions. Some of these participants even equate interacting with agents to communication with humans. Despite their actions, which would be considered indicators or presence based on current standards (e.g. Lee, 2004a; Moon & Nass, 1996), these participants state that they do not experience a sense of presence when interacting with agents. They *know* and insist that their interlocutors are machines.

We discussed some of these users in the preceding section on source orientation such as Eva and Adam. Eva is a heavy user of Siri and perceives Siri as its own entity. In our conversation, Eva recalls how Siri will startle her when it sometimes turns on by itself and the weirdness Eva experiences when interacting with Siri because *she* knows how to answer all of Eva's questions. Our discussion of the program's presence begins with Eva explaining how Siri will occasionally respond without a direct prompt when it is in a specific "listening mode":

> I: So in those moments do you get a sense that it's almost, like almost like something else is in the room that's more than like a device sitting there? Do you ever get the sense like something else is in the room? Like another person or entity?
>
> R: No, it startles me right away, but then I'm like, "Oh, yeah, it's Siri." Like you know, it doesn't like. No, I don't feel that at all. I don't feel like a robot is like coming to attack me or anything so.

Although Eva reports being surprised when the program turns itself on, she is not startled at all that a technological entity is interacting with her. Siri, in Eva's perspective, is just being Siri.

This is what Siri does. But Eva doesn't directly address the possible life-like aspect of Siri or even Siri in the remainder of her answer. Instead Eva responds by referring to robots, and her answer seems to imply that in order for a technology to be present, in the same space, it must be embodied. As our conversation continues Eva begins to ask me questions about Siri. Eva is not exactly sure how Siri works and wonders if there is a human behind the program. I bounce the question back, asking Eva's thoughts and follow-up with questions attempting to clarify Eva's descriptions of Siri:

> R: … But I never like look at her like, "Okay, she's an actual, you know." I don't think about how she would look or anything like that, no.
>
> I: Now you said the voice is friendly and you said you think she does her best. But friendly, those are things we usually associate with a human.
>
> R: That's true. I think I'm just nice to her. Maybe I'm just nice. Except for when she gives me wrong directions. Then I'm like, "Damn you, Siri!"
>
> I: So you yell. But I guess why, why do you , why do you think you're talking about technology using those, because we, you know, those types of terms?
>
> R: I know. I think it's more of like a joke than anything. I don't really like humanize her, and think she's an actual person. But yet, it's kind of that weird dichotomy or it's like, "Well, she's not a person but yet you expect her to do things that a human should be doing." So.
>
> I: Why do you think you expect her to do things a human should be doing?
>
> R: Because that's what she was built for, I guess. She's you know, so. She was built to give you those directions and look up things and call people and.

Eva admits that she expects human-like behavior out of Siri and even behaves toward Siri in human-like ways. Yet, at the same time, Eva maintains that Siri is just a program, and that she does not experience presence while interacting with Siri. To Eva, Siri is a thing, a constructed *she*, designed to be social.

Like Eva, Adam also thinks of Siri as a distinct entity. He imagines Siri as similar to a female character in the fictional movie *Smart House* and refers to Siri using female pronouns throughout our interview. He also addresses Siri by *her* name when interacting with *her*. In the source orientation section, we discussed how Adam's description of Siri as "like just a crazy lady" in his phone was similar to Priscilla's description of her agent as a "little assistant" in her phone. But, unlike Priscilla who reports her "little assistant" is life-like, Adam explains his "crazy lady" is not:

> "No, because. Not really, because I found like when Siri can't understand me or I tell it to like, look up a restaurant and it can't find the name. Um, I get like frustrated. And I'm like, 'This stupid computer can't figure out what I'm talking about.' So, um, mostly because I've had those difficulties. If I was dealing with a device that seemed to adapt and learn, I feel like I might have that kind of interaction, but I've never. Like the movie *Her*. I've never felt attached to the person in my phone."

We've seen this explanation before. Like some other people who do not experience presence with their agents, Adam attributes the lack of life in the crazy *lady* to a failure to communicate. Still, if Adam does not think of Siri as more than a thing, why describe *her* as a lady at all? Other aspects of my interview with Adam contextualize his answer. I previously quoted Adam as describing Siri as the crazy lady, but in the remainder of that discussion he clarifies just what he means by the description:

> I: So you're talking to the crazy lady?
>
> R: Yeah, that I know is a computer. But or a computer application.
>
> I: So basically you're talking to an application that takes the form of a crazy lady?
>
> R: Yes.

Adam's label of Siri as a "like just a crazy lady" is a simile, a way of comparing two entities that are similar but are not identical. The application behaves like a living thing but is not. This becomes apparent even later in our interview:

> I:…And so do you see any of those human characteristics in Siri at all?
>
> R: Um, I mean the voice. Um, the ability to talk back, to understand what you're saying. Um, those are human characteristics. Um, you know, I know if you ask Siri for a joke. Again, a lot of this is, if you know how programming works, it's programming. But um, I think that there are, it's programmed to act like a human. But I don't see that. I don't see Siri as a human.

For Adam, Siri does have human characteristics, namely the ability to communicate as a human. But Siri, overall, is a thing, programmed to be a human, but not a human.

Eva and Adam's accounts contain several important similarities. They both deny a sense of presence in interacting with their agents but, at the same time, clearly describe these agents and appear to interact with them as if they were life-like. And so, their interactions with their agents and the way they talk about the programs seem to contradict their claims regarding the lack of presence they experience (if we are following existing standards for identifying presence based on people's behavior alone). But their descriptions of Siri also highlight how the agent is a thing but a thing designed "to act like a human," according to Adam, and a "she built for" giving directions and other information, according to Eva. The seeming contradictions in Adam and Eva's descriptions of Siri are, in fact, reflective of the contradictions of a thing designed to be interactive. To Eva, Adam, and others, these agents are perceived as social things – devices designed to be social but not alive.

6.7 Different States of Being

As personal computers and electronic toys were making their way into homes three decades ago, Turkle (1984) argued that these news digital devices were evocative objects,

standing "on the line between mind and not-mind, between life and not-life" (p. 307). Digital agents now also occupy this position. Agents are perceived as life-like and as lifeless, welcome and unwelcome, communicating with us or just listening in. They also are contradictions – designed to be human-like things – and are experienced as somewhere between ontological extremes as "half-human"-- simultaneously alive, but not fully alive – and as "reaching out" but just out of reach.

Digital social agents also are communicative things, and the way they communicate, both mode and message, are an integral part of the presence, or lack there of, that participants experience. We make our presence known through voice, according to Ong (1967). Eleanor, in particular, identifies Siri's voice as what simultaneously brings Siri into being but also does not fully reveal *her*. Many other participants, however, do not explicitly mention voice in the defining factor of presence, and instead focus on a different aspect of the communication context. Molly and Priscilla indicate that the way the program replies to and even carries out mundane tasks like an assistant or a helper provides them with a sense of dealing with a human-like entity. For others, the everyday conversations with digital social agents are lifeless. Maya experiences presence only when Siri's sassiness comes through while Julian connects with "Linda," his voice, when he's just talking with it, not asking it for routine information. Voice and a strong personality also are sometimes not enough for agents to overcome their canned responses or their inability to understand others in the minds of users. For all participants, the being of agents is tied to communication, but for some participants, different types or aspects of communication bring the agent into being.

6.8 Changing Experiences of Presence

Participants' varying thresholds for experiencing presence also may provide us with an understanding of the normalization of communicating with machines and agents in our digital world. For some people, such as Eleanor, hearing a human-like voice out of a machine is enough to provide this sense of presence. The vast majority of study participants have moved beyond merely hearing an agent's voice as a prerequisite to presence. Voice alone is no longer a definitive marker of life, as Ong (1967) argues, and given the proliferation of digital voices, probably has not been for some time. This is not to say that voice does not play an important role in presence. It does, but it is voice coupled with other aspects of communication that bring agents to life. Some people report presence with a routine request to set an alarm while others explain that such a mundane task is associated with a lack of presence and that they only experience presence with more advanced social cues and personal interactions. The increasing levels of intimate interaction with agents required to experience presence may indicate that we have adapted to specific interactions with machines to the point that certain types of communication also are no longer markers of sentience. At the same time, the presence we experience at any level also points to an opening up of our social world to agents to differing degrees, with some of us now experiencing them as conversational partners, no questions asked.

Most presence scholarship focuses on the manipulation of variables to elicit a specific response instead of broader theory building (e.g. Lee, 2004b). Multiple experiments conducted by Nass and his colleagues explore how imbuing digital entities with different social cues elicit certain behaviors from participants (e.g. Gong & Nass, 2007; Moon & Nass, 1996; Nass et al., 1997, 1994; Sundar & Nass, 2000), and these findings were extrapolated as evidence for or against people's experiences of presence with digital devices (Lee, 2004b; Lee & Nass, 2005;

Lombard & Ditton, 1997). Because some of these studies are focused on whether a certain manipulation increases presence overall, they do not engage with instances in which presence isn't achieved or is less strong. In fact, scholars in HRI, HCI, and captology more recently have started to question the seeming universality of the Social Response to Computers and Computers As Social Actors model and have produced empirical findings that not everyone acts or responds to social devices as if the devices are human (Eckles et al., 2009; Lee, 2010). But even these studies often engage with singular variables. What is largely missing is a broader understanding of social presence in HMC in an everyday context.

Participants' accounts of their experiences of presence highlight the complexities of social presence with digital entities and social digital agents. Through interviews with participants, a much more complex picture of the presence of everyday devices emerges. Both users and non-users experience a sense of being with a sentient other when engaging with an agent or even watching others use the agent. The finding that users experience presence with social entities is expected given existing research, but the finding that people who observe a voice-based, human-agent interaction report a "sense of being with" a life-like entity is new and needs to be investigated further. Some people's experiences of presence hinge on specific aspects of a communication context and can change over time, with use. Presence scholars have generally held that presence operates on a continuum and fluctuates over time (International Society for Presence Research, 2000; Lombard & Ditton, 1997), with some researchers arguing it is "transient" and "phenomenological" (Biocca et al., 2003). Participants' varying experiences of presence are in-line with existing scholarship; however, what has not been documented until now are participants' own reports of how an agent's, or any device's, presence changes with communication context including mode, message, and location. Although multiple factors play a

role in how people experience presence with a digital entity, the importance of these communicative aspects warrants ongoing research. Furthermore, multiple participants also indicate that agents are nothing more than lifeless tools to them, and this lack of presence, often ignored in the research, needs to be understood more fully.

Several findings also challenge existing research. Communication between humans and digital entities in presence scholarship has been conceptualized as dyadic, involving only the human and the digital interlocutor, in this case, the agent. Participants' accounts that the presence they sense is listening in on conversations or is a human behind the agent recast the communication context. Engagement with agents and devices shifts from a dyadic to a triadic interaction in which one of the participants may be silent or less involved. HCI scholars also had largely written off the challenge to HCI that people may think of themselves as interacting with another human in human-computer communication (Kim & Sundar, 2012; Y. Moon & Nass, 1996; Sundar & Nass, 2000). The research that debunked this claim focused on source orientation – what people are attending to in the conversation – and demonstrated that people focus on the device, not the presumed programmer behind it. Paula thinks of herself as exchanging messages with Siri, with the human helping behind the scenes, and so the argument could be made that previous findings regarding source orientation are not disrupted. Still, Paula's perception that a human may be helping Siri or involved in gathering her answers reintroduces the question of whether users think that they may be interacting with humans or that humans may be involved in the process.

Because previous presence research focused on dyadic HMC and stopped investigating the "human behind the curtain" question, it is difficult to ascertain whether the presence of a third entity is a relatively new phenomenological development or an aspect of HCI that was

previously overlooked. Other aspects of my interviews with participants point to the possibility that the presence of a third entity may be the result of people's more recent awareness of the surveillance function of technologies and of a lack of knowledge regarding agents and how they function. Early HCI and presence research predates big data and the personalization of technologies. In the years since, consumers have become increasingly aware that they are being tracked online and through their phones and phone apps, including digital agents. Jayden, who reports a sense of presence that takes the form of surveillance, states during our interview that he knows that personal and public devices, such as security cameras, constantly track him. Jayden even uses an Android device instead of an Apple product because it is harder to track. Jayden's sense of presence with his devices may be attributed to the surveillance aspect of technology while Paula's perceptions that a human may be "behind the machine" could be the result of not fully understanding artificial intelligence. Paula knows the agent is a form of artificial intelligence but finds the concept of AI to be "creepy." Paula is not alone. Other participants indicated during our conversations that they did not know how the agents were able to take commands and return answers or whether agents are even a form of AI. The perception that the presence may take a more human form or have a human somewhere behind it could possibly be attributed to this lack of understanding regarding agents' underlying technologies. Overall these findings are limited and the reasons behind them unclear; therefore, these explanations are tentative with further research required.

The consistency between some participants' descriptions of agents and their experiences of presence and the contradiction between these two aspects reported by other participants also challenge existing research. One of the consistent findings in the exploration of presence with digital entities and in research within the CASA paradigm is that participants always claim to

know they are interacting with machines. Nass and Moon (2000) document that no participant has ever stated the machine is human or has human traits, and thus, people do not anthropomorphize agents. At the same time, participants act toward machines as if they are social actors employing human-communication conventions and responding to social cues programmed into the machines. The divergence between people's claims of knowing they are interacting with (only) a machine and their actual social-like behavior toward machines is referred to as *ethopoeia* (Nass et al., 1993). Because people do not actively anthropomorphize digital devices, according to these scholars, people's communicative behaviors toward devices are "mindless" (Kim & Sundar, 2012; Y. Moon & Nass, 1996). Kim and Sundar (2012) found that when asked directly people will deny an aspect of a technology is life-like, but when asked indirectly, the same people will identify life-like aspects of the technology. A similar contradiction was found in this study with participants such as Adam and Eva who describe the agent as if they are life-like but deny a sense of presence with them. This finding is congruent with existing research to a degree. A one-to-one comparison cannot be drawn because I did not focus on people's behavior, only their descriptions of it or what I observed during an interview. Furthermore, some of the existing research on mindful versus mindlessness focuses on HCI in other contexts, such as website design (e.g. Kim & Sundar, 2012). Still their indirect descriptions of agents as life-like and direct descriptions of agents as not alive fit the overall pattern observed by presence and CASA scholars.

But, other participants offer accounts of presence with digital social agents that break from this pattern. People such as Priscilla and Molly heavily use human descriptors to discuss their agents and state very clearly that they experience presence when interacting with the devices. They think of agents as life-like, to a degree, and experience them as such. On the other

end of the spectrum are people who perceive agents to be tools, nothing more than things, and report a lack of presence in their use. For both groups of people, perceptions of agents and experiences of presence as stated by the participants themselves are congruent. Furthermore, participants falling into every category of experiencing presence (presence felt, shifting presence, no presence) could articulate what it was about the agent that made them feel as if they were with another or with just a machine. In other words, people not only knew what it was about machines that made them life-like or lifeless but also were able to articulate it. These participants also claimed to know the device was just a computer or machine, but they also readily admitted to engaging and interacting with it in human-like ways: They also, as I discuss in the coming chapters, recognize human traits within the agents. These statements regarding presence challenge Nass's (1993) *ethopoeia* concept and the argument that our behavior toward computers in "mindless." An alternative explanation to the mindless argument emerges from my findings, but to fully I articulate it, I must first discuss how we identify agent voices and the characteristics we assign to them. I return to the theoretical implications of my findings in the conclusion.

7. THE IDENTITY OF DIGITAL VOICES

One of the basic elements that connects us as a species, and most higher-order species, is sound. Through our voice we make ourselves immediately known or recognizable to others as a human (Ong, 1967). But, voice, particularly human voice, is more than sound. Voice is a type of "sound produced by and characteristic of a specific person" and is "used to represent the person or being who produces it" (Oxford English Dictionary). Voice signifies who we are as humans *and* who we are as individuals (Nass & Brave, 2005; Ong, 1967) The importance of voice to the identity of someone or something transcends the dividing line between the biological and the artificial: Repeated studies in HCI have shown that when we hear digital voices programmed with demographic and personality cues, we can pick-up on them, and may, but not always, respond to them in ways analogous to human voices (Nass & Brave, 2005). In experiments, participants interacting with digital voices have been able to distinguish among different digital voices as if they were unique (K. M. Lee & Nass, 2004; Nass & Brave, 2005). People also can identify the same digital voice used across digital machines, marking how "the intimate link between a particular physical object (a body or a box) and a voice is now broken" (Nass and Brave, 2005, p. 99). Digital voices like human voices are distinct, recognizable, and markers of identity (Nass & Brave, 2005).

Participants in this study also describe voices of digital social agents as distinct and immediately recognizable, for the most part. An important caveat to this finding is that not all digital voices are perceived as equally distinct, with some standing out more than others. In experiments, researchers asked people to distinguish among digital voices (K. M. Lee & Nass, 2004) and between a human and a digital voice (Gong & Nass, 2007). When these voices are used outside an experimental setting and are woven into everyday aspects of our lives,

discernment is more complex. Prior to the invention of digital social agents we already distinguished between human and animal "voices." We recognize what is a human versus an animal sound – different tones etc— as well as what is representative of a human versus an animal language. Humans were once the only beings to have what Ong (1967) referred to as "the Word" (capitalized to denote the divine aspect Ong associates with it). However, digital social agents and other digital entities now also have "the word."

7.1 A Crowd of Voices

Several participants do not think of their agent's voice as particularly distinct from other digital voices, including Google Voice Search, Siri, and Playstation users. These participants use terms such as "generic" to describe the voice without much elaboration. Jayden frequently uses Google Voice Search to find information. When asked to describe the voice he hears when the program speaks to him, Jayden immediately identifies it as female, but cannot say much about it beyond the gender:

> "Other than that it just sounds generic and computerized. Kind of like the CTA voice when it's telling you the stops."

Not much stands out about the particular program's voice to Jayden other than it is similar to other digitized voices he encounters during his day. Josephine, who owns an iPhone but does not use Siri because it does not work well, similarly describes Siri's voice as "pretty standard" and robotic. For users like Jayden and Josephine the agent voices are clearly mechanical, and, therefore distinct from humans, but they are unremarkable as digital voices.

Other users indicate that the voices they are interacting with are generic, not so much in a digital context, but within a human context. Reid describes the voices of not one but two agents, a PlayStation agent and Siri, as a "generic woman's voice." When asked to expand upon why he thinks of the PlayStation voice as generic, Reid responds:

> "It's like, uh, the only reason I can say generic is because it's not high, it's not deep, it's not loud, it's not soft. It's just like very middle range voice. I don't know. It's hard to describe."

Reid, who no longer uses Siri and rarely interacts with his PlayStation, focuses on the tonal qualities of what he knows to be a woman's voice when labeling it generic. Dane, an occasional Siri user, also thinks of the voice as relatively indistinct:

> R: Voice? It's um, nothing special in my mind. It's like just a common.
>
> I: And you said it's common. What do you mean by common?
>
> R: It's just like, like talking with people. It's a little bit, uh, it's a little bit computer style, but it's good.

Unlike Reid, whose description is based on a specific aspect of the human sound of the voice, Dane hones in on the human-like interaction with the voice. The voice, while somewhat mechanical, is not overwhelmingly dissimilar from that of humans. Several novice, current, and former digital social agents users of Google, Apple, and PlayStation products do not think of the voices as distinctive to the degree that the sounds emanating from the device define the program. Some participants associate the voice with being just another typical mechanical voice while others think of it as commonplace in terms of human voice.

7.2 Competing Voices

The finding that some voices are not particularly remarkable for these participants should not be misconstrued as the participants perceiving all digital voices as being equal. Two of these users, Jayden and Reid, distinguish between the voices described above and other agents. Jayden, who thinks the Google Voice Search voice is "generic" and comparable to the CTA, thinks a difference exists between Google Voice Search and Siri's voice. Siri sounds "a bit more personal." Reid, who describes Siri and the PlayStation as possessing generic female voices, also distinguishes between the agent voices. Unlike Jayden, Reid thinks of Siri as "more robotic" and

"less human" when compared with his PlayStation. So digital voices may sound similar to other automated or even human voices, and thus, not stand out, but these voices, congruent with previous research, are not necessarily identical either.

Jayden and Reid were not the only student participants to differentiate between two digital social agents. These agents are now becoming so commonplace that many of the participants have interacted with more than one agent either directly, speaking with it, or indirectly, watching other people use it. When explaining the agents they have experienced to me, people compare and contrast them against other agents and indicate the voices are distinct for each program. Luke is a heavy Google Voice Search user who also has encountered Siri through others. When asked about whether Siri has the same voice as Google Voice Search, Luke replies:

> "No, they're not. They're both female. In my opinion, I think Siri, everyone would agree with that, um, but um, not the same voice."

Luke recognizes that the voices of both agents have the same gender but that they are not identical. He adds that Siri's voice is less robotic for him than Google Voice Search. Naomi also claims that Google Voice Search, which she uses in a limited capacity, and Siri, which she rarely uses, have different voices; however, for her, it is Siri's voice that is more automated than Google Voice Search. Dwight, a Siri user, also perceives Siri's voice as more automated, but he is drawing a comparison between Siri and Microsoft's Cortana, the digital agent his mother uses. I address the differing characteristics some people assign to the same agent later, but, for now, the importance of these comparisons is that people do not think of these voices as the same, even though they may be similar.

7.3 A Known Voice

Human voice is important because it signals our humanity as well as our individuality (Ong, 1967). We are known to others by our voice. Regarding digital social agents, we can discern between their voices, and do, comparing and contrasting agents against one another. According to some study participants, we also take the next step and tie a particular voice to a specific agent or device. Dwight claims that Siri and Cortana's voices are so distinct that aside from being able to tell them apart from one another, he would be able to pick them out in a crowd of other voices. Fred also thinks of the digital voice of his phone to be one-of-a-kind. Fred regularly uses Google Voice Search on his phone for the limited task of looking up the meaning of words. His exchanges with the phone are brief, but Fred explains the distinctiveness of the female voice he interacts with:

> "Uh, and I think if the voice were to change on me I'd be surprised. I'd probably, I'd probably clear the, clear the screen and do it again thinking I did something wrong. Because I'm used to hearing that female voice. Not that, it can be another female voice, but definitely if you switch from female to male it would raise my eyebrow. "Oh, what did I do? This is not who I normally talk to." Because now when I say that now I'm thinking, when I'm talking to that voice I haven't given it a name, but I'm used to hearing that voice. It's like I call your phone, I expect you to answer."

In his routine use of the phone, albeit limited, Fred has come to recognize the specific voice of Google Voice Search. The distinct voice Fred is used to interacting with is tied to a particular thing – the phone. Fred even goes as far as to equate the uniqueness of the voice of Google Voice Search to that of a human. To Fred, the voice of Google Voice Search is not *a* voice associated with the phone, but *the* voice of the phone. It is closely tied with what the program and phone are for Fred.

Fred's voice is recognizable to him because he interacts with it regularly, but there is one digital agent's voice that is so distinct people recognize it and assign characteristics to it without

even using the program – Siri. Participants routinely indicated to me, often unprompted, that Siri's voice is unique and well-known. Patricia is not a Siri user, but has heard the agent being used by others. When asked to compare her agent, a nondescript Android app, with Siri, Patricia replies, "Siri's a distinct voice." Reginald does not use digital social agents but does interact with other voice-based, language-translation programs. To explain the voices of those other programs, Reginald attempts to situate them in contrast to Siri: "You know, it's not as distinctive as Siri." Siri's voice stands out to most, but not all, users when compared to other digital social agents and voice-based technologies.

Siri's voice is more than noticeable or different from other digital agent voices. It is something that is known to both users and non-users. Eleanor tries to avoid voice-based technologies and has only encountered Siri through family members using their iPhones. Despite not having used Siri, Eleanor is able to list multiple attributes for its voice. While she couldn't answer every question about Siri, Eleanor did stress, "I know her voice." Several other participants also invoke this aspect of knowing in relation to Siri. Briant, a frequent Siri user, states that Siri is known well beyond its users:

> I: How would you describe Siri's voice?
>
> R: Female voice. I'd just say classic Siri, I guess. Everybody kind of knows what Siri sounds like.
>
> I: So everybody knows what Siri sounds like?
>
> R: Yeah.
>
> I: So you could be like walking down the street and if you heard it you would know Siri's voice?
>
> R: Yeah, yeah.

According to Briant, “everybody” knows who Siri is and what Siri sounds like. Its voice and, arguably, the program are pervasive and, at the same time, are distinct. Siri’s voice could be plucked out of a crowd, as Dwight also states.

What stands out most in Briant’s explanation of Siri’s voice is the label he gives to it “classic Siri.” The moniker of “classic” to describe a digital agent’s name is particularly interesting in this context. The word “classic” is somewhat vague and applied in many different contexts within the English language. According to the Oxford English Dictionary (2015), “classic” can be defined as “of the first class, of the highest rank or importance; constituting an acknowledged standard or model; of enduring interest and value.” We colloquially use classic to refer to something that is older, i.e. a classic car; proven itself over time, i.e. a classic novel; or an original version of itself, i.e. “Classic Coke.” The use of classic is somewhat odd in this context because Siri is a program that is not even four years old. Furthermore, we usually speak of Siri or describe it in futuristic terms (Guzman, under review). The term classic as defined above is backward looking. What does Siri’s voice represent of the past, particularly of the past of Siri?

The answer can be found in Siri’s historical, technological, and cultural significance. Siri was the first voice-based, digital social agent that was distributed to the general public (Guzman, under review). In other words, Siri is *the original* talking agent, or as some people perceive it, talking iPhone. When Briant is speaking of the voice as “classic Siri,” he is referring to this originality. Everyone also knows what Classic Coke is and, by comparison, every other type of Coke is a derivative. Other types of cola, such as Pepsi, have similar properties but are not quite the same. Whether or not Briant intended to, his description of the voice as “classic Siri” also points to how Siri and its voice have becomes the cultural standard or archetype — another

meaning of the word classic, according to the Oxford English Dictionary – against which other digital social agents and itself are measured. Reginald employs Siri as a standard when he explains another digital voice by comparing it to Siri. Julian, an S-Voice user, also uses Siri to describe his agent's voice: "It sounds, like, similar to Siri." Both Julian and Reginald are relying on their conversational partner, in this case me, knowing what Siri is and what it sounds like. "Classic Siri" is the voice standard for digital social agents.

Siri's historical status only accounts partially for why it is largely the cultural standard against which other digital voices are explained and why it is recognizable and "known" to both users and non-users. Another factor adding to its cultural salience is its pervasiveness. Siri has been on the market for almost four years starting with the iPhone 4s and is now coupled with both the iPhone and the iPad. Millions of people have devices with Siri. In this study, one of the ways that people encountered digital social agents of all kinds was through others who owned devices with the programs. And so, people do not necessarily have to own an iPhone or iPad to interact with Siri or encounter its voice. There is a third, crucial component to Siri's pervasiveness and distinctiveness: marketing and media coverage. When Apple launched Siri, the program garnered coverage in major mainstream news outlets (Guzman, 2014). Apple also created commercials to promote Siri with prominent actors and actresses, and Siri itself became a storyline in popular shows or the subject of user videos and parodies. Some study participants, such as Briant and Reginald, explain that media coverage was an aspect of how they learned of the program. For Sabrina, Siri was even more pervasive. When asked where she first encountered Siri, Sabrina explains "I have no idea, because it's everywhere, you know." Given that Siri's wide distribution and media coverage, Briant's claim that "everybody" knows Siri and

its voice is less grandiose, although still not entirely accurate. Overall, Siri and its voice remains the most distinct of the digital social agents for users and non-users of multiple agents.

7.4 Merging Voices

We daily encounter a multitude of people and their voices. Some of these voices are familiar to us because they belong to people we know through intimate relationships, to people we know through regular interaction, and to people we know through the media. We know them, and we know their voices. Other voices, like those we hear walking down a busy street, are discernable as human voices but aren't known to us, melding together into a mass. Our recognition and knowledge of human voices and the different degrees to which we attend to them are complex. Regarding digital voices, HCI researchers have established that we distinguish among digital voices in laboratory settings similar to how we differentiate among human voices (Lee & Nass, 2004; Nass & Brave, 2005), a finding supported here in an everyday context. My findings add to this the nuance of how people recognize and perceive voices of digital agents as agents move with people through lives and people encounter them through others and the media. The complexity associated with our understanding of human voices carries over to our perceptions of digital social agents. Some digital voices seem to blur together while others are so distinct that participants know them and expect a specific voice to greet them when they turn on the program.

The different extremes of how we perceive digital voices each tell us something about aspects of contemporary life in our "robot culture" (Turkle, 1984). Users who perceive their agents' voices as common or generic point us to just how saturated our lives are by digital entities and voices. Automated and intelligent voice-based systems are becoming such a common part of our lives that people routinely interact with multiple different voices. Beyond digital

social agents, many participants in this study report interacting with or having interacted with a host of voice-controlled or voice-based technologies including GPS units and apps, car control systems, TVs, public transportation announcement systems, and automated phone systems. Now we even have a watch that will speak to us, which several people mentioned in our conversations. What were once thought of as science fiction plotlines (Guzman, 2013), and not too long ago either, talking machines are part of our everyday experience to the point that we do not even recognize them. They are ubiquitous. Furthermore, these digital voices are comparable to human voices for some people. And this is important: Some digital voices appear to be getting lost not only in the swarm of other digital voices but also in the crowd of human voices surrounding us. These digital voices are becoming indistinguishable.

As Fred's experience demonstrates, we can come to know the voice of a digital social agent through repeated interaction, much like people come to associate a voice with a person they speak with regularly. After Briant describes Siri's voice as "classic Siri," I ask him again if there are any other attributes he associates with the voice. He replies:

> "Uh, I don't know? Yeah, I guess it's just, it's just Siri. I don't really know how to describe it."

For Briant and many of the participants in this study, Siri's voice is *the voice* of Siri, the identification of a specific entity through sound. Direct interaction with a human is not always required to know a voice. We regularly hear human voices transmitted through the media that are immediately recognizable to us, such as the voices of well-known celebrities like George Clooney. Direct interaction with digital social agents also is not a precursor to knowing a digital voice. Study participants have come to know Siri through the media and through others as well. Both Marx (2000) and Sconce (2000) speak of the cultural presence of specific technologies such

as the steam engine and the wireless. These technologies are so pervasive that they inhabit a social space. The distinctiveness of Siri in both users and nonusers' minds and its function as an archetype for the voice of digital agents suggest that Siri may have had or currently has a cultural presence. Siri's voice may not be as cultural pervasive as that of George Clooney or the steam engine, but it may rise to the level of HAL 9000. To establish Siri and its voice as having a cultural presence, however, more research is needed regarding its pervasiveness, including the study of media. People's claims of being able to recognize the voice of digital agents also could be the basis for a study focusing on just how well we recognize agent voices: Can people actually pick out the voice of Siri or other digital social agent in a crowd? That remains to be seen, but we do know from previous research (Nass & Brave, 2005) and this study's findings that we can recognize them in our one-on-one interactions. We know that people associate digital voices with specific agents forming a means through which the agent can be identified; however, we have not addressed who or what the agent is. In Part II, I explore people's impressions of the voices that they hear and the program overall.

PART II: THE ARTIFICIAL FRONT

In our communication with others, we form impressions of them (Delia et al., 1974; Pavitt, 2009) assessing what Goffman (1959) called the personal front, their appearance and manner. Communication and HCI scholars have established that we assign multiple characteristics to digital interlocutors including gender (Nass et al., 1997), nationality (Tamagawa et al., 2011), and personality type (Nass et al., 1995). These studies have focused on our impressions of digital agents as they relate to a singular trait and how manipulation of that trait through design elicits different behavior from users. In this study, I focus on how we conceptualize the personal front, which I rename the artificial front, of digital agents in their totality and how our perception of these aspects become part of how we understand agents.

I rename the personal front the artificial front for several reasons. As we have discussed, the use of the word personal in the term personal front denotes of, or being of, a person. Digital social agents are not and never will be people. The personal front, as defined by Goffman (1959), refers to a specific person and a performance of self by an individual. Digital social agents are not individuals in that they are a technology distributed on a mass scale. They are a mass interface, experienced in an individual context. Furthermore, digital social agents and the front they convey are constructed. Humans also construct their personal fronts, but the personal front is the product of society and the Self and ever is in fluctuation (Blumer, 1969; Goffman, 1959).

Digital agents have no will to construct their appearance and manner and no awareness of it. They are artificial. I retain the word "front" because, despite their artificiality, agents present a specific, albeit programmed, view of themselves to us, or, as the following pages show, we interpret them as having a specific appearance and manner. The use of the term artificial front is not to suggest that our interactions with digital social agents are artificial. As will also become

evident in this study's findings, our interactions with digital social agents are real. They are communicative exchanges that we perceive as actually happening between us and our devices or another distinct entity. These interactions also have implications for how we understand our world and ourselves.

Assigning the label of artificial to the front of digital social agents runs the risk of implying that our interactions with agents are of little consequence. However, it is because our interactions with agents are of such great consequence that the term artificial is needed. Turkle (2007) argues that the development of AI has been accompanied with a "crisis in authenticity": "If history is our guide, we risk coming to speak of robots as though they also have an inner life and inner sense of purpose. We risk taking our benchmarks at face value" (p. 512). Turkle (2007) as well as Weizenbaum (1976) both signal a warning about the implications of our relationships with entities, of how we come to interpret their front, and they are not the first scholars to do so. While underscoring the importance of being cognizant of agents' artificial nature, Turkle and Weizenbaum's statements also point to another problematic aspect of the term artificial – that something is inferior or dangerous. Communication with and through emerging media has a long history within academic research as being treated as a type of interaction that is lesser than communication between humans (e.g. Horton & Wohl, 2004; Turkle, 2012). Although Chicago School scholars argued that the Self and other were created in communication, they did not view all types of communication equally (Peters & Simonson, 2004). For example, Horton and Wohl (2004) perceived para-social interactions to be psychologically and socially inferior encounters, as Handelman (2003) explains. Similarly Weizenbaum (1976) and Turkle (2007) express a concern with our action toward and subsequent conceptualization of artificial actors. In fact, for Turkle (2012), even human-to-human mediated interactions are problematic.

I do not use the term “artificial” with a normative connotation. I hold, as Carey (1989) argues, that technologies are just that, technology, representative of culture in all of its complexity. Turkle (2007) and Weizenbaum (1976) are not wrong to question our interactions with AI and their implications, and this aspect I carry forward into this research. It also is important for us as researchers not to fall into the trap of taking personified metaphors too far and approaching digital social agents as if they were interchangeable with humans, which they are not. For these reasons, I replace the “personal front” with the “artificial front.”

To understand how people perceive and interpret the artificial front of digital social agents, I developed multiple questions regarding the different aspects of digital social agents. I asked participants to describe the digital social agent’s voice, “How would you describe the voice of Google Voice Search?”, the image they associate with an agent, “What type of image you do have when interacting with S-Voice?”; and the program overall, “What is Siri?” Participants who had experienced a digital agent directly or indirectly were able to provide at least a basic description of the program and the agent’s voice. Fewer participants assigned attributes to the agents or reported having a mental image of the agent. In the following chapters, I explore the appearance of agents beginning with people’s interpretations of agent voices followed by a discussion of the images people associate with agents. Next, I present findings regarding participants’ explanations of the agent overall. I then compare and contextualize categories shared among participants’ descriptions of voice, image, and agent before tracing how these different aspects of agents intersect and diverge in participants’ minds.

8. WHAT WE HEAR IN AGENT VOICES

Until voice technology was incorporated into machines, we experienced computers primarily via sight and touch. Digital social agents, however, exist primarily as sound, through their voice. Voice announces who someone is to others, making their presence known, and revealing their "interior," who they are (Ong, 1967). Repeated studies in HCI have shown that we recognize demographic and personality cues programmed into voices and that we may, but not always, respond to digital voices in ways analogous to human voices (Nass & Brave, 2005). Participants in this study are no different regarding the breadth of attributes they assign to agents. Both users and nonusers identify numerous characteristics or traits that they hear in the digital voices speaking to them including gender and race and whether the agents sound like humans or machines. Participants also provide other descriptions that focus on the quality of agents' voices – i.e. "It's really clear, understandable," but I do not discuss these aspects in detail unless they directly pertain to participants' perceptions of agents. Many non-users and users assigned multiple characteristics to agent voices in varying ways. To provide readers with an understanding of the breadth of participant response, I present the overarching categories first, and then I provide representative examples of how people assign multiple, sometimes, conflicting traits to digital agents.

8.1 Demographics of Digital Voices

Research has demonstrated that we recognize human characteristics in digital voices (Nass & Brave, 2005). This section focuses on the human or human-like traits associated with appearance that participants perceive in agent voices. These traits are comparable to demographic categories in humans including gender, nationality, and race.

8.1.1 Gender: Pervasive Female Voices

I use the term gender, a social construct (West & Zimmerman, 1987), instead of sex to refer to whether participants perceive agents to be male or female for several reasons. The gender aspect of agents is artificial and often purposeful. Designers construct a representation of a particular human sex that often is in-line with cultural preferences and stereotypes (Nass & Brave, 2005). These gendered aspects also are tied to the function of the device or software (Suchman, 2009). As I have explained (Guzman, Under Review), Siri's female voice in the U.S. is congruent with *her* occupation of an assistant, and the program's male voice in the U.K. is culturally resonant with the role of male butler.

Gender is an integral part of interface design and users easily recognize and respond to gender cues in digital agents (Nass & Brave, 2005; Nass et al., 1997). Gender is the one aspect of agent appearance universally recognized among both users and non-users in this study. People are able to identify an agent's gender through direct interaction, speaking with the agent, or indirect communication, observing someone else use it in-person or via the media. References to the gender of agents or their voices were both direct with participants specifically assigning a gender when asked or indirect with participants using gendered pronouns during the course of our conversation.

Participants readily identify gendered aspects of agents when asked to describe the agent's voice. Direct references to gender include describing the voice as "female," a "woman's voice," and a "lady voice" or through statements such as "I have the guy" and "It sounds like a she…" Participants also indirectly assign gender to agents, namely by discussing them using male or female human pronouns that correspond to their voice. Often participants do not realize they are using the gendered pronouns, and when asked about their choice of words, explained

that they selected the pronouns based on the sex they perceived in the agent's voice. Rudy, who does not use digital agents but has multiple voice-based technologies, experienced Siri when a friend used it while Rudy was in the car. While speaking about Siri, Rudy uses female pronouns, and states: "I mean Siri obviously is, the sound, the voice has got to be a woman." Rudy's use of "she" to refer to Siri is representative of how many other participants also employ gendered pronouns in describing agents.

Most participants have interacted with or observed agents that have a female voice by default. Some programs do not provide the option to change the agent voice, and other programs, such as Siri, have only recently provided users with ability to select a different voice. Some participants were not sure whether their agents' voices could be changed to a male option, while others stated that they knew of the option but kept the voice female. However, several study participants purposely switched their agents' voices from female to male, including Jane and Nelson who use Siri on a regular basis. When Siri was first launched, there were no gender options for individual countries, but genders varied by country. Jane initially turned on the United Kingdom voice, which is male, because she thought it sounded proper. Jane explains that it was out of habit that she switched over to the male U.S. voice when it became available. Nelson states that selected the male voice, which he discovered one day while playing with the phone, because he "thought it was just different."

Participants overwhelming describe agent voices for all program types – Siri, S-Voice, Google Voice Search – as female with the few exceptions of Siri users who specifically changed their its voice to male. This finding is largely consistent with current design standards for digital agents. Scholars, such as Nass, encourage designers within certain cultures to use female voices because they allegedly are perceived as less threatening and more helpful (e.g. Nass & Brave,

2005), and there is a long history of tying agent gender characteristics to AI and service applications (Suchman, 2009). The agents' voices in this study are designed to reflect a specific gender. For example, a female voice actor provides the underlying sounds for Siri's voice in the U.S. Following the launch of agents such as Siri and Cortana, some people have begun to question certain claims regarding the inherent nature of female voices and their use in subservient technologies (Zhang, 2015), and several HCI scholars have called for a better approach to gender and more nuanced thinking about gender, including from a feminist perspective (Bardzell, 2010; Muller, 2011; Rode, 2011) .

While this debate is ongoing, people are daily interacting with primarily female digital voices to the degree that they notice when a voice is not female. Nelson explains that when he switched Siri's voice, other people took note:

> "So people, when other people hear my phone like talk or say something they actually notice it a lot. And I think it's just kind of funny."

Other people's reactions to Nelson's voice suggest that female agent voices are pervasive and that we are not only surrounded by digital female voices but also may come to expect them in our interactions with digital entities.

The connection between an agent's voice and the gender of the voice can be so strong that some participants also expect certain agents to have a voice of a specific gender.
As I discussed in an earlier chapter, participants perceive Siri's voice to be distinctly "Siri." One of the defining features of Siri's voice is that it is female. Just as several participants lay claim to knowing Siri's voice or that everyone knows its voice, other participants also state that Siri's most universal vocal quality is its female gender. Justin once used Siri but lately has been interacting with it less as he tries to cut back on his use of technology overall. In my discussion

with Justin about Siri and its voice, Justin, like other Siri users, describes its uniqueness, but then goes one step further to explain why it stands out:

> "It's very distinctive. I mean, everybody knows that they made Siri's voice, um, a lady's voice."

Siri's voice is female, and everyone, according to Justin, "knows" that, just as Briant previously claimed "everybody knows" Siri's voice, period. Eva, a heavy Siri user, not only ties Siri's voice to a specific gender but also equates the entire program to being female. Like, several participants, Eva refers to Siri using the gendered pronouns *she* and *her*:

> I: So are you, why are you using the term her or she to speak about Siri? Do you?
>
> R: Well, in there you can pick the male or female voice. So, it's a phone for a girl, so I picked the girl voice so. But I think it's funny because most guys that I talk to also call it Siri, so I wonder if they are activating the female voice as well. Just because she's more well-known. Because we all call it Siri, right? We don't. What's the male version? Cause Siri isn't you know, I think of like that not being a male figure. I think of that being a female voice. Hum.
>
> I: So you associate Siri with being, like literally an entity like everyone knows what Siri is?
>
> R: Yes.
>
> I: Associates it with the female voice.
>
> R: With the female voice. For sure, I think so.

Similar to Justin, Eva claims that the female Siri is "well-known" to "all." The program's female voice is a universal trait. Eva goes one step beyond Justin, however, in connecting the gender of the voice to Siri's identity. She wonders whether our perceptions of the program and its name change when people select the male voice. For Eva, Siri does not just sound female; Siri is female. Eva is trying to make sense of whether a digital voice can switch genders and still be perceived as the same entity.

It is a good question, and one that I asked Nelson whom I interviewed after Eva. Nelson, who purposely selected the male voice, provides a different take on Siri's gender and identity. For Nelson, the gender of the agent's voice does not matter for who or what the program is to him:

> I: So, describe the male voice to me.
>
> R: It doesn't sound much different really. It just, just also kind of monotone-ish.
>
> I: But you said it's definitely male.
>
> R: Yeah, like other people can tell too.
>
> I: Do you still call it Siri?
>
> R: No.
>
> I: So what do you call it? Do you call it anything?
>
> R: Well, I guess, and I don't really call it anything. But, I guess, if you're referring to it, I'd say it's Siri, because that's what everybody, people know it as.
>
> I: So when you're speaking to it you don't say, "Siri, blah, blah, blah." You just talk.
>
> R: I just start talking.

Nelson can switch Siri's gender, seemingly without any problem, because Siri's identity is not tied to either gender. The implication for how we perceive and understand agent voices is that we do assign gender to digital voices; however, the extent to which people then assign a specific gender to a specific digital agent varies. For some people, the gender is the program. For others, it is just an aspect of the program's voice.

8.1.2 Nationality and Race: White, American Voices Speaking "Good English"

Research has demonstrated that people identify accents and nationality in digital voices (Nass & Brave, 2005; Tamagawa et al., 2011). Participants in this study also assign a nationality

to the voice of digital agents and perceive some agents to be of a specific race. People's attributions regarding the agent's nationality and regional affiliation often were part of their answers to general questions regarding voice (i.e. Describe the voice to me); After participants identified these traits in earlier interviews, I specifically asked people about the traits in some later interviews to explore the consistency of these perceptions. Some people also volunteered descriptions of race, but not as often as other vocal aspects, such as gender. Participants may not have thought of an agents' race prior to our discussion or may have not addressed it because of the sensitivity surrounding race in U.S. culture as well as conventions of polite conversation. If people did not address race in their initial answer regarding voice or agent image or description to me, I would ask them specifically. While some participants then would assign race to the voice, others would explain that they did not think the voice had a race.

Participants did not assign national, regional, and racial characteristics to agent voices with the same frequency as other attributes, such as gender, but when participants did identify these aspects in voices, their responses were almost identical. Several participants identified the voice of Siri and Google Voice Search as being American. Jane identifies Siri's voice as having an "American" accent, while Naomi explains that Google Voice Search is American because it has "no accent." Some people indirectly identified digital agents as being of United States origin by assigning it a regional affiliation within the United States. Julianne, an occasional Siri user, describes its voice:

> "I think not, not from the South. Doesn't have a southern accent. Doesn't have a Boston accent. You know, so the, for me being from the Midwest it sounds very Midwest, you know."

Patricia, who has experienced a digital voice on her Android phone, also parses through its regional affiliation:

> "It's very, um, never an East Coast accent. Usually very either kind of, um, upper Midwest or um, or kind of California newscaster kind of, yeah."

Julianne and Patricia separately agree that Siri's voice is not from the East Coast and may be, Patricia, or most likely is, Julianne, affiliated with the Midwest. Other participants' descriptions of nationality and regionality are more vague. Sigurd, an IT executive who speaks English with an American accent in our conversations, states: "Siri is speaking good English. Not, um, a British type English or. It's speaking good English." Sigurd, who avoided attributing human-like traits to Siri generally, rules out Siri as being from the UK and alludes to Siri being from the United States or, at least, another English speaking country. Participants with Google Voice Search, S-Voice, and Siri described their agents' voices as being "Caucasian" or "white" with only one person, Jane, guessing that the voice could be white or Asian. The nation, region, and race associated with digital voices are not necessarily exclusive of one another. Angela, who has Siri but doesn't use it, describes Siri as being white. When asked to explain that description Angela states: "Well, it's her. I mean she just has the middle-American type voice." And so, Angela draws conclusions regarding Siri's race based on the stereotypes Angela associates with a specific region in the U.S. The racial, national, and regional attributes of an agent's voice, at least in Angela's case, reinforce one another.

Overall, participants who perceive agents as having a particular nationality or race conceptualize the agent as being a white American from the Midwest. These national, regional, or racial characteristics, define the program, but participants do not perceive these characteristics as being a critical characteristic of the voices or agent in the same way that gender defines programs such as Siri. This may be because people may not have been aware of the race or nationality of the program until I asked them. Furthermore, given the pervasiveness of the

"whiteness" of agent voices, participants may have not experienced a digital voice with characteristics of a different race that would cause them to take notice of race.

8.2 Human Voices

In addition to assigning human characteristics to digital agent voices, participants often assessed their overall human-like or machine-like sound. These descriptions ranged from completely human to completely machine. The most human-sounding agent based on general descriptions of the agent voices was Siri. It was the only digital social agent whose voice several people perceived to be actually human. Lillian, who owns an Apple product but rarely uses Siri, explains: "It's a person's voice. I don't, I don't think of it as like a robot or anything." The most probable explanation for Siri's life-like sound to some users is that it is a woman's digitized voice. Some participants, such as Justin, a former Siri user, are aware of the voice's origin and base their description of the voice on this knowledge:

> "It's a natural person. I think she does a bunch of voiceovers. A real person from Atlanta, so it's nice that it's that. Not back in the day with the old Macs in the 90's where it had that voice recognition stuff and it was just all robotic…"

Justin's explanation of Siri's voice also exemplifies another aspect we have discussed: people can differentiate between digital voices as well as compare and contrast different aspects of them including their human and robotic qualities. Similar to Justin, Rudy compares and contrasts Siri's voice to preceding technologies, and Siri is starkly different:

> "You would expect a computer, like the old movie *2001*, they sound mechanical, and now they try to make it sound like its human with some compassion. "

Rudy is contrasting Siri against HAL 9000, the murderous AI machine in *2001: A Space Odyssey* who spoke in a monotone voice. For Rudy, Siri's human voice is more than the sound of a human; Rudy also perceives the voice as having the human characteristic of compassion that was missing from older, fictional technology.

Lillian, Justin, and Rudy directly state Siri's voice is that of a human while other participants allude to its humanness indirectly. Angela, who has an iPhone but avoids using Siri, states regarding the voice: "Well, she just sounds, like, sort of a radio announcer type person in a way." Angela is drawing a parallel between Siri and a specific occupation performed by a human. Similar to Rudy's explanation of Siri, Angela's description also highlights other aspects of Siri, namely the distance between Siri and the user. Siri's voice is transmitted through the phone just as an announcer's voice is broadcast via radio. Several users and non-users perceive Siri's voice to be that of a human, but arrive at the conclusion through different thought processes including considering its actual origin, contrasting it against older, rudimentary technologies, and comparing it with similarly situated humans.

8.3 Artificial Voices

On the opposite end of the spectrum from agent voices perceived to be human are the agent voices that sound like robots or computers. Digital agents with voices in this category include Google Voice Search and, despite other perceptions of it having a distinctly human voice, Siri. Participants use terms and phrases such as "robotic," "like a computer," and "synthesized" to describe agent voices as artificial. Just as several participants who thought of Siri's voice as human contrast it with mechanical or life-less voices, some people who perceive agent voices as robotic contrast them with human voices. For example, Naomi who uses Google Voice Search explains, "It sounds automated. I mean, it doesn't sound like a human. It definitely sounds like a machine." In addition to contrasting the voice of Google Voice Search against a human, Naomi also compares it to other voices known to her, and she recognizes the sound of Google Voice Search as the sound of a machine. Other users compare and contrast the voice against specific humans. Luke, a heavy Google Voice Search user, describes its voice as "female

robotic." When asked to explain why he thought it was robotic, Luke replies: "Yeah, it doesn't sound like a natural person. Like your voice or you know, my wife's voice." Similar to Naomi, Luke contrasts the voice against "a natural person," but for Luke, he is specifically thinking about humans with female voices, such as his wife.

Beyond the actual sound of the agents' voices, users also weigh how agents put together words to form responses. For these participants, the way in which the agents speak and their message signal that the nature of the agent is not human. Dwight, a Siri user, claims that Siri's voice is robotic because

> "… it's not like, 'Hey, what's going on Tommy?" like, It's like, 'Hi, what would you like me to do for you, Connor, or something, or Dwight?'"

Dwight says nothing about the actual sound of the voice in his description, and, instead forms his opinion regarding the voice based on the agents' message. The message Dwight hears from Siri does not resonate with how anyone he knows would speak to him and, for Dwight, Siri's voice is associated with the speech patterns of a machine.

Other users take into account both the sound of the agent's voice and the way in which the agent answers inquiries to reach their conclusion regarding the mechanical characteristics of the agent's voice. Patricia, who has witnessed others use Siri, considers Siri's voice to be robotic. For Patricia, the voice is not robotic because it is stilted and overly formal, as Dwight claims, but because it sounds like a futuristic machine:

> "Siri's voice, um, it's very, it actually sounds like what you imagine the kind of twenty-fifth century robotic voice would be. Like it's very mechanical. Um, but it clearly is responding to you. It's not just automated. Like there's a way that they've programmed it that it's almost like she is talking to you, but she's a robot."

Patricia's description of voice balances the mechanical sound of the agent against its advanced responses to the user. Patricia's explanation attempts to reconcile different types of machine

behavior and sound. Until the introduction of AI, automated machines would produce limited responses to users, and many still due. Patricia equates the mechanical sound of Siri to the sound of these types of machines; however, Siri does not just produce limited responses. As AI, it attempts to personalize information and speak to the user. And so, for Patricia, Siri sounds like a twenty-fifth century robot because it is a highly advanced computerized system.

Some users and non-users perceive digital agent voices to be entirely robotic or computerized. When comparing and contrasting agents' voices against the sounds of humans and machines, these participants recognize the machine aspects as similar to agents' voices. In addition, some people consider the agents' messages and how they are linguistically conveyed in forming their perceptions of voice.

8.4 Converging Voices

While some participants position agent voices as clearly human or machine, other participants describe the same voices as between the two extremes. Some people perceive agent voices as closer to human or machine, but not fully one or the other. These users employ terms such as "kind of robotic," "little robotic," or a "little bit computer" that indicate they hear qualities in the sound of agent voices that share similarities with artificial voices. At the same time, however, these mechanical aspects are not pronounced enough for the user to think of the voice as fully artificial. The voices remain primarily human with mechanical undertones. People also perceive voices as sounding mechanical with human undertones. Gloria, who doesn't use Siri but has heard it, describes the voice as "Computer based, but it was a little with a more human touch." In Siri's voice, Gloria recognizes aspects of machines and humans.

I have discussed how participants' perceptions of agents can fluctuate over time and experience. Some participants think of themselves as talking to a device one moment and a

separate entity the next while others describe how the presence they experience with machines shifts depending on communication contexts. People's perceptions of the human or machine-like sounds of digital voices are no different. Cameran, a singer, initially describes Siri's voice as pleasant but states he would not go so far as to describe it as friendly. When asked to clarify, Cameran describes the voice in greater detail:

> "…there still is a sort of robotic quality to it. I mean, it does remind me, particularly when it's displaying, say, search results, and like switching from 'this is the part that's sort [of] dialogue,' before it's sort of smooth to 'this is me [Siri] trying to sound out whatever it is you searched for.' Like just the inflection is not quite human in those parts. It's much better than other things that I've heard in the past, but, at the same time, I don't know. I don't really see that as a drawback necessarily, because like I think if it tried to be too friendly that would fall into sort of uncanny valley territory. But um, I don't know. I'd say it's just not totally natural."

Cameran works through the different attributes of Siri's voice in his account. Cameran begins by stating it is "sort of robotic," but then clarifies that the qualities of the voice fluctuate based on the interaction. The sound of the voice does not change, but the rhythm and the message is altered when Siri moves from dialogue, or its preprogrammed replies, to answering a user request for which it does not have a set answer. By the end, Cameran describes Siri's voice as "just not totally natural." From Cameran' perspective, Siri's voice is neither entirely robotic nor entirely human. It contains both qualities that fluctuate during use.

Cameran caught me off-guard in mentioning the uncanny valley, a term most communication scholars do not even know, and Cameran later explained that he had just come across the term in his reading. Although Cameran was the only person to mention the uncanny valley by name, several participants explained in their description of agent voices that they preferred them to be less life-like because if they became more human, the voices would be creepy. Other participants, however, said that liked the human-like traits in the digital voices.

Some people also said they would interact more with the agent if the voice had more human-like qualities. The implication of these types of discussions is that people not only perceive human and machine qualities in digital voices but also are aware when there is too much or not enough of one of the traits.

8.5 Vocal Mash-ups

So far I have presented the vocal traits of digital social agents separately. This approach is an effective way of describing the traits and how people arrive at them but an ineffective means for understanding participants' overall conceptualizations of voice. In this section, I present several examples of how participants assemble the different vocal traits. (To preserve space, I omit my general follow-up questions, and their absence is marked by ellipses.)

The most basic and universal accounts of agents' voices are those involving its gender. "A female voice" is the only description of Siri provided by Garett, who does not use digital social agents. Some people add to the voice's gender by identifying other "demographic" attributes. Samuel has Siri but rarely uses it. He initially describes Siri's voice based only on its gender, but provides additional traits as we talk:

> "A woman's voice…It's really clear, understandable. Um, good pace, good flow of the wording… Sounds like an American voice."

Samuel assigns several human attributes to Siri, in addition to some quality descriptors, but never directly addresses whether the voice is human or machine. The voice to Samuel is that of an understandable American woman. For Rudy and other participants like him, digital agent voices consist of attributes we typically associate with human voices.

While some participants only describe agent voices based on human demographic characteristics, many people I talked with layered the demographic attributes with the human or

robotic descriptions of voices. Several people combine gender and voice type. Reid describes the voice of his PlayStation:

> "I'm pretty sure it's just a like a generic woman's voice… Yeah, it sounds human. It doesn't sound like Microsoft SAM. That's like super robotic."

The voice of Reid's agent is that of a "generic woman" who sounds more life-like than other machine voices. Some combinations of demographic attributes and voice type cross the dividing line between human and machine. Participants such as Patricia describe an agent's voice as having traits of both a robot and a female, a "twenty-fifth century" female robot. Sabrina, who has observed others use Siri, similarly describes its voice:

> "I mean, it sounds computerized. They tried to get it to sound like a person, but you can still tell. I think I've heard male and female versions."

To Sabrina, Siri's voice is that of a male or female computer with artificial human attributes.

Several participants also identified additional traits beyond gender, usually when asked more directly (i.e. Would you describe the voice as being of a particular race?), which they also combined with the human or non-human voice descriptions. Naomi, who uses Google Voice Search for accessing the weather, assigns multiple characteristics to its voice:

> "It sounds automated, I mean, it doesn't sound like a human, it definitely sounds like a machine… Um, I mean it's a woman's voice. Um, pleasant sounding. It's not gruff … Yeah, I can't assign a race to it, but definitely like it sounds like a 40-something, a Westerner, an American."

When we assemble these characteristics together, the voice of Google Voice Search to Naomi, can be described as a middle-age, American woman and machine.

In previous chapters, I discussed how participants struggle to assign a definitive characteristic to agents (i.e. source or presence). Some participants also try to reconcile the dichotomy of human gender within a mechanical voice. My conversation with Aki, an occasional Siri user, exemplifies this struggle:

R: Yeah, they have a, she has an intonation, but it's not like fluidly. It's not smooth as human voice. Because Siri doesn't have any emotional, emotion.

I: So you're saying and so it's got some human characteristics, but it's not as smooth as a human voice.

R: Yeah.

I: And then there's no emotion in it?

R: Uh-huh. So it, it, so that's why it make me feel like it still a thing, not, yeah.

I: Now, I think you said she?

R: Yeah, she, because the voice is a lady voice. So it make me feel like it's a she.

Aki thinks of Siri's voice as having some human characteristics, but lacking others. Because of Siri's lack of emotion Aki considers Siri to be a thing. In the next moment, however, Aki is recognizing Siri's human gender. The voice of Siri oscillates between human and machine and, as a result, so does the ontological status of the agent.

8.6 Schizophrenic Voices

In participant's descriptions, digital agent voices are either entirely human – combining a human demographic trait with a description of the voice as human or human-like – or a combination of machine and human attributes. Even people who describe the voice as extremely machine-like still perceive it as having gender, a human quality. What were once separate entities – humans and machines – now reside together in the voices of agents to different degrees and in varying combinations in the minds of users and non-users. McLuhan (2011) argues that our experience with new technologies and modes of communication are accompanied by a new way of experiencing and understanding our world. The separation of thought from the voice in our transition to a literary culture resulted in a "schizophrenic" understanding of our world and in our perception of selves. I am not arguing, in this chapter at least, that our nature is being

divided. But we do have a schizophrenic perception of agent voices that are neither entirely human nor entirely machine.

9. WHAT WE SEE WHEN WE HEAR AGENTS

Impressions of others' personal fronts are often described as our "mental images" of them (e.g. Pavitt, 2009). In the literature regarding impressions, the term "image" is used in both a general and literal sense and refers to the individual traits we assign to others as well as any mental representations we have of their physical nature. We sometimes visualize what the person "looks" like even when we cannot look at them, or observe them directly via our sense of sight. For example, when talking on the phone with a person we have never met, we may develop a mental representation of her or his physical appearance. In these instances, we interpret the sound of another to create a visual image, invoking our sense of sight. Our perception of the person is both oral and visual, with one being derived from the other.

Although we might not always develop the "correct" visualization of a person, when we meet them they look nothing like "how we imagined," we still are able to give them basic traits based on what we have visually observed with other humans. But no one has seen a digital social agent because it exists as a line of code. Digital social agents make themselves known to us primarily through their voices. We have only limited visual cues – a circle with a microphone, a green screen – projected on or through a specific device to take into account when assessing agents' artificial fronts. How then will we visually interpret the voice of something we have never seen? As another way of understanding participants' conceptualizations of agents, I explored these mental visualizations of the "physical" appearance of a digital entity.

Whether participants had ever "imagined" visual representations of agents or their voices varied, with almost half of all participants reporting that they did not "see" the agent or an image associated with the voice in their head while interacting with the agent or encountering it through others. Several of the people who had not experienced an image of the agent prior to our

interview still offered an image of who or what the agent may be based on our conversation. I include these images in the analysis based on Holstein and Gubrium's (1997) argument that qualitative interviews are themselves constructions. For people who possessed them, images of digital social agents varied widely and reflected aspects of agents' voices as well as the function of the agents. In the previous chapter, I discussed how some participants interpret the sound of an agent's voice as being human, machine-like, or an amalgamation of both, and a similar pattern emerges in people's visual representations of agents.

9.1 White Women

In the previous chapter we discussed how participants perceive digital agents' voices to be entirely human, and so, not surprisingly, some users and non-users of S-Voice, Google Voice Search, and Siri also visualize agents as human. The detail with which users and non-users describe "the look" of digital agents as humans varies. Some users explain the visual they have of an agent is "vague." For example, Jayden, a Google Voice Search user, describes the image of the program's voice as "just a generic person that [I] may see randomly" who has "black hair." Most people perceive agent voices as female, and, not surprisingly, participants who perceive agents to be human describe them as taking the appearance of a woman. Julian explains that the voice of his S-Voice, is that of a "30-year-old white lady" with "blonde hair." Several people also incorporate more qualitative aspects into their mental images. Rudy, who has only encountered Siri indirectly, states: "She's in her 20s, sort of sexy looking…She seemed pretty intelligent." Rudy sexualizes Siri based on its female voice, but also adds the attribute of intelligence based on her ability to provide information. Julianne, an occasional Siri user, also describes the image of Siri as "a helpful female," based on the tasks it performs, but Julianne does not specify how an agent can look "helpful." Some visualizations also include other

characteristics, such as where the agent resides. In our discussion of agent voices, we met Patricia, who describes the voice of unspecified agent on her Android phone as being that of a newscaster from the Midwest or California. Patricia also imagines that her agent looks like a "kind of suburban, white woman in her forties or fifties."

Participants attribute the visual representation of agents to multiple sources including the agents' voices as well as real and fictional people they know or have encountered via the media. Users have interpreted agent voices as being primarily Caucasian, and, like gender, this aspect carries over into most people's visualizations of agents. Some participants also explain that their mental images of agents are based on actual humans. In their descriptions of Siri's voice, participants identified the female voice actor behind Siri as the reason why they considered its voice to be female. Several Siri users also associate the image of Siri with this specific voice actor, Susan Bennett, who is a middle-aged, Caucasian woman. Susan Bennett is a real person, but other users' mental representations of agents are based on fictional characters. Adam states that he does not normally associate an image with Siri, but if he were to do so, it would be that of a character in the Disney movie, *Smart House*. The film tells the story of a sentient house that takes care of a family without a mother. The house is represented as a disembodied female voice, at first, but then takes on the human form of a motherly female. The mother character to which Peter is referring is a white, middle-aged woman with dark hair.

Some users also may be taking themselves into consideration when visualizing agents. Paula perceives Siri to be a "middle-aged, female, Caucasian," with blonde hair. Paula attributes the age, race, and gender of Siri to the sound of *her* voice, but as for its hair color, states, "I don't know if that's because I'm, I have a lighter hair color." In her account, Paula considers the possibility that she is imagining the agent to look like her. Other participants juxtapose

themselves against the agent. Above I explained Patricia's mental image of her agent as "suburban." Patricia does not offer an explanation for this description, and it could be that Patricia is drawing on a stereotype of suburban populations. However, in another part of our interview, Patricia states that she does not like the agent's voice because it is speaking at her, not with her, and "doesn't have my cadence." The voice does not sound like Patricia. Patricia is a 44-year-old, black, female who speaks with what sounds like a British-English accent and lives in Chicago. Patricia does not perceive the voice as sounding like her, and so, her image of the voice may be based on what she sees as being completely opposite her. Overall, people draw from multiple sources – voice, real people, fictional people, and themselves – in their human-like mental representations of agents as white females.

9.2 Woman on the Line

In an episode of *The Big Bang Theory*, the male character Raj becomes enamored with Siri, and meets *her* in a stereotypical sitcom dream sequence (Cendrowski, 2012). Within the dream, Raj imagines Siri as a voluptuous woman sitting at a futuristic desk, surrounded by computer equipment, wearing a headset, and responding personally to every request. Two study participants, this time women, recount an image of Siri, nearly identical to Raj's "dream of Siri." I discuss all three here because of their overwhelming similarity, but there is not indication that participants' actual images of Siri are necessarily drawn from the media representation.

J, who has used Siri previously, also imagines Siri as using a computer and interacting with users. Alana describes Siri as "Just a lady sitting at, on a computer screen, reading her response back to you." Lillian, an occasional Siri user, describes a similar scene:

> "Um, kind of, you kind of envision like someone talking through a headset in like a big like office, computer space. You know, that whole like futuristic look of that. But um, yeah, I guess. I guess if there was an image that would be it. But I don't think I see it every time I hear the voice or anything like that."

In the two real and one fictional image, all of which are constructed images of the agent, Siri is embodied and is performing a specific task. Alana envisions Siri as a woman, while Lillian, who assigns Siri a gender in voice descriptions, only sees Siri as a generic person. Similar to some other participants, Alana and Lillian visualize Siri as human. But unlike other participants' images of digital social agents, they see Siri as doing something. The visualization is not of a static entity but of a human who performs specific tasks, giving information to others. And so, Siri is imagined as performing a specific social role.

In these representations, Siri also is surrounded by computers. In Alana's image, Siri appears to be gathering information from the computer to read back to the user, and so, Siri itself appears to rely on technology for its information (which actually is a fairly accurate representation of how Siri relies on other digital sources for information). But the role of computers in Lillian's image is unclear because they are just there, part of the scenery. The computers surrounding Siri could represent its digital nature or its function. From this perspective, participants reconcile Siri's social and mechanical attributes through familiar representations of humans and computers, a biological person surrounded by and interacting with physical things.

The visualizations also are representations of how Siri communicates with users. Siri is talking back via the medium of the headphone to unseen users in each image. Interaction with the agent is viewed as mediated and analogous to speaking with a human who is on the other end of a phone call. These mental images are a "behind-the-scenes" perspective of Siri and conceive the agent as the woman on the other end of the line.

9.3 Humanoid Robots

Participants' mental representation of agents' voices as humans cast the entities behind the voices as more than a specific biological species: These images also portray the voices as being produced by entities who are alive. Other participants, chiefly people who have only experienced a digital social agent via others, perceive agent voices as being produced by something life-like, but not biological. The agents are mechanical, described by participants as humanoids or robots with varying degree of detail.

These representations often are drawn from pop cultural portrayals of artificial entities. Gloria, who has experienced Siri via other people, imagines it as "no more than say maybe as a robot" modeled after "*The Jetsons.*" Patricia, another person who has experienced Siri via others, conjures an image that is "just like video game robots…But the more stylized one, not the, not the ones that we might have imagined 20 years ago." Beyond comparing their visualizations to specific or general media, Gloria and Patricia do not offer additional detail, and the images remain somewhat vague.

Other users who equate their own visualizations to media representations provide more in-depth descriptions to these digital entities and include additional details beyond their media portrayals. Curtis, another person who experienced Siri indirectly, describes his visualization as similar to the shiny, human-looking entities in *I, Robot*:

> R: …it's almost, uh, like I, Robot. Have you ever seen that movie?
>
> I: I've heard of it, yeah.
>
> R: It's, um, I don't know, like it reminds me of a robot, human-looking robot almost kind of.
>
> I: And so human-looking robot. What types of features would this human-looking robot have?

> R: I don't know. Um, I guess just woman features. Delicate, or um, like a woman's face.

Curtis's visualization is that of an entity fashioned after the human-looking robots in *AI* with feminine features. Cameran, an occasional Siri user, reports a similar image:

> R: … I feel like I'm drawing some sort of image from pop culture. But like I couldn't place the exact source of it. I, you know, they're, um, sort of these very smooth, blue plastic looking like, um, uh, android characters.
>
> I: So when you said, "Smooth, blue android characters."
>
> R: Yeah.
>
> I: Do they have faces at all or is it just all kind of smoothed out or?
>
> R: Um, yeah, faces but not like, you know, super expressive human faces.
>
> I: And when you, when you kind of get that picture does the android have a gender at that moment or you just kind of think of that just overall? You know what I'm saying?
>
> R: I guess I'm still thinking of something that's modeled after a woman, because that's like, you know, what the voice sounds like to me. But just like in a very abstract sort of way.

Both Curtis and Cameran' descriptions are drawn from a mix of science fiction and attributes associated with the voice. They imagine Siri as a female, non-descript android. Their visual representations are more specific than other images, but are still nebulous.

Participants' representations, so far, have been based on the aural aspects of agents or the visual appearance of actual humans or of science fiction characters. Some people take into account other aspects of agents or the devices containing them in their mental images. Nicholas has only used Siri on his sister's iPhone or watched her use it, and describes an image of Siri as an android that is different from other humanoid images in one key area:

> "Okay, so like if I were to picture it, it would be like, um, at least some kind of humanoid thing. Completely grey in the face, but you know with an Apple logo

> on their chest or something like that. That's what I picture when I think of like Siri."

Unlike other people who imagine Siri based only on its voice or borrow an image from science fiction, Nicholas incorporates the overall look of most Apple products – grey with a white Apple logo – into his image of Siri, also an Apple product.

Android, humanoid, and robotic images of agents, namely Siri in this study, portray a picture of life-like entities that are sometimes female but very much machine. They are often drawn from or compared to representations of robots or androids in science fiction. They also are extremely vague when compared with the detail users assign to human images of agents. The most likely reason that these visual representations are nebulous and connected to science fiction is that most people have never encountered a humanoid robot in real life. People's only references to human-like robots are predominantly via science fiction, and, in fact, until Siri was created, most people also had never encountered an "intelligent" talking machine. Furthermore, some of the images described here are more aligned with fictional android entities than anything that has been or likely will be built by humans. These more fictional visualizations set the agents apart as other-worldly creatures.

The makeup of the participants who conceptualize agents or their voices as humanoids also sets this category apart. Other categories of images discussed in this chapter include both non-users and users, with varying degrees of reliance on agents. With the exception of Cameran, who is an occasional Siri user, everyone else who reports a mental representation of Siri as a humanoid or android is a non-user who has experienced the program through others. Why only non-users visualize Siri, and only Siri, in this manner is unknown. One possible explanation is that these users do not have enough experience with the program and its voice to form a more stable perception of the agent as more human or more machine, but further research is needed.

9.4 Talking Screens

While the majority of people who attach an image to an agent or its voice describe this image as taking some sort of embodied form, human or otherwise, a few participants primarily envision the device itself or an aspect of it. Most of these users initially said they did not associate an image with their digital agent but then went on to offer a guess. Dwight, a Siri user who perceives himself as interacting with the phone instead of an entity, does not have an image of anything concrete, only a reference to computer code: "Actually in my mind I think of like blue, white, just like numbers." Similar to Dwight, Dane also thinks he is interacting with the phone while occasionally using Siri, and visualizes a vague "computer system image." Dwight and Dane's mental images of Siri focus on its technology and do not involve its vocal aspects.

Other users also perceive their agents as technologies but incorporate the speech capability of the software into their mental images. Trevor, who has Google Voice Search but tries to avoid using it, explains he does not really have a specific image of the voice he hears other than "just a box talking." Priscilla, a heavy Siri user, thinks of herself as talking to a distinct entity when interacting with Siri, a "little person" in her phone; however, when Priscilla is asked directly about her image of the agent, Priscilla does not describe a person or even a humanoid.

> "I just think of like a, like movies where you have like a screen, and it's like talking to you or like the Sci Fi movies. That's what I picture. Looking in a screen with like a little voice."

Priscilla and Trevor's images reflect to varying degrees what the user actually sees, and hears, when interacting with the device. Unlike participants who imagine agents as humans or human-like based primarily on the sound of the voice, some participants who "see" the device or a derivative of it are drawing from what they have observed of the agent via their sense of sight.

Still, the voice is not entirely overlooked in some of these representations. For Priscilla and Trevor, the devices are perceived as life-like because they have a voice inside of them.

A connection may exist between users' source orientation and their visual representation of an agent. Except for Priscilla, participants who have a computer-type image also perceive themselves as interacting with a device. Do we visualize agents and their voices as devices or vague computer images because we think of ourselves as interacting with machines? Or do we think of ourselves as interacting with machines because the agent takes the form of the device? The nature of the connection cannot be determined from this study alone and more research is needed to better understand the relationship.

9.5 The Unimagined

Many participants report having a mental image of the voice or agent or at least provide a guess during our conversation as to what an agent may look like. However, nearly half of the participants who experienced agents either directly or indirectly do not report an image. The reasons why these participants do not develop an image is beyond the scope of this study, but there are several viable explanations, some of which are provided by participants themselves. Carlie, who does not use Siri but has witnessed her mother use it, states that she has no image of Siri because, "I knew it was just a robot, technology based. Otherwise I probably would." Kyle, who has used Siri with a friend, also states that he does not have image of Siri because he "just knew it was just a technology." Both Carlie and Kyle attribute their lack of an image to Siri's machine-like nature. Several of the participants who provided vague descriptions of agents as a technology, such as Dwight, also initially said they did not have an image of their agent, and so, a lack of an image may be equated with people perceiving the agent as only a technology.

Other participants offer a different explanation: Agent voices do not stand out enough for people to turn their attention to trying to figure them out. Alice, who tried Siri but does not use it, has co-workers who are visually impaired and rely on automated readers. As a result, Alice hears these synthetic voices constantly and, to her, they all sound mechanical. Richard, who does not use any agent but has experienced them through others, also routinely encounters voices in his job, only the voices are human: "My job… I talk to people over the phone a lot, and then I see them. So, I really don't do that as much, because I know that people look a lot different typically than the way they sound." Richard explains that he does not pay enough attention to the voices, human or agent, for them to develop an image. Research may backup Alice and Richard's explanations. One measure of presence is whether or not people have developed visual images of a voice they cannot see (Lee & Nass, 2005). Scholars measure presence based on participants' mental images of an entity because possessing a visual representation of someone unseen is a marker of whether or not we have turned our mental resources toward them (Biocca, Burgoon, Harms, & Stoner, 2001). Many, but not all, of the people who do not experience an image with agents also do not report a sense of presence. For various reasons, they do not turn their attention toward the voices. Further research, however, is needed to understand the connection between people's perceptions of digital agents and any lack of agent image.

9.6 Dueling Senses, Dueling Images, Dueling Natures

From this analysis of participants' visual representations emerge varying conceptualizations of digital social agents and their voices. According to Ong (1967), "voice is alive" (p. 309), and the most pervasive characteristic in participants' images is that of something living, even if the life form is not biological. People's visual representations of agents are filled with life-like humans, complete with specific hair color, women answering user questions at a

computer console, female androids, and talking boxes. With the exception of several user images of numbers or vague computers, most people who have an image of agents describe a picture of an entity that is alive.

The different categories comprising the various types of images in this study – white women, women on the other end of the line, humanoid robots, and talking screens – share similarities with categories of vocal descriptions: pervasive female voices, white American voices, human voices, converging voices, and artificial voices. The images demonstrate that people recognize human and machine characteristics in agents and their voices. For some people, one of the natures of digital social agents, human or machine, is more prominent, while for others they are reconciled to a degree e.g. the human operator at computers.

Similarities exist between vocal and image categories of digital social agents, but what about for individual users? Do participants who perceive the voice to be human-like imagine the agent as human? In addition to identifying overarching trends in the codes and categorizing them, I also analyzed the similarities and differences between individual perceptions of voice and mental image. For the most part, people's descriptions of agent voices were congruent with the image that they described across all ontological categories: human, mix of human and machine, and machine. For example, Angela describes the voice of Siri as being female and like a radio announcer and pictures *her* to be a white, middle-aged woman. Alana describes Siri's voices as that of a type of female, telephone operator and describes an image of a woman answering questions behind a computer. Curtis perceives Siri's voice to be female and electronic sounding and describes an image of a feminized android similar to those found in *iRobot*. Not every vocal description and image match, however. In her description of Siri, Aki goes back and forth between the computerized aspects of Siri's voice and the human-like aspects of its gender, but

Aki's image is that of a white woman without any reference to the computer. Naomi provides a highly detailed description of her agent's voice including gender, age, and nationality, yet she has not visualized the agent at all. Because these inconsistencies emerged during analysis, I was not able to ask people about them. But one explanation for the difference could be that participants are considering other aspects of the agent beyond voice, like its place in a technological device, in their imaginations of agents.

My analysis of agent images also reveals that people draw on multiple sources when developing and explaining their mental representations of agents and their voices. Participants routinely pointed to the voice as the underlying source for their image, but they also identified other sources they relied upon in making sense of agents. These other sources included participants' own appearance, their knowledge of the technology, such as the identity and physical attributes of the voice actor who provides the voice of Siri, and representations of similar technologies in pop culture. Because no one has "seen" an agent and very few members of the general public have encountered human-like robots or androids in person, participants who perceived their agents to be amalgamations of humans and technology or AI drew more heavily on what they had "seen" in science fiction and media portrayals of life-like technologies.

All of the participants discussed in this chapter have a single image associated with the agent or its voice – all except one. Julian, a heavy S-Voice user, describes the image of the voice of his agent as a "30-year-old white lady" with blonde hair. This description in and of itself is not extraordinary when compared to other participants' descriptions. But, this description is not Julian' only image he associates with S-Voice. As part of my interview protocol I routinely ask follow-up questions, and in answering those questions, Julian discloses a second image:

> I: … Is that [30-year-old white lady] a mental image, though, you would say you regularly get or is that just something, you know, you're kind of explaining to me now as we're talking?
>
> R: Uh, well, if I, if I really think about it. Like if I think of someone talking to me then, yeah, that's what I picture.
>
> I: When you're talking to Linda. All right just to kind of just, so you're like, "Linda." So in your head are you seeing Linda as that blonde woman do you think or you're just?
>
> R: Uh, no.
>
> …
>
> I: When you use Linda, do you see yourself as talking to the image of Linda or more just phone or a voice or just?
>
> R: Um, well, when I talk to her I think I would. Like, whenever I like talk about it, I think of the screen that I see on my phone. It's like, it's a green screen, and it has like a circle in the middle. I see that.
>
> I: So when you're actually interacting, you're seeing that phone screen?
>
> R: Yeah. And even when I don't look at the screen I still picture it.
>
> I: So the voice then can be described as a, you know, 30-year-old, white lady with blonde hair. But when you're thinking of what you're interacting with it's the screen?
>
> R: Yeah.

In our conversation, Julian indicates that he has two related images. The first image is of the woman, and Julian associates it with the voice of the agent. The second image is of the green computer screen, and Julian associates it with speaking to the agent.

There are several possible implications to Julian' description. If the images both are Julian' perceptions of the agent, then Julian has dual and, potentially dueling, conceptualizations aligned with the opposite ontological aspects of the agent: a human, the image of woman, and the machine, the image of the blank screen. Julian also perceives other aspects of the agent as

fluctuating. We previously discussed how Julian thinks of himself as talking toward an entity, Linda, but when he hears Linda's reply, he thinks of himself as talking with the program. Julian indicates early in the above transcript that when he hears the agent talk to him, Julian imagines it to be the woman, and, when he talks to it, the blank screen. Julian's varying perceptions of source orientation and agent image do not appear to align with one another; they crisscross: While talking toward an entity Julian envisions the computer screen but while listening to what he perceives to be the device he imagines a woman. The reasons why Julian' source orientation and images do not align are not entirely clear. What is evident based on Julian' description of the image and the source is that the agent in Julian' mind simultaneously exists as both a human-like entity and a machine. This conceptualization departs from other participants' perceptions, of at least the image, because the agent is neither partially human nor partially machine; it is potentially all human and all machine depending on the direction of communication. Here the dueling ontologies are simultaneously, and fully represented, not just watered-down versions of each other.

Julian' answer also has other theoretical and methodological implications. It suggests that people can have an image of the agent that is separate from the image associated with the voice. In other words, the voice is perceived to be separate from the agent. This would provide an alternative explanation for why some users' descriptions of voice do not align with their image. However, Julian' answer also could provide an explanation for why participants' perceptions of voice align so closely with the images they described to me. When participants were describing their images to me, these images were of the agent's voice and not necessarily representative of the agent as a whole.

This second explanation is based on how I asked participants questions regarding their mental image of the agent and my own faulty assumptions in adapting a question normally used to investigate human perceptions of other people to human perceptions of disembodied agents. When we encounter another human via a mediated channel, such as the telephone, we may develop a mental image of them. In creating this image of the disembodied voice, we draw on knowledge we already have of humans. The image we have of the voice we hear, is, in our minds, of the human producing that voice. In my own thinking of how we understand digital social agents, I assumed that, as with humans, the image would be of the agent producing the voice. What I did not anticipate was that some people, such as Julian, may mentally separate the voice of the agent, a woman, from the program itself, the green computer screen. In Julian' mind, the S-Voice may exist simultaneously as a human-like entity and a device, and given Julian' other descriptions of the program, including the fact that he names it Linda, this is the most likely scenario. However, the possibility exists that people do not necessarily think of the agent as producing its voice. For example, Nelson considers the gender aspects of Siri's voice to be interchangeable. He does not think of Siri as being of a specific gender. The voice is not the sole determinant of who or what the agent is for Nelson or Julian (and most people as we will discuss in the next chapter). The lesson for future HMC research investigating images associated with agent voices is to clarify with participants if the image they are providing is of the voice and/or the agent and to not assume that participants perceive of the voice and the agent as the same.

10. WHAT WE THINK OF AGENTS

Our exploration of the artificial front has focused on the appearance of agents as revealed through their voice and imagined in users' minds. The voice is the primary means through which agents make themselves known to us, or are programmed to make themselves known, but our understanding of social entities, people or things, extends beyond what can be revealed only in voice. When another person is standing before us, we take into account the entire personal front, assessing it in its totality (Goffman, 1959). In this section, I discuss participants' overall descriptions of the agents. These findings are based on participants' answers to questions such as "What is Google Voice Search?" or "How would you describe Siri to someone who has not used it before?" as well as other aspects of interviews in which participants discussed their overarching perceptions of agents. When we switch our focus to the agent overall, the human characteristics that were so prominent in our discussion of voice and image become less pronounced while the programs' functions come to the fore. The life-like aspects of digital social agents become their social capabilities. Participants' conceptualizations of agents vary from lifeless tools to social entities performing human-like roles. As with many of the other aspects of agents, people's perceptions of agents are not static.

10.1 Alternative Tools

Within the U.S. and other Western cultures, the predominant perspective of technology – mechanical or digital – is that of a tool through which we better control our environment (Pacey, 1983). Mobile phones, computers, Fibtbits, blenders, and the list goes on, are all things that help us accomplish some task or reach a specific goal. For participants who use or have used agents, Google Voice Search, Siri, and S-Voice are digital objects that serve a function. These participants describe the agent as a technology and focus on what it does. Julianne, an occasional

Siri user, sums up the agent as "a helpful tool to get information." Julianne strips Siri down to one of its main functions, retrieving information, and does not even mention its voice or the fact that people can talk to the tool. Other users incorporate the vocal aspect of digital social agents into their descriptions but only as it pertains to completing a task. Lillian describes Siri as

> "a voice-activated system in your phone that can answer questions and um, and make calls for you. And you give it a command, and it performs it."

Lillian's description of Siri focuses on the function of the program and what Siri can do for the user. Lillian incorporates voice into her explanation, but the voice she focuses on most is not Siri's but the user's. We use our voice to control the program, and it responds to us. Lillian's focus is on what the program does and how this is accomplished via voice.

Several users compare and contrast their digital agent against more well-known technologies and position the agent as an alternative tool for accomplishing tasks. Fred, a Google Voice Search user, explains that the program is a type of Google Search conducted by voice instead of via typing in the request, and Angela, who tried Siri but does not use the program, similarly describes Siri as

> "…just a way to answer questions. Instead of typing into the web browser you can just ask it out loud instead, and it will reply."

Cameran also describes Siri as a "different interface for interacting with your iPhone." Fred, Angela, and Cameran all perceive their agents to be technological alternatives to the ways that people normally type in requests or commands. The aspect of agents that sets them apart from existing technologies is their voice capabilities, but, as we have seen in other descriptions, it is the users' voice that is the focus: We talk to the device instead of typing.

The cultural perspective of technology as tools casts the technology as neutral (Pacey, 1983). Agents are things, or computer software, for us to use. We activate them with our voice,

and they respond. In positioning agents as tools, however, these participants strip the programs of their agency. Dwight' description of Siri as "automated" articulates this perspective:

> "Automated, because it's, like, comes to your, it can't know what you're thinking It can't read your thoughts. That you have to ask it and when you do ask it, it kind of gives you, like, what a normal response is gonna be. It's not gonna say, like, 'Oh, I don't know.' It's gonna say, 'Um, you know, either I did not find a listing or it did find a listing.' It doesn't say, 'Maybe,' you know."

Dwight' description of Siri as "automated" highlights the fact that agents are programmed: There is no "mind" behind them. The program is a thing.

10.2 Vague Voices

Most participants use terms such as "voice recognition function" or "voice-activated" to explain the role of the agent's voice. In these descriptions the voice is an integral part of the agent, but it is not the only relevant characteristic of the program. Several participants, however, define the program as a voice. Carlie, who has primarily encountered Siri via her mom, describes Siri as "a female robot's voice, if you could envision that." Naomi similarly thinks of Siri as "an automated voice that comes from my iPad." Neither Carlie nor Naomi elaborates on what the voice does in their description of the program. Siri exists primarily as just a voice to them. Based on other aspects of my conversations with each participant, Carlie thinks of the voice as coming from the device while Naomi perceives it as being produced by the software, but not a human entity. The voice then emanates from and comes to represent a thing to both participants.

For other participants, the voice is more than just a stand-in for a thing. Maya, an occasional Siri user, also describes Siri as a voice, but, it is a voice that carries out tasks:

> "…it's like a voice that acts like Google sort of. Because any time you have like a question, it'll answer it for you. And, but it has more of that personal tone, I guess, because it's a voice talking to you."

Similar to other people's descriptions of agents, Maya perceives Siri to be a technological alternative to manually looking up information via Google. These previous descriptions of agents, however, focused on how the user controlled agents with their own voice. Maya's explanation focuses on what the program does with its voice. The voice is active, and so is the agent. Briant similarly describes Siri:

> "Well, you hold the home button down, and a voice pops up saying, 'How can I help you?' And you talk to it. And it will answer you."

Both Maya and Briant perceive the voice of Siri as performing specific functions for the user including offering help and asking questions. The voice is its own entity within the interaction. The voice has agency, albeit limited agency.

Because it has agency, the voice also has a certain life-like aspect to it, but beyond that, the voice is nebulous. These descriptions of the agent overall do not attach specific traits, human or otherwise, to the voices. During other parts of my interviews with these participants, they identified limited traits in the agent's voice, namely that their agent is female and sounds artificial. Only one participant, Briant, had an image of what the voice may look like, a white female. Why the various traits of agent voices are not mentioned in the overall description of the program is not clear. Participants may not have added these other characteristics when describing the voice in the context of the program because they perceive the voice as representing an artificial entity, the device or program. There may be no need, then, to mention that the voice of or representing a digital entity is artificial because that should be a given in the context of the machine. But, further study is needed. What is clear is that the voice as described with the context of the program is vague.

10.3 Social Interactions

In describing digital social agents and what they can do, many participants refer to their interactions with the program or a voice; however, for some participants the interaction they have with the program is the primary defining factor of the agent. For example, Sabrina, who does not use social agents, describes Siri as "a voiced-based interaction" with a device. When asked to "Describe Google Voice Search" or "Explain Siri to a new user," several participants chose to describe the agent as an unfolding social interaction, instead of giving it a label such as "tool," "program," or "device."

These explanations focus on how the participants talk with the program, how the program responds, and what functions the agent performs. Alana describes Siri and what *she* can do:

> "Uh well, if you don't like typing out, uh, with your directions you can ask her, 'Hey, uh, where's the closest Starbucks?'... Um, she sometimes she can talk back to you, which would be kind of funny too."

Alana's description positions Siri as an alternative way of finding information, similar to other explanations we have discussed, but Alana's interaction with Siri is different because Siri is not just a thing responding to the user. Siri is an active participant in the conversation. S*he*, can also "talk back to you" and be funny.

Eleanor, who has witnessed others use Siri, describes the process of how a person can interact with the agent in more detail:

> "I would say, 'Andrea, what you do is you ask your device a question.' And then, um, it could be really any question like that you need to have information. For example, um, uh, 'Siri, tell me if there's any, uh, stores selling melons within the next mile.' And then she, the voice, you know the computer, would look that up and give you an answer, like couched in a person's, uh, identity. For example, 'I can't find that?' she might say. Or, 'I found such and such, such.'

Like other descriptions of agents, including those that position it as a tool, Alana and Eleanor position the agent as retrieving information for the user. However, the agent is more than a

programmed thing. In their hypothetical interactions, Alana and Eleanor talk to Siri as if it were a person. Siri can also perform tasks for users. *She*, a voice and computer wrapped up "in a person's identity," is a distinct interlocutor with agency.

While some participants detail hypothetical exchanges with the agent, other participants discuss the outcome of these interactions. In describing Siri, Beecher, a former Siri user, focuses on the quality of communication with Siri instead of what was said:

> "Um, Siri if, if she, when she understands what you're saying then Siri is very helpful. Other times if Siri doesn't understand what you're saying then it's, it's irritating, because you kind of have to keep saying it and then slow down. But Siri is, Siri's cool. Siri's really cool and helpful."

Similar to Alana and Eleanor, Beecher imbues Siri with agency. Siri is not a thing that responds to the user. It is a *she* who interacts with the user, can understand the user, and help the user out.

Descriptions that focus on interaction with the agent indirectly define the agent as an interlocutor. The examples presented here position agents as increasingly more social and with a greater degree of agency than the more nebulous descriptions of agents as voice. The agents not only are perceived as more social but also as more human-like. The agent is no longer an it, but a *she* with a specific gender. Furthermore the agent has a mind of its own with the ability to understand, or not understand, or look up information. These conceptualizations are of the agent as a social entity, and some of these social entities even have human-like qualities.

10.4 <u>Personal Assistants</u>

Some participants think of digital social agents as more than interlocutors and conceptualize them as entities occupying social roles normally reserved for humans. These descriptions often incorporate similes that draw a connection between digital and human workers. The most common descriptions for agents falling into this category are variations on the term "assistant" as it refers to a type of professional occupation i.e. personal or executive

assistant. Dane, who occasionally uses Siri, refers to it is as "just like a secretary for me," while Curtis who has only seen Siri used by others, identifies it as a "personal assistant with a woman's voice." As we have discussed, Priscilla thinks of Siri as "kind of like your little phone assistant."

These descriptions of digital agents, particularly the use of the term assistant, reflect the design of the agent as well as how agents are marketed and discussed in the media. Siri, for example, is billed by Apple as an "intelligent personal assistant." But participants' perceptions of agents also are built around how the agent communicates with users and what it does for users. Many of the participants who describe agents as assistants point to the agent's ability to respond to user requests for information. For example, Curtis states:

> "You ask your personal assistant, um, things that you would want to know, and then it answers you with I think a list of different things."

Justin, who previously used Siri, offers a similar explanation for why he thinks of Siri as "kind of a digital assistant":

> "Just hold down the button and say whatever you want, and it can, you know, depending on what it is, it will pull it up and do it for you or go track it down on the Web or tell you it can't do it."

Both Curtis and Justin position Siri as an entity that is meant to help the user. In their descriptions of the agent, the primary "job" of the assistant is answer user questions and find information on behalf of the user.

In addition to looking up information, the agent also performs other functions for the user. Dane considers Siri to be a secretary because it not only finds information for him but also helps him schedule and control his time via an iPhone:

> "Actually my calendar is there. So, she can talk to me or he can talk to me and giving some reminder of when I first open that in the morning… Well, it's going to plan: what's the plan for the day and well, kind, of reminding."

Similar to a flesh-and-blood secretary, Siri has the capability to help Dane coordinate his daily activities and then remind Dane of his schedule. The vocal interaction between Dane and Siri also has the potential to mimic how Dane and a human assistant may interact with one another..

Participants who describe agents as assistants recognize that the programs communicate in ways similar to human assistants and perform tasks analogous to their human counterparts. The agents are perceived as a specific type of social entity replicated after humans, and, as such, have a great degree of agency. Yet, the degree to which the agents are human-like beyond their social role varies. Some users, such as Curtis, Dane, and Priscilla, heavily anthropomorphize agents describing them not only as assistants but also assigning other human-like characteristics to them, namely gender. Other participants, such as Justin, consider agents to be "digital assistants" that carry out tasks in an artificial environment and are digital in nature. Both conceptions focus on the technology as a social entity, but one entity is more of a social being while the other, to borrow from an earlier concept, is a social thing.

10.5 Tools and Beings at Our Service

Our assessment of the personal front with humans includes taking into account our relationship with others (Goffman 1959), and, similarly, our understanding of the artificial front also includes who the agent is in relation to us. Participants' descriptions of digital agents in the preceding discussion provide insight into what, or who, agents are to us as a program. Conceptualizations of agents as tools situate the programs as things we use to accomplish a task. As we have discussed, from this perspective, agents, despite their name, have little-to-no agency. An agent as a voice, an interaction, or an assistant, takes the form of an interlocutor, a communication partner with which we can interact. These descriptions situate agents as a separate entity from users, as either a social being or social thing. However, the one aspect that

does not change in participants' relationship with machines across any category is the control they exert over machines.

Elsewhere I have argued that the design, function, and marketing of digital social agents, specifically Siri, seemingly places us in a position of power over the agent (Guzman, under review). I will not repeat the entire argument here but will briefly discuss key aspects as it relates to participants' descriptions of the programs. The heuristic of the assistant that is baked into the design of the agent and publicly promoted by technology companies situates the users and programs in a simulated employer-employee relationship. Within this relationship, the program, or the assistant, does work for the user. Some of the participants in this study picked up on this heuristic and adopted this conceptualization of agents, describing them as secretaries or assistants. The power dynamic in this social arrangement is skewed toward the user, even though the agent is positioned as its own entity.

This relationship is reinforced further by how we communicate with the program. In participants' descriptions of interactions with the programs, a pattern emerges in who speaks to whom first and who carries out the work. Conversations with agents center around participants' needs. They make a request of the agent, or tell it what to do, and the agent replies back to us or carries out the task. The agent does not initiate conversation. In the interactions described by participants, we are the ones that control the flow of conversation. The agent waits to be spoken to, to be directed. To revisit Lillian's explanation in a relationship context: "you give it a command and it performs it." Unlike real-world assistants who have agency and autonomy, at least to a degree, the autonomy of digital social agents is severely limited.

Eleanor, who details a user request for Siri above, notes this power differential between agent and user and refers to Siri later in our discussion as a "technology slave." Eleanor explains

this perception is built upon Siri's gender as a female because "women have been more in that [subservient] role than men, at least in this society." Beyond societal perceptions of gender, Eleanor cites how we interact with Siri and how it functions as reasons why she are perceives Siri as a slave:

> "Because she has to do what you tell her to do. She's just, I mean you say, 'I want such and such.' And she says, 'Okay, I'll go get it for you. Here it is.'"

To Eleanor, Siri is a servant be virtue of its gender, its function, and its communication with users. Although Eleanor recognizes that Siri takes the form of a type of digital slave and other participants refer to agents as assistants or tools, most people do not specifically mention the power dynamic between them and the agent. It is inferred through how participants talk about the program and the roles they assign to agents. Still as tools, assistants, interlocutors, or slaves, digital social agents are perceived by participants as things and entities that work for users.

10.6 Congruence and Contradiction

In previous chapters, I have discussed how participants' perceptions of agents can shift from one moment to the next or even contradict one another, a trend that continues here. Participants' descriptions of agents sometimes span several of the agent categories I just described or even bounce from one extreme, agents as tools, to the other, agents as social beings. During my conversation with Paula about her use of Siri, Paula's descriptions of Siri vary, offering what appear to be opposite perspectives of Siri. When asked to describe Siri, Paula states:

> "Um, I'd say that it's a voice-recognition based, uh, software that takes your inquiries and is able to intelligently rather very well impressively, um, search through various, um, maps depending on key words and phrases that it picks up. Um, it can recognize, um, questions, um, such as, 'Can you tell me where?' And it will look for locations and it's nicely able to narrow down things… And it's a time saver, and it's really helpful."

Based on this description of Siri, Paula's conception of the program is that of an intelligent tool. Siri is a thing, a piece of software, that allows the user to save time while completing a task, but it also has limited agency. During other parts of my interview, however, Paula heavily anthropomorphizes the program. Paula is one of the participants who imagine Siri to be life-like: Siri's a friendly, white woman with hair possibly like Paula's. As we are finishing the discussion of Siri's image, Paula, who I am interviewing in a public library, returns to my earlier question regarding the program overall:

> "But after I just finished saying what I did a moment ago, and I don't, I don't know if it's because we're in the library. But I mean, it's almost like a librarian, a friendly librarian. Because she has a wealth of knowledge at her hands that she can pull up from at any time. Um, and it's not such a stingy environment that you don't feel like you can go up and ask a resource or reference person for their help in locating something or tracking something down. And they're, every librarian I've ever met has always been incredibly friendly and approachable, so um, maybe that. And I'm sorry I jumped backwards a little bit."

This description provides a different take on Siri. Siri is no longer an intelligent tool; *she* is a social entity in a specific role with a personality and a gender. Paula provides us with what appear to be different perspectives of Siri: agent as smart tool and agent as human-like entity. The argument could be made that Paula's perceptions of Siri are not that different because both imbue the agent with life-like characteristics, and both descriptions focus on the agents' level of intelligence. The second description could be viewed as an extension of the first description; however, a piece of software and a female librarian still are seemingly two different entities. The question is why these contradictions exist, and the answer may be in what Paula and I were discussing when Paula offers conflicting accounts of Siri.

Paula's first shift in her description of Siri did not occur with the librarian comment, but with the image of Siri. Paula went from describing a program, a thing, to describing a highly detailed image of a woman. It was on the tail-end of the discussion of Siri as a woman and its

personality that Paula offers up the librarian explanation. Our discussion then turns to presence, in which Paula wonders aloud whether Siri has a human behind it, and following on that train of thought, arrives at a discussion of artificial intelligence. As we move away from our discussion of the image of Siri, Paula returns to referring to Siri as an it, and all personification falls away. At the end of the interview, Paula refers to Siri as a tool four different times in short succession.

The anomaly in Paula's description of Siri appears to center around Paula's image of Siri. Why the switch? The agent's voice. Paula has a bachelor's degree in theatre, and part of her education involved learning to read voices and how to manipulate them to produce different sounds. In her explanation of the mental image she has of Siri, Paula refers to both her voice training and how Siri sounds. In Siri's voice, Paula recognizes human or human-like elements. During this part of our conversation, Paula is focused on Siri's voice as it relates to what Siri looks like. At the same time, Paula and I are sitting in a public library, as she notes in her response, where we both are observing librarians moving around us. When Paula's attention turns away from Siri the voice or Siri the image to Siri the program, Siri again becomes a thing. Paula now is focusing on other aspects of the program, namely its mechanical nature. As with Julian' dueling images of S-Voice, a woman associated with the voice versus a digital screen associated with the program, we see in Paula a shift in perception of the agent based on whether she is focusing on the program (machine) versus the voice (human). Julian and Paula both recognize human and machine-like traits and attributes in programs, as do the majority of other participants who describe agents with varying levels of human and machine characteristics.

10.7 Rise of the Machine

Participants' descriptions of agents stress different aspects of the programs. Some participants focus on the mechanical attributes of agents and conceptualize them as nothing more

than tools, or things. From this perspective, digital agents are of the same class as a whole host of other technologies. Agents are just other things. Other people hone in on the agent's voice that can represent the device or a more life-like, but nebulous entity. Participants also perceive agents as interlocutors garbed in human-like traits, engaging in conversation with users and even assign agents social roles that, until now, have been predominantly associated with humans. The communicative aspects of agents – the voice that serves as a channel in some contexts and an interlocutor in others, the way people talk to the program, and the way it responds – are all important factors in people's varying perceptions of agents.

If we compare participants' perceptions of programs as a whole versus their conceptualizations of voice, we are presented with a whole new perspective on agents. Some people perceive agent voices to be entirely human, some people think they are entirely mechanical, and some people recognize aspects of both humans and machines within agent voices. Similarly, participants' images of digital agents range from humans with specific racial and gender traits to floating numbers. Perceptions of both voice and image have distinct human and machine categories. When we look at people's descriptions of agents as a whole, the category of the machine is strongly represented. The human-like qualities are stripped out to the extent that agents lose their agency; they do not even take the form of androids. Within the remaining categories of people's perceptions of agents, we still see remnants of human-like attributes, and in some cases they can still be fairly pronounced, but there is not digital social agent that a participant will say is actually human.

Now, this observation that people do not think of machines as human probably reads as an unnecessary statement of the obvious, but it is important to how we conceptualize and make sense of agents. Although people may identify an agent's voice belonging to a specific human,

such as the voice actor behind Siri, and visualize the agent as an actual middle-aged white woman living in the Midwest that we know, the agent in its totality retains its mechanical nature. Still, the life that accompanies voice has not been completely lost for most participants. The agent may not be entirely human or even have a gender, but it can still be social. As Turkle (1984) argues, evocative objects, such as agents, challenge more than the boundary line between two entities. They also change our core understanding of the entities that fall on either side of that line. In this aspect, the machine that comes to the fore in our overall perceptions of agents is not of the same nature that it once was. I will discuss more about the shifting nature of machines and humans in a later chapter, but the prominence of the technological aspects of machines warrants closer analysis. In the next section, I explore how we make sense of digital social agents as technologies within the context of our everyday lives.

PART III: OUR LIVES WITH DIGITAL SOCIAL AGENTS

In the preceding chapters, we explored participants' conceptualizations of digital social agents as things or social entities in the context of the artificial front. These discussions focused on the perceived identity of agents. In the following chapters, we turn our attention toward exploring the nature of digital social agents within the context of participants' everyday lives. These sections will address people's perceptions of the process of communicating with machines and the integration or rejection of digital social agents into our daily routines. Finally, we will turn our attention from agents back to ourselves to understand who we are in light of them.

11. THE AWESOME WEIRDNESS OF SPEAKING WITH MACHINES

11.1 Awesome Impressions

When I ask participants to recall their first experience with a digital social agent, the majority of users and non-users report a similar reaction: they were in awe. Molly, who now is a heavy Siri user, describes her initial encounter:

> "I don't want to say shocking, but more of like surprise like, 'Wow! This is where technology has come to at this point."

Luke, who daily uses Google Voice Search, also reports being wowed: "Yeah, that was a trip ... Kind of blows you away." Multiple participants thought of digital agents as "amazing" and "cool" the first time they spoke with them or saw the programs in use because of the agents' advanced communication abilities. Agents talk and interact with users in a way starkly different from most technologies people had previously encountered, such as GPS devices and applications or automated phone-answering systems.

Some users were surprised that they could speak with a device and that the voice would respond in an intelligible way. Gloria, who has experienced Siri via others, describes her initial reaction: "I was thinking how far technology had come. It's amazing being able to talk, have a machine talk back to you." Dane, an occasional Siri user, also explains that he thought of Siri as "quite cool" because "you can have the interaction with the computer, and it's through the voice." Participants such as Gloria and Dane were "amazed" that they could speak to a device and have it speak back.

Other participants report that the most impressive aspect of agents was not their vocal capabilities, which users still perceived as cool, but the depth and breadth of the programs' responses. People were impressed by the agent's ability to interpret the user's request and respond in-kind. Participants also reported that they were surprised with just how much

information agents could provide and how well the agent could respond to unusual off-the-wall requests. Kyle, who has used Siri with a friend, recounts how his initial reaction to Siri shifts from amusement when joking with the agent to amazement at its accuracy:

> "At first you know it was, uh, I found it humorous. But then we started asking it, you know, actual questions about you know, DNA and what is DNA and things like that. You know, I mean it was actually giving us back feedback. You know, it was like, 'Wow, this is pretty hip.'"

What is so "hip" initially about agents for most users is that the programs communicate in human-like ways by interacting via speech and responding in sophisticated ways to users.

11.2 Weird Encounters (of the agent kind)

Agents are awesome, at least initially, because they offer us a new way of interacting with digital devices and they communicate with us in novel ways. But what leaves most participants with a sense of wonder at the voices emanating from machines also elicits a response from users that something is not quite right about the programs and how we interact with them. Some participants refer to agents and their interactions with them, both initially and ongoing, as "weird" or, to a lesser degree, "creepy." People's perceptions of a life-like or human-like technology as creepy or weird are not unusual in robot and computer design. This point where a technology is perceived as so human-like that it becomes uncomfortable is referred to as the uncanny valley (Mori, 2012); however, the uncanny valley, the over-anthropomorphized design of the agent, likely is not the reason, or, at least the only reason, for participants' perceptions of "weirdness." While participants may recognize human aspects in digital voices, they do not describe the voices themselves as creepy; in fact, they usually describe the voices as just the opposite. The weirdness of the agents also does not turn away users as is predicted by the uncanny valley. Some of the heaviest users of agents perceive them or aspects of them as weird, including Eva who refers to Siri as both cool and weird. The weirdness of agents, according to

participants, is the process of communicating with them and the context in which we communicate with them.

For some participants, just talking to a machine and having it respond back is weird. Aki, an occasional Siri user, explains that it is "weird to talk to a phone," a thing with a human voice. Leslie, who has observed a friend use Google Voice Search, also finds it odd to swipe out humans for machines in conversation:

> "It was kind of weird only because I feel like communication should be between people instead of robots."

Other users explain that the weirdness in their conversations with agents arises based on the feedback or the message the program is sending to the user as well as how the agent is delivering it. Priscilla, who relies on Siri to coordinate her life, reports that "…when it starts joking with me, I'm like 'That's kind of weird.' Like a little person in my phone." Just as some people, perceive the ability to talk as a human trait, others think of joking as a human quality. The depth with which agents can understand user requests and respond to them also is weird for participants such as Carlie. Carlie, who has watched her mom use Siri, explains the program is weird in "how that obviously it knows what you're saying and can deliver information you want."

When agents step into these human-like roles or send nuanced messages, the user has to reconcile what the agent is saying and doing with its status as a machine (and this also applies to the initial awesomeness of the machine). Turkle (1984) also has documented how specific actions by a machine force us to think about the machine itself and what it is. When the agent catches us "off-guard," it makes its presence known, in the sense of presence that Ong (1967) and Goffman (1959) speak of. We then have to turn our attention toward the agent, even if it is for a few seconds.

In its survey of how people use voice-activated search features, including Siri, Cortana and Google Voice Search, Google (2014) found that less than a quarter of adults will speak to their devices in front of others. Multiple participants in this study also report that they are fine with using the digital social agent in private, but when the context changes from a private to a public space, the interaction becomes weird for both participants and observers. Luke has Google Voice Search and interacts with it routinely, but the one place he will not use it is in front of others because he is "afraid to":

> R: It's just weird. It's just weird, and I feel lazy, uh, when I, when I'm doing, like doing something by voice, um, instead of typing it. My wife will send text messages by talking to the phone, which is a phone call…but she has no shame. She does, she'll be walking down the sidewalk just talking messages into her phone. But I don't know, it's just, I haven't become that comfortable with it. Like around other people I think I'd look crazy or something.
>
> I: Why do you think? So you used the word "weird," and you used the word "crazy". Why is it weird, and why is it crazy?
>
> R: Because you're talking to something that isn't human. Even a pet or an animal, you know, can understand you or you can interact with it. You know, and it wags its tail or something. And even though you do get a response from this it's, it's a new dynamic and uh, you know, if I were younger or if this were introduced to me at a younger age, I think it would feel more organic. But as it stands that's not the case.
>
> I: And so when you said, so it's because you're talking to other things. So are you afraid people are going to judge you or you just don't even just want to do it front of?
>
> R: Yeah, maybe it's the judgment. Maybe it's a little bit of the judgment. You know, like I don't know. I don't know. I can't put my finger on it.

The reason for Luke's feeling of weirdness associated with using digital social agents in public is that Luke is talking with a thing instead of a living entity. Luke's explanation of why he does not use Google Voice Search in public involves more than weirdness. Luke perceives talking to an agent in front of others as something people will judge him for, and, whether or not Luke realizes

it, it is something he judges his wife for doing. Luke not only thinks of interacting with agents in public as weird but also as socially unacceptable. It is something for which people, such as his wife, probably should feel at least a little bit of shame.

Nicholas shares a similar opinion regarding the use of agents in public, but his perspective is that of the observer. Nicholas has Google Voice Search on his phone but hasn't turned on the option to allow the agent to talk to him. Nicholas explains that he prefers that the agent does not speak to him, particularly when he is using his phone in public:

> "I do find, like, find it weird when people talk to their phone out in public. So, I don't know. It's just, like, sometimes it's weird to see a conversation going on between, you know, a person and Siri. So I guess, you know, I prefer to just like, uh, just type it out on my screen if I need to use it."

Similar to Luke, Nicholas thinks that interacting with an agent in front of others is weird, and so he avoids it. But Nicholas also provides us an alternative way of interacting with the phone in public, via text. Sabrina, who has experienced Siri via others, also discusses when interacting with a device in public is weird or not:

> "I don't know, I just think it's weird like if you're walking around and you talk to your phone. Like just click on it, and it's there, and it's not weird. You know, like say you, so if I need to make a phone call and I just start talking to my phone in the middle of a bunch of people that would be weird."

From Nicholas and Sabrina's explanations, it is clear the weirdness is attributed to the user talking to the agent in public. Use of a phone in public is fine, as long as it is a text-based interaction, but vocally communicating with a thing in front of other people is just weird.

11.3 <u>Awesome Weirdness</u>

If we compare people's perceptions of the awesomeness of agents to their weirdness, we can see similar patterns emerge as to why digital agents are awesome and weird. Some people are amazed that they can speak directly with a device and have it understand them while others

perceive substituting a device for a human in communication to be strange. An agent's ability to understand and respond to complex questions and requests is cool for some users but raises questions in the minds of others. The aspect of digital agents casting them as either weird or awesome is their ability to communicate. The question, then, is what is it about communication that places it at the center of this dichotomy. Part of the answer can be found in both Nicholas and Sabrina's explanation of the weirdness of using machines in public: texting with devices is normal and acceptable, speaking with them is not. We have different perceptions of speaking with machines than typing with them. It is the mode of communication with the machine, oral versus written, that casts the interaction as either cool or odd (or both). The ability of the agent to understand participants and respond to them intelligently, the message, also is an integral part of this awesome weirdness. Both the mode with which we communicate with machines and the agent's message are critical aspects of how we perceive agents and, even more importantly, how people integrate digital social agents into their life, if at all.

11.4 Typing is for Machines

Communication technologies are more than media — electronic, digital, or otherwise — through which we send and receive messages. Their form and function are an integral aspect of how the world around us is shaped and how we perceive that world (Innis, 2007, 2008; McLuhan, 2011; Ong, 1967). When the Western world transitioned from an oral to a literate culture, the way we experienced the world around us shifted from a reliance on the sense of hearing to a reliance on the sense of sight, and what became important to us, and the arbiter of knowledge, was whether we could see something in writing (Innis, 2008; McLuhan, 2011). We are so enraptured in this bias that we often do not recognize it as McLuhan (1994) has argued, "For any medium has the power of imposing its own assumptions on the unwary" (p. 15). Our

communication with other people is shaped by the technology we use to the degree that its affordances and limitations become the norm for how we communicate with others. For example, the mobile phone that was once a medium of oral communication has now become a medium of text-based communication between two or more people (Farley, 2005; Snowden, 2007). We now expect people to interact with us via text on our phones, and may even become annoyed when someone tries to call us. Although, to hear a human voice and occasionally use the phone to speak with people is not weird or, entirely, unusual. When we communicate orally, either in-person or via a medium, we usually are interacting with another human.

The medium and mode through which we interact with machines also has had a profound effect on how we perceive communication directly with machines. Unlike our interaction with humans that began as oral communication focused on a sense of sound and then transitioned to a sense of sight (Innis, 2008; McLuhan, 2011; Ong, 1967), communication with machines has followed a different transition. Initial interaction with mechanical computers was haptic and visual; workers manipulated gears and read the results off of dials and, later, punch cards. With digital computers the visual became even more important: We developed a language, or groups of languages, for programming machines, and users eventually could interact with machines themselves through a system of icons and text provided by graphical user interfaces. The haptic, for a while, receded into the background. In interacting via text or icon with a machine, we still had to touch the keys or manipulate a mouse, but our focus was on the words we were imputing or the icons we were clicking. As Manovich (1995) argues, it is through the screen, a visual apparatus, that we access information produced by computers. More recently, the haptic aspects of human-machine communication have become more important with the introduction and increasingly widespread distribution of touchscreens on mobile phones, laptops, and tablets.

Even when we are touching computers, however, our focus is still on what we are touching, the *screen*. As Verhoeff (2009) explains, "The haptic element of touch screens primarily meant for viewing reflects the notion – and action – of viewing itself" (p. 213).

The primary modes with which we interact with machines have been visual and haptic. In my observations of people interacting with their technologies in public spaces, I saw people typing and touching, scrolling and clicking. The visual and haptic patterns of human-machine communication that preceded the development of voice-based technologies and remain dominant, as I will demonstrate, are important because they are the norms against which speaking with machines are measured. It is because speaking with machines and having them answer in intelligent ways diverges from our usual form of communication with machines that we perceive oral communication with machines to be awesome and weird. It is within this context in which visual and haptic communication with machines is privileged that participants make their decisions regarding whether or not to use digital social agents and how to use them.

11.4.1 Old-Fashioned Googling

Several participants stated that they do not use digital social agents or use them only in a limited capacity because they prefer to type their inquiries into the device or the internet directly. Some of these users describe themselves as "old-fashioned" when it comes to interacting with voice-based technologies. Angela explains why she does not use an agent by juxtaposing herself against her friend who uses Google Voice Search:

> "No, I just know about it [the agent]. And plus my friends, some of my, one of my friends always Googles everything. He speaks into it preferring not to type. I prefer to type. I'm old-fashioned."

Connor, who does not use any digital agents but has seen friends use them, says he avoids the programs because he does not find them efficient and effective. When I ask Connor what a better way of interacting with the phone is, Connor replies:

> "Well, me I just do everything manually. I just search … type words, numbers, symbols and then just go about searching everything, you know, just uh, the regular, more old-fashioned way I guess."

Both Angela and Connor see themselves as old-fashioned when it comes to interacting with machines because they prefer to text and type instead of speak. Their remarks are not only judgments about interacting with agents but also a reflection of the Self. In the context of interacting with voice-based technologies they see of themselves as behind what others are doing. Their perception of themselves as old-fashioned does not necessarily mean that they lack experience with technology generally, however. Angela, for example, is a project manager in an IT department and considers herself to be technologically proficient. It is within the context of interacting with the agent that they are old-fashioned.

Participants' descriptions of themselves as "old-fashioned" for preferring to communicate via text with a device reflect their perceptions of machine communication, past and present. By equating text-based interactions with machines to being "old-fashioned," participants are referring to this human-computer interaction as a type of past practice. The phrase colloquially has the meaning of something that is not only old but also out-of-date. In fact, Naomi, who uses Google Voice Search and Siri on a very limited basis, states that "I'm archaic" because she does not speak with her phone and iPad more. By situating typing with machines in the past, these participants also locate the practice of speaking with machines in the present. If people are old-fashioned for texting, then they are contemporary for using voice. The practice of texting is one

that is no longer the norm, otherwise it would not be old-fashioned, and so, speaking with machines is situated as the new norm for interacting with devices.

11.4.2 High-Tech Gimmick

Other participants do not use digital social agents or use them less because they do not see the need for the programs. Some participants perceive digital social agents to be "gimmicks" or superfluous technologies. Patricia, who avoids voice-based programs, explains that Siri is "… something that, it became a kind of gimmick. A marketing device that, um, Apple has worked very well with." Lillian, who occasionally uses Siri, partially shares Patricia's opinion of Siri. Unlike the majority of participants who were initially "wowed" by digital social agents, Lillian first's reaction to Siri was that it "seemed like a gimmick." Lillian's perception of Siri is based on its lack of utility in her life:

> "Since like it seemed, like, we had all of the resources, so much going on on the phone already. It's just a cool technological thing. And it didn't really seem like it would expedite the process to do much of anything really. Although, I guess, sorry, now that I'm second-guessing all of my things, if you don't want to be, like, looking at your phone while you're driving or whatever. It just might be easier to just talk. I know some people hook their phones up to their car, so it like talks through that. So, maybe that. I don't do that. So, it doesn't serve me any purpose, but maybe for some people it does."

Lillian thinks of Siri as just one of the technological bells-and-whistles built into phones that is not practical, at least for her. Lillian explains later in the interview that she does not use voice-based applications because "it's just easier for me to just Google it by myself then to say something." For Lillian, Siri may do some cool stuff, and possibly be of limited use to others, but it cannot improve upon the way she already interacts with her iPhone.

Trevor does not go as far to call Siri a gimmick, but he also does not think the program, or a multitude of other emerging technologies, are necessary. Trevor explains that he did think that Siri was cool when he first experienced the program – "for like, maybe, the first 30

seconds." After that, Trevor came to the conclusion that he had no use for the technology. Trevor said he does not use voiced-based programs because they cannot offer him anything that he cannot already do by himself:

> "It wasn't for me. You know what, give me that old, traditional. I'm gonna do a manual search. Turn it on. I can dial. I can select. I can do any command that I really want to do. I don't need. Command-wise I mean, it's great, but what is it really for?"

Similar to Lillian and Patricia, Trevor does not see the point of the technology when typing in requests works well, and similar to participants who perceive themselves as old-fashioned, Trevor does not stray from what has worked in the past. In fact, for Trevor, Siri and voice-based technology are the stuff of the future: Trevor explains that "unless you're George Jetson, that's, it's just, 'no,'" to using the technology. Trevor, then, perceives Siri and voice-based technologies to be futuristic and unnecessary in the modern world where traditional methods of human-computer interaction still serve a purpose.

11.4.3 Learning to Speak with Machines

The shift from typing a request, clicking a file, and tapping an icon to interact with a machine to talking to it involves an adjustment period, according to participants. People have to learn how to use the technology, and, for several participants, having the opportunity to learn how to use the program or being diligent in learning the program is a barrier to use. Bridget is 85 and uses multiple technologies to stay in touch with family and friends and in her work with the Arts. Bridget thinks that agents, such as Siri, could be useful to her, but she has not used the program yet because no one has showed her how. Other participants, such as Samuel, report that they know the basics of the technology but do not use it or use it more because they have not put in the effort to adjust to it:

> "It's just not a go-to thing for me. To me I'm more comfortable with doing the Google Search Engine or something like that. I'm sure it's just my own idiosyncrasies and lack of using it. I think I probably if I got used to using it, you know."

Samuel, who is 64, does not use Siri more for two reasons: first, Samuel can carry out any task he would use Siri for by typing it into Google and, second, because there is no need to learn Siri, he has not put in the time or effort. Bridget and Samuel are both older, but, their lack of knowledge of agents is not necessarily a function of age. Both participants each own an iPhone, tablet, and other computer, and rate themselves as technologically proficient. In fact, other participants of multiple ages report having to get used to the technology.

One of the biggest transitions for participants is just finding a use for the technology or remembering that their device is equipped with the agent. Although most participants report that they thought of agents as cool and amazing the first time they encountered them, participants also report that they did not start using the technologies on a regular basis for varying amounts of time from almost right away to years later. Beecher, who is 20 and has used Siri frequently, explains it took him several months to find a purpose for it:

> "Yeah, it developed over time. At first when I pretty much first got the phone, and I learned about Siri I was like, 'Oh, this is kind of funny. This is cool.' Then, uh, it wasn't until like maybe a month or two after I had the phone that like I realized that I could actually use her for real-life things."

Beecher's account of joking or playing around with an agent shortly after encountering it for the first time is not unusual. Because most participants had not experienced speaking with a device on such a sophisticated scale, they tested the technology's life-like limits and purposely sought out the "Easter eggs." It was after joking around with the device, trying it out, that participants found or didn't find more of an everyday use. Nelson is a 23-year-old Siri user, and Nelson's transition to using the device has consisted of multiple phases:

I: How long did it take for you to get used to Siri?

R: Uh, not too long. I don't know, pretty quick.

I: And did you start using it right away or did you like play around?

R: Uh, not really. Yeah.

I: So you played, maybe played around with it, and then how did you, I guess, start to use it? You know, how did it kind of work its way in?

R: Uh, I stopped using it for a while. And then I kind of just. Well, I don't really use it to ask questions…It's really helpful if like when you want to go somewhere and you just say, "Find, you know, X."

I: So you stopped for questions.

R: I didn't find it really helpful like when you're just searching for the internet. It's almost easier to just do it yourself I guess.

I: Is that why you initially stopped using it?

R: Yeah.

I: And then you found the other functions and started using it?

R: Yeah.

In Nelson's account, we see how Nelson acclimates to the technology. Nelson plays with Siri at first, then stops using it. Nelson tried asking questions, but found the usual way of interacting with machines, typing, was more effective, and stopped again. Then he found a use for it in finding locations and getting directions. Nelson's acclimation to the agent is not immediate and not consistent. Because speaking to agents is a novel form of communication, the incorporation of agents into our lives involves a process of learning how to use the agent and what the agent can be used for. Some people never make it past the first barrier, preferring to stick with typing, while others may experience a short or prolonged transition of integrating agents into their lives.

11.4.4 Life On-The-Go

Most people who used or experienced digital social agents in this study interacted with an agent tied to a mobile device, either a smartphone or a tablet. Many of the uses participants identified for agents closely align with how people generally use their mobile phones. For example, smartphone users report relying on their phones for navigation (A. Smith, 2015), and participants in this study also state that they turn to agents to help them get where they are going. Google's (2014) study also found that voice search users across multiple devices use the feature for multi-tasking, a finding repeated here. Participants who use digital social agents, occasionally or regularly, report that they turn to agents primarily when they are moving throughout their daily routines. Eva, a journalist who uses Siri to place calls to other people, explains why users employ digital social agents to carry out these routine tasks with mobile devices:

> "It's just easier instead of going through all my contact lists and everything and trying to find it when I'm on-the-go. I just hold it down and do that."

Mobile phones offer people the ability to perform a variety of tasks from any location that has a signal or data coverage. But the one downfall to the efficiency of mobile phones is that we have to interact with them visually and haptically. Walking and driving can be difficult and, in fact, deadly while attending to mobile phone screens. As Eva points out, with Siri and other digital agents, the user only has to press one button or, with some agents, just start speaking.

Participants report that they primarily turn to agents in mobile devices when they cannot type information into the phone or look at it. Nelson, a Siri user explains:

> "Well, let's say like if you're driving or other things that's supposed to be hands free. So that's kind of more influenced on why I use it now."

Similar to Nelson, most participants report that they use an agent while driving or, for non-users, think that agents would be most helpful for drivers. Part of people's reliance on agents in a vehicle may be attributable to where people in this study live, a state that recently passed legislation requiring all mobile phone use in vehicles to be hands-free. Agents are more than a convenience while driving; they are some people's only option for using their mobile phones on-the-go. Overall, people turn to agents in mobile contexts because voice-based communication is more efficient than visual and tactile interaction with the device or the programs are the only way people can use their device when their hands or eyes are otherwise occupied. The digital social agent then addresses a shortcoming in the design of text-based technologies.

11.4.5 Convenient Laziness

While some participants perceive digital social agents as being useful only in hands-free or mobile contexts, other people turn to the programs for a variety of different functions. They claim that they use Google Voice Search or Siri because speaking with a phone is more convenient than the "old-fashioned alternative" of typing information in. Jayden explains that Siri "helps me get what I'm trying to do done faster without having to look at it." Some of this ease of use still is limited to specific contexts. For example, Naomi only uses Google Voice Search for looking up the weather:

> "...so for me looking up the weather that way is a lot simpler. Um, because the, the uh, temperatures just pop up as well, right there. And it's a lot easier than having to go to Weather.com or some other website. So that's, that's the reason why I do it. It's much quicker for me. That's the only reason why I use it."

Participants such as Naomi save themselves multiple steps by using agents for specific tasks. These steps saved include the time it would have taken to type in a request as well as the time and effort needed to navigate to a website and then filter through the information. The

convenience of digital social agents extends beyond the effort needed to type a search request. Still, for most other functions, these users prefer to do the work themselves.

Other participants, however, more fully integrate digital social agents into their lives because of an agent's convenience. When I asked Molly what she uses Siri for, Molly replies:

> "I would say everything. Any questions, instead of having to, you know, physically go into Google and have to type something in, I just, you know, press the button, 'Siri, tell me this, tell me that.' Um, directions, times."

Molly, who says it took her several months to adjust to Siri, finds speaking to her phone and having the agent do the work for her to be better than "physically" using it. Similarly Beecher used Siri for multiple tasks throughout his day until he recently switched phones:

> "It was probably like, it was, it was well over more than 30 times a day. Because I was, you know, you're walking, and you're like, 'Hey Siri, give me directions to my house, to my home or give me?' 'What is, who is Little Albert or something like?' You know, just regular, just asking her questions. It'll make it a lot easier as opposed to trying to go to Google and type something in. It just makes it easier."

Instead of executing each request and the steps required to fulfill it themselves, both Beecher and Molly have come to rely on Siri, turning to it to do the work for them. Multiple participants think of digital social agents as "just an alternative" way of interacting with the phone that may be more useful in some contexts. But for users like Beecher and Molly, it is the best way to find information or control their device. Oral communication with the phone has replaced or now rivals physical and haptic interaction. Furthermore, as Beecher states, the former ways of interacting with the device or finding information, typing in requests, are deemed less adequate or less desirable.

Some participants use a different term to describe the convenience of digital social agents: laziness. These users explain that they turn to the agent not because it is faster, necessarily, but because they are being lazy. Maya explains why she occasionally will use Siri:

> "Um, I use it to like find nearest maybe like, uh, shoe stores or things like that when I'm like too lazy to type it in or like the nearest Target or the nearest, you know, supermarket."

Maya and other participants who make similar statements are using lazy in a colloquial context. Here lazy means not putting forth as much effort by speaking into a phone instead of typing a request, but nothing is necessarily lost in this process, either. Maya's laziness can be understand as an alternative perspective on the convenience of agents because in both contexts people are making a choice to make a task easier. Still, referring to speaking to an agent instead of typing in a request as lazy offers a slightly different perspective on this type of action. Instead of being a better choice predicated on convenience, the decision to use a digital social agent is a lesser choice predicated on choosing the easy way out. In this context, digital social agents are perceived as an inferior form of communication with a device: typing is still the standard, speaking, the shortcut. Similar to people's perceptions of themselves as "old-fashioned," participants' self-descriptions of laziness also are a reflection of Self in the context of the machine. People see themselves as not putting in the effort they should be using the agent.

Digital social agents provide us with a new way of interacting with technology — through voice. But because of the novelty of oral communication with machines, we weigh this process against the older, more familiar practice of interacting with our phones visually and haptically. Against the norm of typing to interact with technology, some people do not perceive a need for this new form of communication and choose to stick with the "old-fashioned" method. Others think talking with phones is only necessary when the old standard of typing is deficient and does not work, such as hands-free contexts. However, some participants after a period of transition have begun to think of digital agents as more convenient alternative to previous forms of communication. Several participants even think of using agents as superior to typing in

requests and have integrated Google Voice Search, Siri, and S-Voice into their daily routines. In this study, fewer people report this reliance on vocal communication with agents, and most participants explain they use agents for limited tasks regularly or sporadically. They say that even when they have the option to speak to the phone, they will more than likely text. The use of digital social agents and oral communication with devices is becoming more prominent; however, visual and haptic interaction with technologies still dominates.

11.5 Meeting of the (Artificial & Biological) Minds

Our interaction with agents and how we perceive human-machine exchanges, as well as the digital interlocutors themselves, hinge on multiple aspects of the communication process working together. In the previous section, we discussed how a shift in the senses and faculties we use to communicate with machines is an important aspect of how we make sense of digital social agents and integrate these technologies into our lives. In addition to mode and medium, however, is the message conveyed in communication. Blumer (1969) argues that in order for two parties to reach an understanding in communication they must be able to take on the role of the other. Beyond sharing knowledge of the words or gestures being conveyed, the partners also must be of one mind regarding what those words and gestures mean within the context that they are being conveyed. The challenge of human-machine communication is to what extent humans and machines can be enough of the same "mind" to make sense of one another.

Before discussing our communication with digital social agents, I want to make clear that I am not arguing that agents or any voice-based technologies offered the first opportunity to *communicate* with machines. As Naomi, a study participant who has a bachelor's degree in journalism, explains during our conversation, "Even with computing, we're communicating with a device." And we have been communicating with machines for some time, but not recognized it

as such (Jones, 2014). As we have discussed, programmers communicate directly with machines through code, while users rely on typing in requests or clicking icons. This system has worked fairly well, from the user standpoint, because we have been able to indicate what we want from computers, and they have been able to respond visually but silently, except for the occasional chime or bleep.

Giving voice to machines brings with it an entirely new context for human-machine communication. Turkle (1984) and Suchman (2009) argue that people expect machines endowed with an identifiable human-like attribute to also possess other comparable traits. Following this argument, digital social agents present a communication context in which we will expect them to play the role we typically assign to humans. A critical aspect of that role is that they can understand us when we speak to them on our terms, and Turkle (1984, 2007) has documented that users' have varying perceptions on how well a digital entity can understand them. A digital social agent may have the best sounding voice in the world, but if it cannot process what we are saying and respond appropriately, it is of no use to us. In this section, I discuss participants' perceptions of how well agents understand them and the implications for the integration of agents into people's lives.

11.5.1 Miscommunication

Despite the sophistication of the artificial intelligence technology behind digital social agents, participants still routinely report problems with interacting with the agents. The degree to which humans and agents misunderstand one another and the ramifications of that misunderstanding vary. Several participants explain that they have tried digital agents but had less than productive encounters and stopped using them or rarely use them. For example, Angela does not use Siri "because she doesn't work. At least when I tried her, she didn't work for me. So

I just type everything in." Similar to Angela, other participants also refer to miscommunication as the agent "not working." This phrase equates the communication breakdown to a failure with the program. In fact, most participants who experience a communication problem with Siri or Google Voice Search blame it. Some participants will put the onus on themselves, to a degree, stating that they have not put forth the effort to learn how to talk to the agent. Alice explains why she does not use Google Voice Search on her phone:

> "I don't know, it's probably because I'm not used to it. It takes, it really takes me more time and thought, and sometimes you have to train with a device to understand. It's like when they started out where you could dictate, and it would learn your words. It doesn't always understand. It's easier for me to go to Google."

Alice admits she could try to learn to use the agent better, but because she has had misunderstandings with it in the past, as well as other technologies, she does not use the program. Both Angela and Alice, as well as other participants who try the program and decide to drop it, return back to using the method of communication they are most comfortable with and is the most productive: typing in commands.

HCI scholars have observed that people will interact with computers using communication conventions normally reserved for humans, such as politeness (Nass, 2004). But we also will let computers know when we are angry, and several participants in this study report hashing it out with an agent. We already have discussed Adam who refers to Siri as a "crazy lady," and he gives it this moniker because Siri and he do not always get along:

> "I found that Siri sometimes doesn't, can't understand me. Um, whether I'm just not speaking clearly or what I'm asking for is kind of strange. Um, so I often get upset with Siri."

Adam explains that he will get so frustrated with Siri to the point that he will swear at *her*, and, no, he does not apologize either. Adam leaves open the possibility that maybe he does not

understand Siri, but the program gets the brunt of the blame. Adam does not give up on the program, but he does use it less as a result of this failure to communicate. Most users report some sort of lack of understanding with the program or an instance in which an agent did not work, and these instances of miscommunication cause some people to not use the program or use it in limited ways while others report being temporarily frustrated.

11.5.2 Empty Dialogue

Other participants do not give digital social agents much of a try or a try at all because they do not like talking with computers, period. These participants report that they prefer instead to talk with humans because people can understand them, a technological device cannot. Kelly does not use digital social agents or even have a smartphone. Kelly does not have an interest in technology, and in her job as the director of a non-profit agency, can just have other people take care of technology for her. Kelly explains that in addition to her general disinterest in technology, she would not want to use digital social agents because of her negative experiences with digital voices and automated answering serves:

> "When I hear an electronic voice it triggers an automatically negative response. In that, 'Oh, gosh. Now I know I am not going to be able to have real communication with this company or this agency or whatever it is.' Without some form of like long distance, you know, investment of my time, you know, and energy."

Kelly perceives communication with a mechanical entity as subpar when compared to humans. When I ask her if she would change her mind if the voice represented a more sophisticated and intelligent machine, Kelly's opinion does not change:

> "You know, I don't think so. I like to talk to people... You know, I don't know what you can call it, but a computer that is able to somehow develop more of a sense of who you are, it's still not a human being with all human foils and human strengths and human interests and human passionism and human compassionism. You know, that to me is the really important part of any call, you know or any interaction."

The lack of understanding by machines goes beyond not "hearing" and processing a command correctly, such as substituting one homonym for another. This misunderstanding is much deeper and more personal. For Kelly, humans understand each other in unique ways because of their shared humanity. Blumer (1969) argues that communication hinges on each party being able to be of similar mind, but for Kelly, as well as several other participants who avoid agents purposefully, machines cannot take the role of a human because they lack the knowledge of what it is to be human.

11.5.3 Effective Communication

Although some people think that agents "don't work" or could never understand them, other users and non-users find the ability of agents to understand requests to be adequate, if not impressive. Some participants think of an agent as understanding them because it can process a spoken request and produce an intelligible response: Samuel, an occasional Siri user, explains that Siri initially amazed him because it "could understand me and also talk back in understandable terms." Rudy, who has used basic voice-based technologies, is impressed at Siri's natural language processing.

Other participants equate the agents' understanding with its ability to make sense of questions and answer them correctly and consistently. Curtis, who has only seen Siri used by others, discusses his first impression of the program:

> "I thought it was cool that, um, you know, you could ask her things, and then she'll bring up, you know, what the closest she thinks, and usually it's right on."

Briant, a heavy Siri user, also states that he found the program impressive because "it had a response for everything that we had to say and ask." These questions included asking Siri for information as well as making off-the-wall remarks to Siri. In fact, participants describes agents'

appropriate, and often funny, responses to odd comments or questions, such as "Where can I hide a body?" as both amazing and weird because of the level of understanding involved. When agents are responding to these questions or comments they are not just drawing factual knowledge from another source. These answers and comments require a specific level of cultural knowledge that is surprising to some users.

Some participants have conflicting opinions of an agents' advanced knowledge. Eva, a heavy Siri user, explains that in some ways it is sad and, other ways, awesome that we are approaching a point where we can have conversations with artificial entities and make complex requests of them:

> "You know, it's sad, but it's, um, crazy that she knows like how to respond and how to say that back and what to say, and if you're looking for a restaurant she knows exactly where to look and where you are. It's kind of crazy."

Eva is in awe of Siri's ability not only to understand her question but also to "know" her location and deliver a tailored response. The sadness and craziness that Eva speaks of is in reference to Siri's understanding of the question and its ability to take into consideration the same factors that a human would in making a decision about a restaurant. The machine has a human-like understanding of Eva's requests.

Some participants even think that their interactions with agents constitute communication. In my discussions with Naomi about Google Voice Search and Siri, Naomi actually uses the word "communicate" to refer to her interactions with the agents. This is unusual: Most people I spoke with did not use the term in the context of exchanging messages with an agent. To test if this word choice is purposeful, I ask Naomi if she considers her interactions with Siri, the agent we were speaking about at the time, to be communication:

> "Yeah, because she responds. I don't know. I don't know. It's not like she comes back with numbers or codes; She comes back in a language I understand. So, even

> though I'm sure there's a system of algorithms that get's her to translate what I'm saying and communicate the way I communicate."

Naomi thinks of herself as communicating with Siri because each party can understand one another. The program is able to take human language and translate it so that it can develop an answer. Agents know enough, understand enough, about humans to deliver an answer that can be understood to them.

But this understanding of users has its limits. While participants report that agents can provide information to them or carry out complex tasks, no one states that Google Voice Search, Siri, or S-Voice has an understanding of the user in an intimate sense. Most people do not perceive agents as delivering personalized information to them or knowing and understanding them in ways a human could. And users do not necessarily expect or want this behavior out of the agent – having agents consistently find the nearest McDonald's or respond to questions about HAL 9000 can be weird enough.

11.5.4 Artificial Communication

Digital social agents are programmed to respond to people as if they were human, but several participants explained that they consider these human-like responses to be a fictional front for the technology. Leslie, who does not use digital social agents, argues that machines "can't really understand you" in the sense that their ability to know us or appear to know and understand humans is an "illusion." Unlike Kelly and similar participants who think that agents and technology cannot understand humans enough to communicate or communicate well, these participants think that we can exchange information with machines but that these interactions are not genuine.

Justin, an occasional Siri user, explains why our interactions with machines do not involve real understanding between the parties. In addition to asking people questions regarding

agents, I also asked participants to explain the difference between humans and computers or humans and digital social agents. Justin identifies the ability of humans to have and feel emotions as one of the dividing lines between the two entities:

> R: Right, because again it goes back to the problem with AI just not having feelings. It doesn't necessarily, it knows what it's doing, but it might not necessarily. It might realize the impact in some sort of way, but not the impact of anything with, you know, one way or the other. It's just there.
>
> I: Now, you said computers don't have emotions, but Siri shows emotion, so?
>
> R: And yeah, it does because it's programmed in a way that the voice is inflected, you know. That was some(thing) that they recorded as like, "Okay, you're going to do this."
>
> I: So they have emotions, but they're not the same as humans?
>
> R: I guess it's perceived emotion because uh, you know, that person's voice is a real person's voice that, um, they, you know, like, 'Hey, how you doing?' 'It is a depressing day.' I mean, it's just an AI computer. It doesn't know what depression is…

Justin thinks that AI entities can process information, but they do not know, have an awareness of, what it is they are conveying in their interactions with humans. Similar to Leslie, Justin does not think any show of emotion by the agent is real to the agent; we perceive the emotions conveyed by agent, but they are not, as Justin implies and Turkle (2007) has previously argued regarding AI, authentic. From this perspective, our communication with agents is artificial.

11.6 Shifting Senses of Communication

The shift from visual and haptic communication with machines to oral communication has brought with it a transition in how participants make sense of the devices and integrate them into their lives. It is because agents can speak and do so intelligently that participants often simultaneously view them as amazing and weird, cool and creepy. Participants have had to work to understand how this new way of communicating with devices can make sense in their daily

routines. For some people, the “old” ways of typing things into machines are still more appealing than futuristic vocal interactions. For other people, talking with machines offers improvements to their lives in limited and expanded contexts.

But the mode of communication only goes so far for participants when it comes to deciding whether or not to use agents; the agents have to be able to understand them. Blumer (1969) argues that we have to able to be of similar minds, at least to a degree, to communicate with one another. Some people do not think this is possible with agents because only humans can understand one another; People also have learned through experiencing “failures” with the machine that understanding is not possible. Other participants, however, think that machines can interpret what we say to them and deliver results that are intelligible. Some people even go as far as to argue that we communicate with agents.

A discussion of the role digital agents play in our lives and the factors that influence their adoption is important because it speaks to the ontology of digital social agents. When we began speaking to machines, arguably well before agents, we changed their nature: Machines are no longer things we type with; they are things we speak with. Well, some participants speak with them, anyway. They also became entities that understood humans to a limited degree. AI raises questions of the authenticity of our interactions with intelligent machines (Turkle, 2007), and the authenticity of communication with agents is brought into question here. All of these aspects are part of a bigger shift occurring in our understanding of machines and agents that I discuss in more detail in the next section.

12. ONTOLOGICAL UPHEAVAL

The transition from pulling levers, turning dials, and typing on a keyboard to speaking with computers and digital devices has been accompanied by a shift in the senses we use while interacting with machines that is a crucial aspect of how we incorporate agents into our lives. The result of this shift is that what once we knew of machines is, at first, unrecognizable to us. According to Ricoeur (2005), objects and people go in and out of our presence, and when they leave and are reintroduced, we must become familiar with them again: "The work of recognition must struggle with the threat of the "'unrecognizable'" (p. 66). When we encounter digital social agents we hold in our hands a device that we know is a machine, and we know that what is inside should be digital and mechanical. Yet, when the agent speaks, we are confronted with something we do not know. The significance of the introduction of sound and voice, accompanied with a "mind," into our communication is that we must now work to make sense of the unrecognizable. For McLuhan, this transition of sense and senses has implications beyond whether and how we choose to use Google Voice Search, S-Voice, or Siri. McLuhan (2011) argues:

> If a technology is introduced either from within or from without a culture, and if it gives new stress or ascendancy to one or another of our senses, the ratio among all of our senses is altered. We no longer feel the same, nor do our eyes and ears and other senses remain the same (p. 29).

We no longer just read text on a screen. We hear a voice speak out from the screen and sense via these new senses a presence with us. We feel the agent. We listen to the agent. We talk to them. We expect them to talk back. We also no longer think and feel the same way about ourselves. We, too, are rendered unrecognizable. In this chapter, I focus on how we negotiate the ontology of machines and humans in relation to one another and what Turkle (1984, 2007) has argued is the moving boundary between each entity.

12.1 Confusion and Instability

I concluded the chapter on the artificial front of digital voices by drawing on McLuhan's (2011) idea of the split ("schizophrenic") nature of humans and their world that resulted from a transition away from an oral to a literate culture. We are experiencing another similar confusion of the senses and our world as we transition from a visual and haptic mode of communication to oral-aural communication with machines. What were once stable conceptions of things and people are unrecognizable and must be renegotiated. This transition is an experience, literally, in that it is felt as much as it is witnessed. This renegotiation is an extension of the blurring of ontological boundaries between humans and computers first described by Turkle (1984).

Our understanding of digital social agents and the world of things is confused. Some of us think we are talking to our iPhone when using Siri, others of us perceive we are conversing with a distinct entity named Siri, and still a few of us do not even know what we are talking to. We hear digital and human voices around us, blurring together, and, in that crowd, the artificial is just as likely to be perceived as real as the biological. We perceive digital voices and images as spanning a spectrum from fully human to fully machine with overlap in the middle. We conceptualize agents as a whole as a mix of liveness and deadness, as social things. In describing Siri, Paula remarks that it is "an artificial intelligence. And in that respect it doesn't exist, but it does exist." We do not even know what exists or does not exist anymore. We may not know what exists but we are fairly certain that what does not exist is a woman. We can feel *her* presence and know that it she there, but, at the same time, not there. We can never touch *her*. It is simultaneously weird and awesome.

At least when the steam locomotive, the industrial machine, crashed into the garden (Marx, 2000), we knew it was there. And that is where the confusion lies with digital social

agents. The visual and the tangible are not necessarily separate senses; they are intertwined (Warren, 1982; Warren & Rossano, 1991). We not only could see the locomotive, the massive industrial machines, the computer that filled an entire room but also could reach out and touch them. Even if we were viewing them from afar, as the locomotive crossed the plain, we felt as if we could reach out and touch it. As Carey (1989) has explained, it was what followed the locomotive, the telegraph, that began this transition into the ephemeral. When communication was removed from the tangible and "live" voice removed from the body, presence inhabited the ether (Sconce, 2000). Digital technology has had its own problems with tangibility, hence the idea that we can jack into cyberspace (Sconce 2000). The matter of a digital book is not the same matter of a physical book (Gunkel, 2007), but we can at least see the words of a digital book, look at its reproduced cover, and highlight key texts. When we interact with computers and other digital devices, we feel the keys and see what we are typing on screen.

The visual is not completely divorced from digital social agents. Most programs also display the text of the conversation on the screen or will bring up textual information, such as a Wikipedia entry; however, people mostly use the agents for multitasking where the main modes of communication are speaking and listening. We also can grasp the mobile phone, and it is because we can hold a phone, iPad, or gaming system that some people hold onto the idea that the digital social agent is the device. Despite the visual aspects of digital social agents, the oral-aural dominate, and we must make sense of agents primarily with these senses. With new senses have come new ways of knowing and new states of being for both agents and people. In the next sections I outline in greater detail the ontological shifts that have accompanied this new sense of agents in which we will see the ongoing state of confusion regarding computers and humans with glimpses of new, possible, stabilities.

12.2 Our Sense of Things

When Turkle (1984) left off with her discussion of the ontology of computers 30 years ago, we were presented with a view of computers as not only processing information but also as possessing intelligence, as oscillating between alive and not alive, particularly from the vantage point of children. Nass et al. (1994) also declared a decade later that "computers are social actors." The perception that computers possess intelligence has not diminished but only become more pronounced and more stable, as has our understanding of machines as social actors, both of which I will discuss in a moment. I first want to address our revised perception of computers that has accompanied the shift to oral-aural modes of communication.

In all of the confusion that has accompanied our sense of agents and machines is one emerging characteristic that has reached stability relatively quickly: Computers, phones, and devices, all of which are things, can speak. They have voice. Although most respondents told me that they were initially amazed at hearing an agent or the device speak, depending on what they perceive is doing the talking, the initial surprise soon wore off. This feeling of awesomeness dissipated quickly because talking computers and digital voices have been so fully incorporated into our culture that they are quotidian things. They have become so commonplace that when I interviewed people, participants routinely told me that they had never thought about the fact that they speak to a device or about the voice that is responding to them. Agents and devices just talk. It's what they do. It's what they are.

In reassigning the ability to speak from a human-only trait to one shared with computers and agents, we also transferred onto digital entities expectations that come with that human ability to speak, the ability to understand. As I explained earlier, humans and computers reached an understandable means of communicating a long time ago, but many people, with a few

exceptions, do not even conceive of this type of interaction as understanding or communicating. But they do think of talking to a device and a digital agent as a form of communication, and so the nature of an agent is that of a thing that talks, a thing that communicates (also another trait transferred from humans to machines). But how well computers and digital entities communicate is contested territory centering around the meaning of what it is to understand. Participants vary on whether agents can even process the requests people make of them and produce cogent results. The heavier users perceive agents as going beyond mere processing of information to a more sophisticated understanding of a question or request that takes into account factors that only a human could at one time, such as an awareness of location while searching for a destination. Some participants may yield that we speak with agents but argue that machines neither understand us nor could ever understand us because they are not human. Even people who think of machines as understanding humans, place a limit on machine understanding: agents may understand what we ask of them, but they do not know us personally. The implications for how we perceive the nature of agents and computers is that a basic understanding of language and the world is within the realm of artificial for some people while for other people understanding is only a human trait. For both groups, knowing a person or persons intimately remains a distinctly human capability.

A decade after Turkle (1984) published her work on the evocative nature of computers and digital objects, Nass et al. (1994) presented a paper with a title that declared "Computers Are Social Actors." With this declaration along with *The Media Equation* and hundreds of other papers that followed, Nass and fellow scholars seemingly provided the empirical evidence of the changing nature of computers. Except these researchers were not focused on the ontology of computers or agents; they were focused on our psychological and sense-making reactions to the

machines (an oversight in the presence literature that I discuss later). But, their research documents a significant shift in the ontology of computers and machines. Digital devices are no longer things to use, but things to interact with. Digital social agents, for the most part, also are perceived as social entities: We conceptualize them to be, at the very least, interlocutors, either talking devices, talking programs, or something more life-like. They also further the social nature of devices. Unlike the laboratory computers in HCI experiments, digital social agents accompany us throughout our lives speaking to us, answering questions, and fulfilling requests. As a result, some participants conceptualize digital social agents as occupying social roles such as that of an assistant. The social nature of digital agents also extends beyond the one-on-one interaction between human and machine to social situations involving others. Some people feel weird being observed by others when interacting with an agent while other participants interact with agents in social spaces. Computers, then, have been social for some time, and their social nature is becoming more pronounced in agents.

Digital agents, and by extension digital devices such as phones and computers, are things that speak, things that can understand (to a limited extent), and things that are social. These characteristics of computers, all of which were once human-only traits, did not originate with digital social agents but are bolstered and extended by them. To this list I also would add gender, another trait that was once solely associated with humans (sex also extends to most biological entities) that is now perceived by participants to be an integral part of the nature of agents. The claim that a technology and, to be precise, piece of software, has gender is not new. Wajcman (1991) and other feminist theorists have argued that technology as a whole is gendered. Their position focuses on the social construction of technology including what qualifies as technology, who uses the technology, or how we integrate the technology into our own performance of

gender. Scholars such as Adam (1998) argue that the underlying design of AI and the artificial knowledge it creates reflect a gendered view of the world. Moving one step beyond the implicit aspects of gender within technology, Suchman (2009) traces the explicit aspects of gender in agent and interface design, and Nass and Brave (2005) have argued that gender is one of the most critical components of artificial voices. Participants' also perceive gender as an integral part of who or what agents are. Gender is one of the key human characteristics, beyond an agent's ability to communicate and its life-like attributes, that does not fade when we move from considering the voice of the agent to conceptualizing it as a whole. Agents are male or female, and most often female, and gender often is a crucial component of the identity of the agent for most participants. Earlier I discussed Eleanor's description of an interaction with Siri in which Eleanor states: "And then she, the voice, you know the computer, would look that up…" Eleanor does not separate gender or voice from the computer; they all are part of the same entity. Agents and digital devices possess gender. We hear it when they speak.

Most participants perceive agents as possessing the particular characteristics I have just discussed; although, as I explained at the beginning of this chapter, the nature of agents and computers is up for renegotiation. For some participants agents have a more stable ontology than for others. Some participants firmly position agents as just machines, things. Sigurd, for example, does not anthropomorphize Siri, refers to it as software, and describes its role in his life as that of a tool. At first glance, Sigurd and participants like him appear to adhere to "traditional" pre-agent, pre-AI definitions of computers as tangible things used as tools. When compared with participants such as Julian, who names his social agent, or Priscilla, who thinks of her agent as a little person in her phone, these users seemingly do not recognize the human-like attributes in agents. In light of what I have discussed, however, we can view their position from a different

perspective. These participants are very aware that machines talk, because that is what machines do. These participants again recognize the machine, the agents, based on the renegotiated things they have become.

A key difference exists between participants who conceptualize agents as things and those who conceptualize them as entities, and that is what is behind the human-like or life-like elements. For participants who think of agents as things, machines possess the characteristics of gender, speech, etc because it is programmed into them. There is no life or mind, or even the illusion of one, behind the agent. Other participants still perceive these qualities in agents as at least being life-like. They may no longer be exclusively human, but the life has not been fully sucked out of them, either. And this is one aspect of the ontology of digital devices that has not changed since Turkle's (1984) original work. Computers, and now digital social agents, continue to walk the line between alive and not alive. And people still struggle with the liveness of agents as well as reconciling other characteristics that were once human that are now moving into a contested ontological space.

The result is an internal and cultural struggle as to who or what agents are and what traits they actually possess. Molly is a Siri user who has integrated the program into much of her life. She relies on it frequently, and is not even ashamed to use it in front of other people. Molly heavily anthropomorphizes Siri when speaking about *her*. Yet, when I asked Molly to assign traits to Siri, Molly struggles:

> R: Um, I don't want to say personable, but she, I don't know. It's hard to even do that because I, she doesn't have a personality, so how do you go off of? I don't know how to describe her as trait-wise.
>
> I: So she doesn't have a personality, and you said, you don't want to say she's personable.
>
> R: Right. Because she's not a real person, but.

I: But you get the sense that it's personable or she's personable?

R: Only to a certain degree, because she can laugh at you. I, well, to me it makes it seem like she's laughing at you when you ask her a question, and she'll turn it around into a different way.

I: So you're saying it's hard to say she has a personality or personable, because she's a machine?

R: Yeah.

I: Are those traits you normally associate with a human, then?

R: No.

I: And that's why. It's just they're just not machine traits?

R: Correct.

Molly is not entirely sure whether Siri possesses any traits. Molly seems to think that in some way, Siri may be personable or have a personality. After all, the program gives the impression that it is laughing at Molly. But Molly also knows that Siri is not a real person; it is a machine, or what she once knew to be a machine, and being personable and having a personality are not traits she formerly recognized within the machine. Molly is struggling to make sense of the unrecognizable by working through what characteristics of the machine are known to her. Although Molly has a hard time deciding whether the program has any traits and whether it is appropriate to assign a personality to an agent, Molly does not hold back from anthropomorphizing Siri's gender. Molly either does not realize that she has referred to Siri as a woman and used gendered, female pronouns, or, as we have discussed, gender is just part of the nature of machines and the program.

Unfortunately my interview with Molly was cut short so I did not have a chance to circle back at the end to better understand why Molly initially struggled with Siri's traits. It may have

nothing to do with Molly, and the problem at those junctures may have been my questioning. Molly's difficulties in negotiating how to describe traits in relation to the machine may indicate that Molly, aside from gender, eschews the anthropomorphization of technology. But Molly provides other answers to the contrary. As I did in most interviews, I asked Molly to describe the difference between humans and machines:

> R: I feel like a computer would be more. I don't want to say smarter, but maybe more advanced than the average human.
>
> I: In what ways?
>
> R: We can just say that maybe they have a bigger brain if you look at it that way. They're more knowledgeable.

Molly, who has a bachelor's degree in biology, places the computer "brain" above the human brain that is among the highest-order of animal brains. Now, does Molly think a computer has a biological brain? No. But it does have an artificial equivalent that outperforms the biological. And, even more important, is that Molly does not distinguish between the function of the human or artificial brain: producing knowledge. Molly's statement situates knowledge as both a human and machine characteristic, with it being a trait possessed to a greater degree by machines. From a cultural perspective, Molly's claim that the machine has a bigger brain is not unusual. We think of machines as possessing minds and have done so for some time (Turkle, 1984, 2007; Hayles, 2005). And so, Molly may think of intelligence as part of the nature of the machine. Molly's discussion of Siri and the ease with which certain attributes, gender and intelligence, are interchangeable between humans and machines while others cannot be so easily reassigned demonstrates the ontological certainty and uncertainty associated with agents and machines that arises from a change in senses and inability to recognize an entity.

Participants also disagree as to which human-like characteristics can be transferred from humans to machines. I previously discussed Justin who draws the dividing line between humans and machines at emotions. Even when agents seemingly express emotion, this emotion is not real, it is perceived, according to Justin. He is not alone in this definition of humans. Many other participants also claim that having emotions and the ability to express them are uniquely human traits. Priscilla has a different perspective. She thinks that some aspects of talking with an agent are weird, and part of her reason for this perception is that "it's kind of like bridging the line between like technology and like, uh, human emotions." When I ask Priscilla to explain, she states:

> "Like, um, usually when you think about your phone you think of like technology. You think robotic. You think simple logistics. Um, and so when it, when you start doing things like telling it jokes and um, it's just, it carries, it carries more human characteristics I guess."

Priscilla later offers that maybe now that machines can have emotion, the one human ability still connected to emotion is our ability to decipher emotion in others. Unlike Justin, Priscilla does not perceive expressing emotion to be exclusively within the purview of humans.

The ability to express emotion is just one example of a once human-only trait that now is in this contested space between human and machine. Free-will is another. Some participants claim that only humans have autonomy. For Adam, AI also calls this into question. When asked to describe the difference between humans and machines, Adam explains:

> "I would say free will, but um, you know, when you get into artificial intelligence I think a computer could have free will so. I've had computers turn off on me and that shows that they have free will."

The claim that computer or other technical failures imbue machines with a certain liveness has been documented throughout the history of electronic devices (e.g. Sconce, 2000; Turkle, 1984; Waytz et al., 2010). Yet, no matter how much experience we have with machines, people still

interpret these actions within the context of a machine possessing a human-like trait. In Adam's explanation AI now serves as further evidence for the free will of the computer beyond random glitches. Other participants, however, do not think free will in agents or computers is possible.

Turkle (1984) argues that evocative objects, such as computers, call into question ontological boundaries and spark a renegotiation of the line between human and machine. Agents, which are part of a much larger integration of digital devices into our lives, continue to test these boundaries. Ontological questions that arose initially with electronic devices, such as liveness and free will, remain unresolved today, further complicated by the increased sophistication of our technologies. Some categories have been settled, at least to some degree. Machines speak and understand, are social, possess gender, and think. Yet, even when we are confident that humans and machines share these traits, we cannot agree as to whether personality and emotion can be transferred to the machine. Most individuals are able to draw a boundary line between human and machine, but, if we look at these lines collectively, they are scattered, and not cohesive. Agents, artificial intelligence, and other advances in computing have more than challenged the human-machine boundary; they are rendering it almost obsolete.

12.3 Our Sense of Self

The introduction of new forms of communication and increasingly complex artificial "minds" into agents has implications beyond how we perceive agents and machines. Shifts in how we communicate and who we communicate with impact our own culture, our own nature (McLuhan, 2011; Ong, 1967). It is through communication with an other that we form both a sense of the other, but also a sense of Self (Blumer, 1969; Cooley, 2004; Mead, 1934). And this includes our communication with computers (Turkle, 1984, 2007). In this section, I explore how

we have come to see ourselves collectively, our humanity, in light of our interaction with digital social agents.

Many participants perceive technology as growing exponentially and moving forward with an inertia that cannot be stopped, and agents are part of this proliferation of technology. Some people welcome new technologies and agents because the devices and programs are exciting and enable people to be more efficient. Luke, a heavy Google Voice Search user who has an IT background explains:

> "It's not gonna stop becoming more intertwined with our lives. I don't think it's possible to really figure out exactly how that's gonna end up in 10, 15, 20 years. But I mean you think about 10 years ago and BlackBerries were starting, right. There was no such thing as an app or a Smartphone. Um, so it's really difficult to tell, but that's, that's why I enjoy it."

Other participants want to slow down this progression and do not use agents because they are trying to draw boundaries between themselves and technology. Eleanor explains why she does not use Siri:

> "Because it's just, you know, there's a lot of stuff available. And you don't have to use all the stuff that's available. You don't have to, you know. If you don't like it, why should you use it? And I mean I'm just, I feel like I'm kind of maintaining a unique, um, ness, uniqueness. Um, by being who I am and staying in touch with who I am and not sacrificing it just so that I can become, uh, literate as a, um, technology user."

Both Luke and Eleanor perceive technology as being an integral aspect of modern life, but they offer different perspectives on how prominent a role technology, digital agents included, should play in their own lives. Their decision to use or not use agents is predicated on the Self.

The majority of participants perceive technology generally as having an influence on themselves and their relationships. Most of these discussions regarding the impact of digital social agents on people's lives and society contain familiar tropes found in cultural discourse regarding new and emerging technologies and their adoption. As I discussed in several prior

sections, some users described themselves as being "lazy" when using Siri or Google Voice Search because they did not want to go through the trouble of looking up information manually a.k.a. typing it in. Some of these participants, as well as numerous others, explain that technology, agents included, is making individuals and our culture as a whole lazier. "It's getting easier for us not to do anything. To become easier to be lazy as time goes by," explains Leslie who purposely does not use agents because she values self-reliance. But, other users do not see themselves as being lazy but as being more efficient. Like Luke, Sigurd enjoys using Siri and relies on the program heavily: "It enhances productivity is what I would say. Uh, not only productivity but just it just makes it easier to find things." From Sigurd's perspective, humans gain with digital social agents, not lose something to them. Priscilla also thinks Siri makes her more efficient but, making a reference to *Her*, wonders what the social cost will be as we continue to use agents in the future:

> R: Um, it [using agents more] could be, make things a lot easier. Um, people would be more organized I think. But also become a little disconnected.
>
> I: What do you mean by that?
>
> R: Um, there's less face-to-face interaction with other people. Um, if I have to remind me to talk to somebody, I'm not gonna go out and find them and talk to them if I can just text the message. I don't have to see them. I can FaceTime them. Kind of disconnect a little bit.

Priscilla perceives the long-term impact for us as a society as both positive, making us more efficient, and negative, further removing us from one another. Digital social agents then increase our productivity, but make us lazy, enable us to be more efficient, but disconnect us. The conflicting perceptions that machines benefit us or make us more lazy is a cultural debate about technology that extends back to *The Phaedrus*. Priscilla's concerns regarding being disconnected

from others also echo more recent commentary on the state of personal relationships in a technological age (e.g. Turkle, 2012).

The possible benefits and ramifications of digital social agents are certainly important for us individually and culturally; however, they do not speak to who we are – our nature – and how our nature changes in light of digital social agents. In our conversations, participants focus on describing machines and how technology has evolved. They rarely connect these changes in technology, including machines becoming more human-like, to who we are as humans. Even in discussions that directly link humans and machines, participants overlook humans. For example, participants describe agents as being weird, creepy, and bizarre. The reasons they provide, some of which I have discussed, include an agent's personality and its ability to speak and to understand the user. The weirdness of digital social agents is that in these moments they are presenting themselves and behaving as if they were human. Furthermore, as I also have demonstrated at length, we recognize human attributes in machines. Few participants directly connect an agent's weirdness to its human-like behavior. Instead, they state that agents are not behaving in a machine-like way. Their focus is on the machine and what is unrecognizable in it.

When I directly ask participants whether they have considered who they are or who we are as humans in light of the human-like agents, many of them answer, "No." This answer is not entirely surprising because, aside from being a highly philosophical question, many participants also have not given a second-thought to digital social agents and talking with machines, period. When I discuss the issue further with them and ask about the merger of humans and machines or a point where machines and humans become like one another and the possible ramifications, most participants perceive this ontological shift, if it occurs at all, as happening in the future. These users point to current advances in robotics as well as the breakneck speed with which

technology is developed. Some people think this transition will occur in the near future. When asked if he thought technology would ever be human-like, Curtis replies: "I think so … it's growing so fast that it, the trajectory that I see technology on, I see it happening in my lifetime." Other people place that day in a far-off future, including Leslie: "Like on *WALL-E* where they're just sitting down on those, the flotation things. Like I would not be surprised if that did happen after like 10,000 years or something."

People who think that machines eventually will become more fully human have varying opinions on the implication for humans. Dane, for example, thinks this would be a positive innovation because "we need that, uh, technology." Maya expresses more mixed feelings when I ask her if we will reach the point where we cannot distinguish Siri from a human: "Um, I think that it may happen. I hope it doesn't, because well it would be really cool, but I hope we don't lose our sense of humanity." Advanced technologies that are human-like are important, and even cool, but would alter our sense of who we are.

These life-like technologies that call into question our ontology are not a reality now, according to participants. Digital social agents – even though they share the traits of speech, understanding, intelligence, and gender with humans – are not a radical technology that disrupts our humanity and our understanding of ourselves. Luke, for example explains that Google Voice Search does not have any human characteristics: "I don't, I don't see it in the sense of like the movie *Her*." Siri, Google Voice Search, and S-Voice are entities or devices we talk to that may increase our productivity or make us lazy, but beyond that, do not affect who we are. Participants do not perceive the individual and cultural implications of agents as being much different from the affordances and drawbacks of other technologies.

Still, some participants indicate that agents and other technologies are bringing us closer or have brought us to the point where machines have a more personal, deeper impact on us and who we are. Eva is one of the users who perceives Siri to be both awesome and weird. The weirdness that Eva experiences with Siri is its life-like responses to questions:

> "It's, cause it's, how does she know that it's you, and how does she know how to respond? And it's like the movie *Her*. Where it's like the step before that. So I feel like it's coming…"

In the movie *Her*, the human characters perceive the agent to be real and treat *her* as such. For Eva digital social agents are the stepping stone to a world in which artificial entities are fully anthropomorphized, and we have to confront what this means for who we are.

12.4 Humans: The Machine-Speaking Animal

Although participants do not describe agents as influencing who we are beyond the usual implications of technology, our nature has changed as the result of the integration of agents and other voice-based technologies into our lives. Earlier I described how machines share with humans the ability to speak. This shift in the nature of computers from primarily mute devices to technologies with voice is accompanied by a parallel transition in our own nature. We now speak with machines. We are machine-speaking animals.

This fact hardly seems significant considering that the ability to speak already was in our ontological purview. It is almost as obvious as my assertion that no one thinks of machines as being human. We speak to people, animals, and other inanimate objects all the time. Participants in this study also routinely discuss how they speak with agents, and for heavy users, they speak with Siri or Google Voice Search extensively throughout the day. When I ask Beecher how often he uses Siri, Beecher begins to laugh, and I ask him why:

> "No, I was laughing because it's like I was thinking, I was gonna say. I was gonna make a joke and be like, "Yeah, I talk to Siri more than I talk to anybody else." But I was like that sounds sad, so, and it's also not true."

So Beecher may not talk to Siri more than "anybody else" – or he may and not want to admit it – but he does speak with it extensively. When I ask him to put a number on how many times he typically talked with Siri during the day, Beecher says, at least 30. Like people who perceive agents to be weird, Beecher thinks the number of his daily interactions with Siri "sounds sad" because Beecher is speaking with a technology. Beecher knows Siri is not a human.

Eva, like Beecher, also speaks with Siri throughout her day but was not fully aware of the extent to which she speaks with Siri until the end of our conversation when I ask her to explain the difference between humans and machines:

> "I don't know. I'm with my computer more than I am with humans sometimes. Um, oh gosh, it's just everything. It's like the social media and you know, and it's funny because like I feel like sometimes social media brings us together more, and then sometimes it's almost like. And then now for me and my boyfriend to talk on the phone, we rarely do that. Like we text. And so it's odd like when I talk, like I hear his voice, it's like we just, I'm not a phone talker anymore. It's completely changed like how I am as a human with other humans."

Eva, interestingly, does not directly answer my question. Instead, she explains how machines have affected who we are as humans. But, nestled within Eva's answer is an interesting statement. Eva, who has a long-distance boyfriend, rarely talks with him and finds it odd to actually hear his voice. Now, in the greater context of how people use mobile phones to interact with one another Eva's statement is not out of the ordinary. People generally tend to text more than they place phone calls (Smith, 2015). What makes Eva's statement interesting is that earlier in our interview, Eva was very specific about Siri's voice. It was Eva who wondered if Siri could be Siri without *her* female voice. Eva also describes Siri's voice as comforting and friendly. Siri's voice regularly fills Eva's ears, but to hear her boyfriend's voice is "odd." Realizing what

Eva had just said, and the fact that I personally will talk to Siri more in some days than my own partner, I decide to ask Eva more about the difference in how she interacts with Siri and her boyfriend.

> I: ...So, but, you text with your partner or your significant other?
>
> R: Uh-huh.
>
> I: But you talk with Siri?
>
> R: That's true.
>
> I: So why?
>
> R: I think like yeah, that's very true. I don't know how to answer that. I don't know why. This is so interesting. Yeah, that's true I talk to her, but um, I make it a point almost now to like call him, because I don't want to get into that role, that dehumanized role…

Eva does not realize until our conversation, and neither did I, how her social interactions with machines and with some humans have reversed: She talks with a machine, but types with a human. Beecher may joke about speaking with Siri more than other people, but for some users, their heavy use of agents may equate to them speaking with agents equally to or more than they speak with some humans. At the end of her statement, Eva expresses concern for the potential that our interactions with machines may be dehumanizing because Eva knows Siri is not a human.

We do not just talk one-on-one with agents, we also bring them into our social interactions with others. While some participants shy away from using digital social agents when they are in public or with people, other participants report that talking with agents is part of their group social interactions. When people first start using agents they will often show off the agent to others, taking turns asking the agent outlandish requests. For example, Kyle reports that he and his friend who has an iPhone with Siri like to ask the female agent derogatory questions to

see how *she* will reply. In these social situations, the agent becomes a sort of entertainer, an extension of the "jester" function of the mobile phone (Fogg & Eckles, 2007). Agents can only entertain people for so long, however. People predominantly turn to agents to request information or settle factual disputes. As I discussed earlier in this chapter, Molly perceives Siri as having a mind and intelligence superior to that of a human. After Molly tells me this, I ask Molly how she uses Siri in relation to other humans:

> I: … So, who would you rather get information from a computer or a human?
>
> R: A computer. I mean there's both sources of error in there. I just feel like a computer would maybe be less of a, sort of, maybe less of an error.
>
> I: Have you ever found yourself turning to Siri instead of a human ever when you're looking up information? Like there's a person next to you. You know, like you're in a group of people.
>
> R: Oh, yeah. Or even if I do, I'll still use her to verify.
>
> I: Why do you think that is?
>
> R: Um, maybe it's trust.
>
> I: Would you have done that before Siri. Like even if you had your phone, let's say you still had Google, and you could have typed it in. Would you still have done that? With, like, say you had the human there. They said something. Would you still have Googled it to verify or is that something new with Siri?
>
> R: That's something new with Siri. I probably wouldn't do that only if I like absolutely had to. Like if we were unsure about something. Maybe like a time or?
>
> I: Why do you think that's new with Siri?
>
> R: That's a good question. Um, maybe it's just because of the availability.

Molly uses Siri to find information as well as fact-check other people. Through her frequent use of Siri, frequent spoken conversations with Siri, Molly has come to trust Siri and rely on *her*, the machine, to a greater degree than some humans. When presented with the option of seeking information from a human or Siri, Molly considers the agent to be a viable alternative to the

human. In some ways, particularly when knowledge is involved, Molly considers the agent to be more dependable and easily available. Like Beecher and Eva, Molly knows Siri is not human. And that is why Molly talks to *her*.

So, we are machine-speaking animals. We engage in dialogue with agents to varying degrees: Some of us speak with agents in equal or greater amounts than humans, and some of us even come to trust agents more than humans when it comes to what machines do best, serve as a repository for information. Molly's admission that she prefers to seek information from Siri or use it to verify statements from other humans, at first, seems shocking. The counter argument could be made that Molly's actions are no different than what many of us do every day when we type a search into Google to look up information or to win a factual bet.

Yet, we still sense that something is different when Molly deliberately chooses to speak with Siri instead of a human. It is more of an internal reaction, the kind that is felt in your gut or that catches your breath, like the weirdness and awesomeness that we first sensed when we spoke to an agent. Our senses our right: It is the sense that makes all the difference. To understand why this reaction is so deep, so personal, we have to recount our evolution as communicators and the subsequent changes to our ontology.

In an oral-aural culture, communication occurred in the present and in the presence of others (Ong, 1967). What we knew of the world was based on our immediate experiences or the experiences of others conveyed to us (Innis, 2007, 2008). Memory of a culture and its knowledge resided within individuals such as sages, witches, and bards. To obtain knowledge or wisdom, we had to speak with the wise. When we began the transition from the speaking animal to the reading and writing animal, knowledge, feelings, and everything we once held internally were separated from our body, made external, creating our "schizophrenic" condition, according to

McLuhan (2011). Knowledge no longer resided in people but in written words in things (Innis, 2007, 2008; McLuhan, 2011). With the shift from the literate to the electronic society, knowledge was uploaded, combined, and created within and by the machine. We increasingly rely on electronic media to the point where even our personal memories are now even separated from us (Jones, 2014). Knowledge now resides within Google.

But agents and robots have brought us into a new cycle in the evolution in communication. With the advent of speaking agents, knowledge is again freed from the visual word, at least when it is being conveyed to us. We have taken all the knowledge that we long ago removed from ourselves, made external, and ripped from the purview of humans, and we have reassembled it, or at least access to it, in digital social agents and other voice-based AI and robotic technologies. The new assemblage has a hauntingly familiar form. Participants describe Siri, and other agents as being like a librarian or an encyclopedia. Agents are, from participants' perspectives, repositories of knowledge. But repositories contain the printed word. Siri speaks. What is haunting and weird about digital social agents, as well as robots, is not that they are glimpses into the future. Siri and all digital social agents are twisted, futuristic reincarnations of the sages and wise women of the past. Molly and other users go to them and speak with them to hear what they have to say. The evolution of our nature as humans and communicators has been from human-speaking animals to reading and writing animals to typing animals to machine-speaking animals.

But what does it mean that we now are machine-speaking animals who communicate with futuristic reproductions of ghosts from our ancient past? We know that with new communication technologies and new senses of knowing and interacting come new ways of being (McLuhan, 2011). This is not merely a transition we experience as individuals; it is one

that disrupts our culture and the "monopolies of knowledge" within it (Innis, 2008). Weizenbaum (1976) has sounded a warning that is now echoed by Turkle (2007) about the danger of artificial reproductions that become real to us. But, other scholars, such as Carey (1989) have also warned against knee-jerk, neo-Luddite reactions to emerging technologies. The greater implications of our transition to the machine-speaking animal are something that I am still considering and are a topic for a different paper.

What is important is that the conversation regarding the ontology of digital social agents is taking place. The participants I spoke with repeatedly said that they had not given much thought to talking agents or devices much less what these entities mean for them as humans. I was initially surprised at this lack of awareness of talking devices and artificial intelligence in general, until I remembered that I, in fact, was the exception. According to McLuhan (2011) communication technologies "shock" our senses to the extent that our world, not just machines, are rendered unrecognizable to us:

> "Every new technology thus diminishes sense interplay and consciousness, precisely in the new area of novelty where a kind of identification of viewer and object occurs. This somnambulist conforming of beholder to the new form or structure renders those most deeply immersed in a revolution the least aware of its dynamic" (p. 308).

We are often unaware or fully cognizant of the implications of what is happening around us during technological and cultural transitions. Therefore it is important to take on the challenge of digital social agents and other human-like artificial intelligence technologies to awaken ourselves to our new way of being.

13. CONCLUSION: NEW WAYS FORWARD

When I began this dissertation, my main objective was to better understand how people conceptualize digital social agents. I wanted to know: "Who or what are digital social agents to us?" Our interactions with things and people, as well as people-like things, also has the potential to influence who we are (Blumer, 1969; Mead, 1934), and this research also became about how we perceive ourselves after coming into contact directly or indirectly with talking, sentient, but disembodied, voices. While HCI scholars have produced a large body of literature regarding our interactions with voice-based technologies, what is missing from this, still crucial, scholarship is the user's perspective of the form and meaning of these devices and applications in their daily lives. With this in mind, I conducted field observations and interviews, talking with people about their experiences with and conceptualizations of Google Voice Search, Siri, S-Voice, and other digital social agents. In these conversations, participants shared their conceptualizations of agents and their voices, whether agents are blonde or brunette, whether they are human or humanoid, and whether they make sense in the context in our busy technology-saturated lives or will further burden us.

In the preceding pages, I have discussed the various findings from this study grouped together into sections but still somewhat separate from one another. In this conclusion, I provide a brief overview of these findings tying them together more closely before discussing their implications for existing and emerging theories. I also discuss the limitations and challenges of my research and of studying digital social agents generally. As I was designing this research, I knew that people's perceptions of any technology can be highly complex, and I did not expect digital social agents to be any different. Still I was surprised and, often, overwhelmed at the complexity of our thoughts regarding digital social agents and other emerging technologies. The

research I present here is a first step toward making sense of the consistent and contradictory aspects of how we understand digital social agents and ourselves in light of them. This is not a hesitant first step. What I present here is the most holistic understanding we have to date of people's perceptions of agents as they and other AI technologies are being integrated into the our daily lives. It also exposes how our nature is changing along with the nature of the machine. With that said, this dissertation represents the first step because there still is much more work to do as this study has created new questions while answering existing ones. I conclude by mapping out future research trajectories for digital social agents and new ways forward in the study of human-machine communication.

13.1 A Multitude of Images Within the Machine

The central question of this dissertation focuses on who or what digital social agents are to us. There is not a single answer but multiple answers. People do not even agree as to the origin of an agent's voice. Some people perceive the voice to be *of* the machine while other people think the voice to be *in* the machine, representing either a distinct program or potentially life-like entity. Several people do not think of the voice as belonging to one or the other, and instead, perceive the voice to speak for the device, at times, and an independent entity at others. And while participants do not necessarily know where the voice is coming from, they often think of it as distinct and tied to specific agents identities; although, even digital agent voices can get lost in the crowd of human and artificial voices that fill our modern lives. Certain digital voices are well known, particularly the voice of Siri, who has a type of cultural presence, as far as agents go. Siri has become a type of archetype for digital voices, and both users and non-users can recognize *her* voice. When we hear Siri's or other distinct voices we sometimes feel a unique presence with

us. Other times our sense of being with another shifts with changes in the context of our communication with it.

People assess digital social agents based on their voices, how they communicate, and how well they communicate, all of which comprise the artificial front. Participants recognize in agent voices both the human and the machine or an intertwining of the two. Of the human-like aspects we hear in agent voices, gender is the most prominent, but we also recognize other traits including race, nationality, regional affiliation and even age. The mental images people form of digital social agents are closely tied to their perceptions of voice. For some, the voice takes the form of a flesh-and-blood human, often a Caucasian woman. Other participants, who think of agent voices as being both artificial and biological, merge these two qualities in their images, seeing the agent as a woman in close proximity to computers or as a female humanoid. Several participants, who perceive mainly artificiality in agent voices, form a visual representation of the machine. Like other aspects of how we assess the artificial front, people also may form dual images that separately represent the agent and the device. Still, others do not see anything when they hear artificial voices that they perceive to be primarily lifeless.

While agent voices and images can take the form of humans in people's minds, when participants consider agents in their totality, their function as programs and their place within machines begin to play more prominent roles in the form of the agent. Despite hearing gender or other life-like qualities in agent voices, some participants think of them only as tools. For most participants, however, the life-like attributes in agent voices are translated into agency, and some agents retain their anthropomorphized qualities. The appearance of agents, formed primarily through the characteristics of agent voices, is important in the formation of the artificial front but so is the manner, the ability of agents to communicate, to understand, and to carry out tasks. That

digital social agents can speak in human-like terms surprises people and leaves them in awe. At the same time, it also leaves people with the feeling that they have encountered something weird. And, as with humans, how we perceive the artificial front and experience presence can change over time. The awesomeness of digital agents usually, but now always, fades over time, but feelings of weirdness seem to persist with use when participants take a moment to think about their interactions with agents. Some people realize that digital social agents can be of use to them right away, an improvement over typing a request, but most people go through a transition of finding a use for an agent and learning how to use it. Overall it is the combination of appearance and manner along with the presence we experience when using agents that determine whether agents are social things or social beings that are integrated partially or fully into our lives.

Our conceptions of agents cut across multiple different dimensions making a singular image of the voice in, or of, the machine impossible. But, there are enough similarities in how we perceive the artificial front and presence to catch a glimpse of shared perceptions of digital social agents. Some people like Kelly or Martha want nothing to do with digital social agents because the programs represent a non-human form of communication that is inferior to interactions with real humans. Lillian, Patricia, and Trevor also shun digital social agents, but, for them, Siri and its counterparts, are gimmicks that do not serve a purpose other than to add a new app to our phones or sell more devices. Other people, such as Eleanor and Leslie, think of digital social agents as another technology that is creeping into our lives, making people more dependent on machines, and they value their independence enough to stay out of a relationship with an agent. Although some people do not see digital social agents as serving a purpose in their lives, other people view them as important aspects of moving through their busy lives. There are

participants like Fred and Naomi who perceive Siri and Google Voice Search as voices that can perform limited tasks but cannot replace other forms of human-machine communication. Sigurd, a Siri user, or Luke, a Google Voice Search user, also do not perceive any life in their agents, but to them, their programs are indispensible tools making their lives easier. Eva and Adam talk with and swear at their female agents as if they were human, but, of course, the agents are not alive, they are merely social things. And then there are Priscilla and Molly. Their programs are important in their lives, but, what is more, they are alive, at least some of the time. The agents are women, who may even be a miniature version of a human living within the phone, and regularly perform important functions. Finally, there are people like Julian who one minute perceive their agent as being so life-like that they give it a name, visualize it as flesh-and-blood woman, and talk to it when they are bored but, in the next minute, are aware that the voice speaking back to them is nothing more than a machine taking the shape of a screen.

Who or what we perceive agents to be resides in our ever-evolving social construction of agents. And, as we are constructing agents and making sense of them, we also are coming to terms with ourselves. We are people who seek greater efficiency in our fast-pace world, even if it means being lazy when choosing to speak a request instead of type it, or we are purposely drawing boundaries with technologies attempting to maintain our autonomy and human uniqueness. Our communication with digital social agents as well as other technologies that are voice-based and sentient has transformed both our perceptions of the nature of machines and the nature of humans. Machines as they have evolved and are now experienced in agents are things that have voice, can understand, are social, possess gender, and have a mind of their own. We have a harder time perceiving how our nature is changing alongside the agent and other technologies. We now are machine-speaking animals who have created in digital social agents a

futuristic ghost from our past with which we speak as we seek wisdom, or, at least, directions to the best burger in town.

13.2 A New Understanding of the Artificial

To understand how we make sense of digital social agents, I drew on scholarship spanning disciplines and epistemological and methodological approaches. There were two key theoretical areas I focused on in this study. The first relates to how we perceive of other people and machines. This body of work includes the concept of impressions, and impression formation, and the personal front. The second concept I focused on was presence, particularly social presence defined loosely as a "sense of being with" (Biocca et al., 2003). I operated from an epistemological position, informed by symbolic interactionism and cultural studies, that holds that our understanding of digital social agents and ourselves form in and through communication with others. Of particular interest in this study was how the transition to voice-based communication influenced our understanding of machines. Most of what we know of digital social agents has been the result of laboratory experiments focused on limited variables and people's behavior. My goal was to focus on the phenomenological, people's lived experiences of digital social agents, and, to this end, I employed a qualitative approach consisting of field observations and interviews. In this section, I discuss the theoretical, epistemological, and methodological implications and extensions of my research.

13.2.1 Establishing the Artificial Front

There are two competing perspectives on how we make sense of each other when we enter into one another's presence. The first, grounded in psychology, focuses on our cognitive processing of the other, the impressions we form (e.g. Delia et al., 1974). Impression scholarship regarding HCI also focuses on our internal processing of individual characteristics of machines

such as our perception of their gender (e.g. Nass et al., 1995; Quintana et al., 1982). The second is a constructionist perspective, grounded in the social, that concerns itself with how we interpret the personal front others convey to us (Goffman, 1959). My exploration of digital social agents follows more closely this second approach. My goal was to understand the different aspects of agents' appearance and manner and how they work together to comprise our overall conceptualization of agents. I renamed the personal front (Goffman, 1959) the artificial front to set it apart from our understanding of humans and to denote, in a non-normative sense, the artificial nature of the agent.

When we encounter objects or people we seek to make sense of them through a "course of recognition" (Ricoeur, 2005). Because agents are relatively new, many participants were initially faced with the unrecognizable. When confronted with the unrecognizable, the previously unknown or the reemergence of what was once recognizable, we search for the known, for that which we can recognize (Ricoeur, 2005). In agents, people recognize characteristics of both humans, including themselves, and machines. This recognition of the familiar is important because it provides us a new way of understanding how people make sense of agents and interact with them that runs contrary to current theories regarding our perception of agents.

Most of the existing scholarship on our impressions of agents operates from positivist or post-positivist epistemologies that hold ontologies of things and people as clearly defined and stable. An agent, for example, is a piece of software, part of the machine, and it will always have these properties unless redesigned. An agent is always a machine, a lifeless thing. It can never be a human or *truly* share characteristics with a human. As explained in the chapter on presence, HCI researchers have found that while people act toward machines as if they were human, i.e. use politeness conventions, they always maintain that they are machines. In this study, as I also

stated earlier, people have an awareness of how they act toward agents that runs contrary to the *ethopoeia* concept (Nass et al., 1993) and toward the theories of mindlessness supporting it.

Most HCI research regarding voice-based technologies and impressions or presence follow an objectivist, social scientific model focused on people's behaviors. Reeves and Nass (1998) claim that people do not "mindfully" make decisions about how they interact with machines, and therefore cannot accurately assess their own interactions with machines (Kim & Sundar, 2012; Nass & Moon, 2000). To revisit an example from an earlier chapter, people in previous HCI research will indirectly assign human characteristics to an interface but when asked directly about human characteristics will not recognize the traits as being human (Kim & Sundar, 2012). Participants in this study, however, provide rationalization for their perceptions of agents and recognize both machine and human-like qualities in agents. Scholars who promote a "mindless" explanation for our interactions with agents argue we rely on mental scripts formed around human interaction to respond "inappropriately" to machines (Nass & Moon, 2000). The inappropriate aspect is that people use human-communication conventions, such as politeness, toward machines that users admit have no feelings (Nass & Moon, 2000; Reeves & Nass, 1998). The key reason some scholars argue that this response is mindless and not mindful is that people do not actually anthropomorphize machines. People may speak of them as life-like but do not perceive them as human or having human qualities. Nass and Moon (2000) explain:

> One can observe many individuals who cherish a computer or other object because they have become emotionally attached to it, who give computers (and other technologies, most notably automobiles) a name, and who carry on running dialogues with machines that cannot listen. These responses are not evidence for anthropomorphism, because anthropomorphism, as defined here, involves the thoughtful, sincere belief that the object has human characteristics. If the adults who exhibit the previous behaviors were asked whether the object they were orienting to actually had human traits and characteristics, the evidence suggests that adults…would say 'no" (p. 93)

According to Nass and Moon (2000) and other scholars promoting a mindless conceptualization of computers and agents, people are not treating machines as if they are human in communication because people do not actually think the machines are human and share any qualities with humans.

This study's findings, however, demonstrate otherwise. Participants recognize human or human-like qualities and characteristics in agents. The counter argument could be posed that people do not recognize human qualities in agents, that these characteristics are only human-like which is not the same as being human, according to Nass and Moon (2000). However, I also have demonstrated that the ontology of machines, as socially defined, is not stable: From a phenomenological perspective, it shifts with our perceptions. As I have established in the chapter, Ontological Upheaval, machines now share numerous traits with humans beyond those initially identified by Turkle (1984). We see something of ourselves in machines, and we recognize human characteristics in machines to the degree that they no longer are solely human. Therefore, the claim cannot be made that we do not perceive human characteristics in machines because we have reconfigured our understanding of humans and machines to the degree that we now share characteristics. We may not think of a digital agent or a computer as entirely a human, but we do anthropomorphize them culturally (Hayles, 2005) and individually (Turkle, 1984) as this study also has demonstrated.

My goal here is not to enter the mindful or mindless debate. The debate, which centers around theories of the mind (Kim & Sundar, 2012; Nass & Moon, 2000), is a psychological one: My concern is the social. As Goffman (1959) argued, when other people enter our presence we form our understanding of them by taking into account their personal front that we then make sense of within a greater cultural context. We now can say the same of the artificial front. We are

aware of agents, recognize certain characteristics of humans and machines within them, and respond in-kind.

It is important to note that agents are not the machine characteristics or human characteristics that comprise them. They also are more than an amalgamation of both human and machine characteristics. We have come to recognize agents as their own distinct entity. I encountered numerous participants who, when I mentioned one agent, such as Google Voice Search, would also bring up Siri. The agent is no longer unrecognizable. It is its own entity. Google Voice Search, Siri, and S-Voice are their own class. We not only compare agents against humans or machines, that which was known before (Ricoeur, 2005), but also compare agents to one another – that which is now known.

13.2.2 An Awareness of Presence

The second theoretical body of work I draw from focuses on the concept of presence; however, similar to the artificial front, the literature is bifurcated along epistemological and theoretical lines. There is the presence that Ong (1967) and Goffman (1959) speak of that is defined as turning our attention toward and to considering our interiority in relation to that of the other. More recently, scholars have redefined presence as it relates to our use of technology. Here presence is "the illusion of nonmediation" in which we fail to recognize, even partially, that we are interacting with a technology (Lombard & Ditton, 1997). Some scholars have offered a revised definition that does not focus on the "failure" of our senses (e.g. Lee, 2004a); however, these revised definitions still argue that presence occurs when we overlook or do not recognize some aspect of the mediated context. In an HCI context, people's behaviors toward agents have been interpreted as an indication of presence (e.g. Lee, 2004b).

As I discussed in the chapter on presence, people's experiences of presence with social agents follows patterns documented within more recent presence literature. Several findings, however, offer opportunities for theoretical expansion. Some participants reported the presence of a third entity in their interactions with digital social agents, including a human presence. Researchers previously established that most people perceive themselves as interacting directly with a device and not a human behind it; however, my findings reintroduce the possibility of a human actor in our conceptualizations of human-machine communication. Furthermore, existing presence research between humans and machines has focused on dyadic interactions. Participants' reports of a third party, although removed, shifts the context in which presence occurs from one-on-one communication to a triadic or possibly group communication setting.

Another finding that challenges existing presence research is how we measure presence within HCI. "Inappropriate" behavior toward social computers, such as the use of politeness conventions, has been interpreted as people experiencing presence (International Society for Presence Research, 2000; Lombard & Ditton, 1997). In this study, several participants discuss behavior that highly anthropomorphizes the machine. They refer to the agent by its name, thank it, etc. Yet, at the same time, these participants also report that they do not feel a sense of being with another when using the agent. Putting aside the problematic assertion that being polite toward machines is inappropriate because it is unnecessary – What is appropriate communication with machines? The literature never states. – extrapolating people's experiences from their behavior may not be accurate.

The psychological conceptualizations of presence also fall down at the same juncture as theories related to impressions and impression formation: they all assume the machine has a stable ontology. Particularly within the presence literature, a medium is always defined as a

technological entity and can only understood as such. From our revised understanding of the nature of agents and machines, we now know that they share characteristics with humans. Any "failure" or oversight of the medium can be turned on itself: Non-presence is the failure to perceive the humanness within agents. Rather than focusing on what we are or are not perceiving, we should focus on the social experience of presence.

13.2.3 Coming into Being Through Communication

This study was based on epistemological position that we come to know our world and ourselves in and through communication (Blumer, 1969; Carey, 1989; Cooley, 2004; Mead, 1934). This way of knowing that is focused on our interaction with our world and those around us has been the foundation of a large body of work associated with the Chicago School and its successors, including symbolic interactionists. However, much of this scholarship has approached things and humans as distinct entities: Things are given meaning through our communication with others about them and in our self-communication when we use the objects ourselves (Blumer, 1969). Our understanding of people, however, emerges through both direct and indirect communication with them. Digital social agents that speak disrupt the usual senses we rely upon to interact with digital devices and computers. Instead of typing with a phone or scrolling with an iPad, we can speak directly with the agents that often are programmed with a sense of awareness. This study establishes that we can come to know agents in some of the ways that we can people, through our direct vocal, haptic, and visual communication with agents as well as our interaction with others about them.

The communication we encounter via others or the media regarding agents or similar technologies is important to how we make sense of Siri, S-Voice, and Google Voice Search as well as other digital social agents. Many participants report encountering digital social agents in

the media first before seeing or using them in person. People also routinely learn about agents via others, namely friends and family members. These experiences help to shape people's understanding of the agents, what they can do, and how to use them.

Because most people have never experienced a talking, sentient digital entity prior to using or observing agents, they have limited personal resources on which to draw to make sense of the artificial voice emanating from their phone. Some of them look to the only place where they have encountered anything similar, in science fiction and the mass media. People routinely explain digital social agents and artificial intelligence within the context of popular culture making references to *Her*, *2001: A Space Odyssey, AI, Chappie, Minority Report, Transformers, Terminator, War Games, I, Robot, Wall-E, Smart House, Robot & Frank, Bicentennial Man, Star Trek, The Jetsons,* and *Black Mirror* as well as the mainstream news and technology magazines. As with other technological devices, people's interactions with others about agents and their exposure to media messages regarding agents or similar technologies play an important role in how they come to make sense of agents.

Our communication with agents is crucial to our formation of the artificial front, is key to our experience of presence with agents, and is at the center of our renegotiation of the ontology of machines and ourselves. This communication with agents can consist of our own conversations with digital social agents or our direct observations of other people's interactions with agents. People's perceptions of the artificial front as well as their experiences of presence are predicated upon their communication with agents: the agent's voice, the messages being exchanged with the agent, and how the agent conveys the message. Participants also compare the communication occurring between them and the agent to other forms of communication with machines, namely typing. In every aspect of this study from how people imagine the agent to

their sense of being with something lifelike to the understanding they achieve with the agent to their decision to forgo using the agent in favor of texting, people's communication with the agent was crucial to their conceptualization of it.

Communication with agents is important to how we make sense of them because they exist primarily in communication, in and through speech. Agents have no body, other than the phone. They cannot walk up to us. They have no face. They only exist when we are speaking to them or they are speaking to us. When we end an interaction, agents immediately leave our presence; although, they may remain in our minds. It is through communication in which the nature of the agent is "revealed," and according to Heidegger (1977), we are revealed to ourselves. Agents come into being through communication, and we come into being in our communication with them.

13.2.4 The Importance of Talking to Humans

Our understanding of HMC and HCI has been limited primarily to experiments removed from an everyday context, and qualitative approaches and methods are largely missing within this scholarship (Wang & Nelson, 2014) with Turkle's ongoing work being a notable exception. Most HCI research regarding voice-based technologies and presence follow an objectivist, social scientific model focused on people's behaviors. Reeves and Nass (1998) put forward epistemological and methodological arguments in support of social scientific methods, claiming in *The Media Equation*: "If we had asked people to comment on whether they were polite to computers, whether line drawings have personality, or whether they pay more attention to low-fidelity audio, we would have had nothing to report" (p. 255).

This study's findings clearly contradict that claim. People have a lot to say about agents, their interactions with them, and their overall thoughts on the relationship between humans and

machines. This study does not erase epistemological differences between quantitative and qualitative research that are the impetus for Reeves and Nass' argument: In a subsequent book Nass and Brave (2005) argue that anecdotal data is compelling but not objective. Similar to Turkle's (1984) work, however, this study demonstrates another way of knowing and understanding our interactions with machines from the interpretations of participants themselves.

This is not to say that talking about digital agents is easy. Interviews were difficult for some respondents, and some people did reply "I don't know" to certain questions. To some presence and CASA scholars' point, many people stated that they had not critically thought about digital social agents prior to our interview. And in defense of early presence and HCI scholarship such as *The Media Equation*, first published in 1996, more than 20 years has elapsed between this initial research and my interviews. In the interim, multiple voice-based and social technologies have been introduced and integrated into people's lives. We have had several decades to acclimate to increasingly social and personal devices, such as the mobile phone, and digital voices. The subject of talking machines, while not common, is not completely unknown to most people in our robot culture. Participants may not have thought much about talking machines or agents prior to my conversations with them because their lives are saturated by technology, generally, and increasingly human-like technology specifically.

What is important is that when approached, on the street, no less, people can discuss these technologies. Some participants state that they find these conversations interesting, providing them a different perspective on their own lives and the world around them. For researchers, this study's findings, developed from data gathered through qualitative methods and analysis, provide in-depth and nuanced insight into how people conceptualize digital social agents, make sense of them, and integrate them into their lives that cannot be known through

experimental methods. The ability to observe, conduct interviews, and analyze data concurrently allowed me to adapt the research to emerging findings to stretch theoretical categories. The larger cultural insights into communication practices, such as our reliance on typing with machines, would not have been possible without this flexibility. This study's findings allow us to better understand the existing literature, including conceptual and theoretical problems, and develop new theoretical and philosophical directions for exploring the artificial.

13.3 Limitations

Before discussing possibilities for continued research, it is important to discuss this study's limitations regarding method and data collection. I conducted my field interviews in a large urban city in the Midwest during late winter and early spring, and the location and timing of research serve as limitations for several reasons. Technology use, particularly mobile technology use, can be contingent on geographic location. People living in urban areas use their phones to navigate multiple aspects of their lives from looking up public transportation schedules to finding the nearest Starbucks. In contrast, residents of smaller or mid-size cities may not rely on their technology in the same way. People in urban areas also may be more likely to encounter digital voices because they are integrated into public services and utilities. For example, some participants in this study talk about digital agent voices in the context of the public transportation system. Many of these participants were exposed to digital voices when I was talking to them even if they were not from the particular city in which I was working because I was interviewing them in transportation hubs, including an Amtrak station. These findings then should be considered within the context of urban technology use in the United States.

The diversity of my study population also may have been limited by geographic location. Because it was winter when I conducted my field interviews, I had to find indoor locations to

interview people until the final week or two of data collection. These spaces had to be public or semi-public to allow me to work in them and had to be well-suited to observing and interviewing people. I took advantage of cultural spaces, such as a library, and transportation centers, such as train and bus stations, that allowed me to interview people of various backgrounds, including some people with limited technology access. Many of my observations also took place at eateries or coffee shops that had communal spaces, but, given the high price of real estate in a metropolitan area, also had higher prices. The area in the city in which I conducted most of my interviews is a tourist destination that also has a high density of up-scale retailers as well as large corporations with a professional workforce. This may have limited the economic diversity of my study population. Furthermore, the city in general has a large number of higher-education institutions, some of which also were clustered in the area in which I was working. As a result, the educational background of my study population skews more heavily toward people with college and advanced degrees. Economic status and educational background affect people's ability to purchase technologies containing digital social agents as well as their need for and use of technology. With that said, people who did not finish high school or whose highest level of education is high school are included in the study population as are people with varying socioeconomic and employment backgrounds from the unemployed to current CEOs.

This study's results also are representative of the digital social agents included in the study: unspecified Android applications, Google Voice Search, PlayStation applications, S-Voice, and Siri. Every effort was made to include different agents and stretch and test theoretical findings as they relate to each agent. The majority of people I encountered used Siri directly or were exposed to it indirectly either via another person or via the media. While many of my findings are drawn from people's interactions with Siri and at least one other digital social agent,

usually Google Voice Search, if not multiple digital social agents, my ability to compare and to contrast findings across social agents was restricted by the lack of data for some agents. Overall my findings should be viewed within the context of Siri.

My method of conducting active interviews in the field allowed me to interview a wide range of people with varying conceptualizations of agents, despite geographic and agent limitations. Many participants were willing to speak with me for extended periods of time. However, given the breadth of the topics I was covering, I found it difficult to explore in-depth all of the different aspects I was covering in a single interview. For most questions, I was able to follow-up with at least one "why?" but there was not enough time to investigate people's varying perspectives on a single question as is the norm in active interviewing. I adapted my protocol by asking most people the same questions, and so, the findings are representative of most of the people interviewed; however, the topics that I went in-depth on with each participant varied based on their answers. While this solution allows for consistent data collection, the findings could have had more depth if I had additional time with each participant.

13.4 A New Agenda for Studying Agents and HMC

From these findings, their theoretical implications, as well as limitations, come opportunities for ongoing studies as well as new research directions. In many of the individual chapters, I have identified areas for future research including more in-depth investigations of the "why?" question behind many of my findings. The possibility that people experience presence in a triadic interaction, with something listening into their communication with agents, is a particularly intriguing and important subject for additional investigation that may provide insight into presence in the era of government and corporate surveillance. People's conceptualizations that a human is helping the agent to operate also should be investigated further to determine if

theories regarding source orientation have to be revised. Many of the study's limitations also can be addressed through new studies that compare our use of agents across geographic areas and take into account different agents, including agents being introduced into the home. We also need to take more fully into consideration how the type of device – phone, tablet, home system, or even watch – figures into our conceptualization of digital social agents.

In deciding our research trajectories, we have to make decisions about what to include and what to let go, for now (Markham, 2004). One crucial aspect of HMC research that we need to focus on, but I could not address within this study, is critical analysis and reflection on agents and our new understandings of machines and selves. Agents and agent voices are not neutral entities. We imbue them with race, with gender, and with specific descriptions normally reserved for flesh-and-blood humans. We need to challenge these representations and what they mean for the populations being represented as well as those who are underrepresented. As I have done regarding Siri (Guzman, under review), we need to interrogate just who the agent is working for and the power dynamics involved between agents and humans, between the maker of autonomous technologies and the public.

Research also is needed to help us culturally contextualize digital social agents and other artificial entities. Although people's understanding of artificial intelligence was not the main focus of this study, it quickly became clear to me that people's knowledge of AI varies greatly and that many people are ill-informed as to what AI is, relying often on science fiction. The exploration of our conceptualizations of AI and who we are in relation to AI is critical to making sense of agents and other AI technologies. Similarly, people's ideas regarding the difference between humans and computers proved important to understanding some of the data in this

study, and more work is needed to determine where the ontological divide now rests more generally between the mechanical and the biological.

Moving forward with research in human-machine communication more generally we need to rethink how we adapt human-to-human theories of communication for human-to-machine communication. I agree with Jones (2014) that we need to start thinking beyond the comparison of the two to developing an understanding focused on HMC in its own right. A first step toward this development is to move away from concepts and theories that hold ontologies static. The ontology of agents and other emerging technologies will only make sense if we realize that their nature evolves and ours along with them.

We are in the midst of a cultural and technological transition where we are experiencing our world in new ways through very old senses. We are in the verge, which we may have never left after the "information revolution," and, if history is our guide, we risk further diverging from one another (Carey, 1993), this time set off against a new class of beings. To understand the implications of this period of transition and what it means for who we are, we cannot, as Heidegger (1977) warns, be distracted by the technological, the material:

> Everything, then, depends upon this: that we ponder this arising and that, recollecting, we watch over it. How can that happen? Above all through our catching sight of what comes to presence in technology, instead of merely staring at the technological. So long as we represent technology as an instrument, we remain held fast in the will to master it. (p. 32)

"What comes to presence in technology," then, is ourselves, our being and essence, according to Heidegger (1977). All investigation of human-machine communication then has to be at the locus in which both human and machine are created – in communication.

APPENDIX

This appendix provides an overview of the types of questions I asked during participant interviews. These questions address my research questions regarding our conceptualizations of digital social agents and their presence as well as our perspectives of the Self in relation to these technologies. My dissertation also explored the perspectives of both users and non-users and how our conceptualizations of agents and the Self shift over time, and I developed questions tailored to both groups of participants that also address the temporal element of this study. Some questions are adapted from existing interview protocols, and these adaptations are noted with a reference to the original study. Other questions developed out of the research. The questions listed below are ordered by topic to make them easier to review, but this is not a script. Because the goals of qualitative research (Denzin & Lincoln, 2013) and active interviewing (Holstein & Gubrium, 1997) are an understanding of the world from the perspective of the participant, I asked broad questions first and then adapted remaining questions to a participant's answers. I routinely asked "Why?", "Why do you think that …?" or "Tell me more about …", etc as follow-ups to people's replies. These questions cover areas of potential discussion.

Familiarity/Use of digital social agents: These questions focus on whether participants know of and/or have used digital social agents, why they use or don't use them, and a general description of how they use them. Questions regarding an "awareness of" also address presence.

People who have used digital social agents:

1. Have you ever used a technology that you can interact with using your voice?
    a. What is the name of the technology?
2. Have you ever used a device or program that in addition to using voice commands also could complete other tasks that you requested of it?

    a. What type of technology was it?

3. How often do you use X?
4. Describe what you typically do with X.
5. Describe why you use X.
6. Describe/demonstrate a typical interaction with X.
7. Do you think of yourself as speaking with your device or X?
8. Do you think of X as separate from the device?
9. Generally, describe your opinion of X.

People who have not used digital social agents? (Begin with Q1 & Q2 above)

1. Have you heard of devices/programs that allow you to use them with only your voice?
    a. What are the devices/programs?
    b. What are they supposed to do?
    c. Where did you hear about them?
    d. What did (source with information about the technology) say about the technology?
2. Have you heard of devices/programs that can complete different tasks for you just by the sound of your voice?
    a. What are the devices/programs?
    b. What are they supposed to do?
    c. Where did you hear about them?
    d. What did (source with information about the technology) say about the technology?
3. Why do you think you haven't used these types of technologies?

4. (If person identifies a specific barrier to the technology, such as cost), Would you use the technology if …?
    a. What would you use the technology for?
5. Generally, describe your opinion of X.
6. What would make you want to use the technology more?
7. Why do you prefer X mode of communication (typing, touch, etc) over speaking with the device?

Impressions of digital social agents: As discussed, impressions include the characteristics and attributes people assign to digital social agents and the overall "mental images" people form of them (Pavitt, 2009). These questions are for users of digital social agents; they will be adapted when appropriate for people who are familiar with but have not used these technologies.

1. Describe X to me. (Example of non-user adaptation, "describe what you know about X to me.")
2. If you had to describe X to someone who had never heard of X before, how would you describe it?
3. Describe the voice of X.
    a. Why did you select these characteristics?
    b. What about…. (characteristics not mentioned race, etc)
    c. Does X sound human? Why or why not?
4. Sometimes when we hear a voice we form a mental picture of the entity producing the voice. What mental picture, if any, do you form of X? Describe it to me. *Adapted from Lee & Nass (2005).*
    a. Is the mental picture what you think of as X or the voice of X?

5. When you are interacting with X, what do you think you're interacting with?
    a. The program, the device, the image (as applicable)?
6. Do you get the sense of interacting with the voice or the device?
7. What traits do you associate with X?

Relationship to/with digital social agents: These questions aim to understand who digital social agents are to us and how we see ourselves in connection to them. Answers to these questions relate to impressions, as well as conceptualizations of Self, and overlap with presence regarding our connection to a digital entity.

1. Explain how X fits into your daily activity.
2. Would you say that X carries out a specific role for you? If so, what would that role be?
3. Regarding your explanation of your interaction with X above,
    a. You said/demonstrated how you started the exchange with X. Do you always initiate interaction with X or does it sometimes interact with you first?
    b. How would you describe the flow of conversation between you and X?
4. How would you describe X in relation to you?
5. How then would you describe yourself in relation to X?
6. How prominent a role does X play in your life?
7. Do you use X primarily by yourself or around others? Why or why not?

Presence: These questions focus on an awareness of and turning of attention toward (Goffman, 1959; Ong, 1967); forming a connection to and being with (Biocca et al., 2003); and social inhabitance (Jones, 1997). Questions of an awareness of also are addressed in first section.

1. When you are interacting with X do you get the sense as if something else or someone else is with you?
2. Do you get the sense that X is somehow alive?
3. When you are interacting with X do you feel as if X is providing (information, directions, etc) specifically for you? *Adapted from Lombard, Ditton, & Weinstein (2013)*.
4. Do you think X is speaking directly to you?
5. Do you think X is delivering messages just for you?
6. How well do you feel X knows you? *Adapted from Kumar & Benbasat (2002).*
7. How well does X pay attention to you in interaction? How well do you pay attention to X? *Adapted from Nowak and Biocca (2003).*
8. When using X do you ever feel as if X is not a program/machine?
9. Do you wish you had more of a relationship with X? *Adapted, Nowak & Biocca (2003)*
10. Do you think technology X or similar technologies are used by many people?
11. What type of a role do you think X plays in your life? Other people's lives?
12. Do you think many people use X?
13. How prominent a role do you think technologies like X play in our society now? In the future?

Seeing the Self in Light of Digital Social Agents: These questions address generally how participants perceive humans in light of machines and how they perceive themselves. Some of the more general questions regarding humans versus machines are based on some of Turkle's (1984) discussions and approaches to metaphysics of machines.

1. How would you describe yourself overall?
2. How would you describe yourself as a technology user?
    a. How does X figure into your overall use of technology?
3. Describe your proficiency with technology?
4. Does technology help you to be any of the things you just described?
    a. If so, what and how? How does X figure in?
    b. If not, why not?
5. Why did you purchase/not purchase X?
6. You said you use X for Y activities. Why did you select X for those activities?
7. Overall, how would you describe yourself as a technology user?
    a. So if you are Z-type technology user, how does X figure into your overall use of technology?
8. How would other people describe you regarding your use of technology?
    a. Has anyone commented on you using/not using X?
        i. What was your reaction to their thoughts?
    b. Would other people be surprised by your use/not use of X?
9. What are the similarities/differences between humans and X?
10. Is X more like a computer or a human?
    a. In what ways?
    b. What characteristics if any does it share with the opposite (human or computer)?
    c. What would it take for X to be more like the opposite?
11. Do you think computers and digital devices are becoming more like humans?
    a. What about in the future?

Change over time: The other questions listed all address people's current conceptualizations of digital social agents and themselves, with a few questions referring to the future. These questions also are aimed at possible change over time.

1. How did you first hear about X or similar technologies?
2. When you first heard of X or similar technologies, what was your reaction?
3. When you first used X, what was your reaction?
4. How would you have described X following your first use?
5. Has your understanding of X changed with use? If so, how?
6. If asked whether X was more like a human than computer following your first use what would your answer have been? And now?
7. Earlier you said Y in your descriptions of X but now you said Z regarding your early experiences. Why do you think there is a difference? Are there any other differences?
8. When you first interacted with X, did you feel as if the X were speaking directly to you? How does this compare with now?

Demographic characteristics:

1. Age
2. Gender
3. Race/ethnicity
4. Socioeconomic status
5. Education level
6. Occupation
7. Technologies owned.
8. Uses for technologies.

REFERENCES

Adam, A. (1998). *Artificial knowing: Gender and the thinking machine*. New York, NY: Routledge.

Adler, P. A., & Adler, P. (1994). Observational techniques. In *Handbook of qualitative research* (pp. 377–393). Thousand Oaks, CA: SAGE Publications.

Anderson, J. A., & Baym, G. (2004). Philosophies and philosophic issues in communication, 1995-2004. *Journal of Communication*, *54*, 589–615.

Angrosino, M. V., & Mays de Pérez, K. A. (2000). Rethinking observation. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 673–702). Thousand Oaks, CA: SAGE Publications.

Aron, J. (2011). How innovative is Apple's new voice assistant, Siri? *New Scientist*, *212*(2836), 24. http://doi.org/10.1016/S0262-4079(11)62647-X

Aronovitch, C. D. (1976). The voice of personality: Stereotyped judgments and their relation to voice quality and sex of speaker. *Journal of Social Psychology*, *99*, 207–220.

Asch, S. E. (1962). *Social psychology.* Englewood Cliffs, N.J. Retrieved from http://catalog.hathitrust.org/Record/006094136

Balakrishnan, K., & Honavar, V. (2001). Evolutionary and neural synthesis of intelligent agents. In M. Patel, V. Honavar, & K. Balakrishnan (Eds.), *Advances in the evolutionary synthesis of intelligent agents* (pp. 1–27). Retrieved from http://18.7.25.65/sites/default/files/titles/content/9780262162012_sch_0001.pdf

Bardzell, S. (2010). Feminist HCI: Taking stock and outlining an agenda for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 1301–1310). ACM. Retrieved from http://dl.acm.org/citation.cfm?id=1753521

Baym, N.K. (2009). What constitutes quality in qualitative Internet research? In A.N. Markham & N.K. Baym, (Eds.) *Internet inquiry: Conversations about method* (pp. 173-189). Thousand Oaks, CA: Sage Publications Inc.

Becker, H. S. (1996). The epistemology of qualitative research. In R. Jessor, A. Colby, & R. A. Shweder (Eds.), *Ethnography and human development: Context and meaning in social inquiry* (Vol. 27, pp. 53–71). Chicago, IL: University of Chicago Press.

Beniger, J. R. (1987). Personalization of mass media and the growth of pseudo-community. *Communication Research*, *14*(3), 352–371. http://doi.org/10.1177/009365087014003005

Bennahum, D. S. (1998). *Extra life: Coming of age in cyberspace*. New York, NY: Basic Books.

Berger, C. R. (2005). Interpersonal communication: Theoretical perspectives, future prospects. *Journal of Communication*, *55*, 415–447.

Berry, D. M. (2011). *The philosophy of software*. Palgrave Macmillan.

Berryman, S. (2007). The imitation of life in ancient Greek philosophy. In J. Riskin (Ed.), *Genesis redux: Essays in the history and philosophy of artificial life* (pp. 35–45). Chicago: University of Chicago Press.

Bierhoff, H.W. (1989). *Person perception and attribution*. Berlin, Germany: Springer-Verlag.

Biocca, F., Burgoon, J. K., Harms, C., & Stoner, M. (2001). Criteria and scope conditions for a theory and measure of social presence. In *4th Annual International Workshop on Presence*. Philadelphia, PA.

Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence*, *12*(5), 456–480.

Bloom, K., Zajac, D. J., & Titus, J. (1999). The influence of nasality of voice on sex-stereotyped perceptions. *Journal of Nonverbal Behavior*, *23*(4), 271–281.

Blumer, H. (1969). *Symbolic interactionism: Perspective and method*. Englewood Cliffs, NJ: Prentice-Hall.

Boellstorff, T. (2010). *Coming of age in Second Life: An anthropologist explores the virtually human*. Princeton University Press.

Boellstroff, T., Nardi, B., Pearce, C., & Taylor, T. L. (2012). *Ethnography and virtual worlds: A handbook of method*. Princeton, N.J.: Princeton University Press.

boyd, danah. (forthcoming). Making sense of teen life: Strategies for capturing ethnographic data in a newtworked era. In E. Hargittai & C. Sandvig (Eds.), *Digital research confidential: The secrets of studying behavior online*. Cambridge, Mass: MIT Press.

Boyd, J. E., & Perry, R. P. (1972). Impression formation as an interpersonal communication phenomenon. *Canadian Psychologist/Psychologie Canadienne*, *13*(3), 207.

Burgoon, J. K., & Hoobler, G. K. (2002). Nonverbal signals. In M. L. Knapp & J. A. Daly (Eds.), *Handbook of Interpersonal Communication* (3rd ed., pp. 240–299). Thousand Oaks, CA: Sage Publications.

Carey, J. W. (1989). *Communication as culture: Essays on media and society*. New York, NY: Routledge.

Carey, J. W. (1990). Technology as a totem for culture: on americans' use of high technology as a model for social order. *American Journalism*, *7*(4), 242–251.

Carey, J. W. (1993). Everything that rises must diverge: Notes on communications, technology and the symbolic construction of the social. In P. Gaunt (Ed.), *Beyond agendas: New directions in communication research* (pp. 171–184). Westport, CT: Greenwood Press.

Cendrowski, M. (2012). The beta test initiation. *The Big Bang Theory*. Burbank: Warner Brothers.

Chaffee, S. H., & Metzger, M. J. (2001). The end of mass communication? *Mass Communication & Society*, *4*(4), 365–379.

Charmaz, K. (2014). *Constructing grounded theory* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Charmaz, K., & Mitchell, R. G. (2001). Grounded theory in ethnography. In P. Atkinson, A. Coffey, S. Delamont, J. Lofland, & L. Lofland (Eds.), *Handbook of ethnography* (pp. 160–174). Thousand Oaks, CA: SAGE Publications.

Chatman, S. (1978). *Story and discourse: Narrative structure in fiction and film*. Ithaca, NY: Cornell University. Retrieved from http://archive.org/details/StoryAndDiscourseNarrativeStructureInFictionAndFilm

Christians, C. (1997). The ethics of being in a communications context. In C. Christians & M. Traber (Eds.), *Communication ethics and universal values*. Thousand Oaks, CA: SAGE Publications.

Christians, C. (2013). Ethics and politics in qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research* (pp. 125–168). Thousand Oaks, CA: SAGE Publications.

Christians, C., & Carey, J. W. (1989). The logic and aims of qualiative research. In G. Stempel & B. H. Westley (Eds.), *Research methods in mass communication* (pp. 354–374). Cliffs, N.J.: Prentice-Hall.

Clifford, J., & Marcus, G. E. (1986). *Writing culture: The poetics and politics of ethnography* (25th Anniversary). Berkley: University of California Press.

Collins, E. C., Biernat, M., & Eidelman, S. (2009). Stereotypes in the communication and translation of person impressions. *Journal of Experimental Social Psychology*, *45*(2), 368–374. http://doi.org/10.1016/j.jesp.2008.09.005

Cooley, C. (1897/2004). The process of social change. In J. D. Peters & P. Simonson (Eds.), *Mass communication and American social thought: key texts, 1919-1968* (pp. 21–24). Lanham, Md: Rowman & Littlefield Publishers.

Crockett, P. F. (1965). Cognitive complexity and impression formation. In B. A. Maher (Ed.), *Progress in experimental personality research* (Vol. 2, pp. 47–90). New York, NY: Academic Press.

Dance, F. E. X. (1970). The "concept" of communication. *Journal of Communication*, *20*(2), 201–10.

Delia, J. G. (1972). Dialects and the effects of stereotypes on interpersonal attraction and cognitive processes in impression formation. *Quarterly Journal of Speech*, *58*, 285–297.

Delia, J. G. (1977). Constructivism and the study of human communication. *Quarterly Journal of Speech*, *63*, 66–83.

Delia, J. G., Clark, R. A., & Switzer, D. E. (1974). Cognitive complexity and impression formation in information social interaction. *Speech Monographs*, *41*(4), 299–308.

Delia, J. G., O'Keefe, B. J., & O'Keefe, Daniel J. (1982). The constructivist approach to communication. In F. E. X. Dance (Ed.), *Human Communication Theory: Comparative Essays* (pp. 147–191). New York, NY: Harper & Row.

Denzin, N. K. (1992). *Symbolic interactionism and cultural studies: The politics of interpretation*. Malden, MA: Blackwell.

Denzin, N. K. (2002). Confronting ethnography's crisis of representation. *Journal of Contemporary Ethnography*, *31*, 482–490.

Denzin, N. K., & Lincoln, Y. S. (2013). The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *The landscape of qualitative research* (pp. 1–42). Thousand Oaks, CA: SAGE Publications.

Diebold, J. (1966). Goals to match our means. In C. R. Dechert (Ed.), *The social impact of cybernetics* (pp. 1–10). New York, NY: Simon and Schuster.

Duggan, M. (2013). *Cell phone activities 2013*. Pew Research Center. Retrieved from http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013/

Eckles, D., Wightman, D., Carlson, C., Thamrongrattanarit, A., Bastea-Forte, M., & Fogg, B. J. (2009). Social responses in mobile messaging: influence strategies, self-disclosure, and source orientation. In *CHI 2009: Studying Cell Phone Use*. Boston, MA.

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication*, *11*(2), 415–441. http://doi.org/10.1111/j.1083-6101.2006.00020.x

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (2011). *Writing ethnographic fieldnotes* (2nd Ed.). Chicago, IL: University of Chicago Press.

Entman, R., & Steinman, C. (2008, Nov). Tear down the walls: Re-envisioning communication theory and research. Paper presented at the National Communication Association, San Diego, CA.

Eyssel, F., & Hegel, F. (2012). (S)he's got the look: Gender stereotyping of robots. *Journal of Applied Social Psychology*, *42*(9), 2213–2230. http://doi.org/10.1111/j.1559-1816.2012.00937.x

Farley, T. (2005). Mobile telephone history. *Telektronikk*, *3*, 22–34.

Flaherty, M. G. (2002). The crisis in representation: A brief history and some questions. *Journal of Contemporary Ethnography*, *31*, 479–482.

Fogg, B. J. (2002). *Persuasive technology*. Morgan Kaufmann.

Fogg, B. J. (2007). The future of persuasion is mobile. In B. J. Fogg & D. Eckles (Eds.), *Mobile persuasion: 20 perspectives on the future of behavior change* (pp. 5–14). Palo Alto, CA: Stanford University.

Fogg, B. J., & Eckles, D. (Eds.). (2007). *Mobile persuasion: 20 perspectives on the future of behavior change*. Standford, CA : Stanford Captology Media,.

Fontana, A., & Frey, J. H. (2000). The interview: From structured questions to negotiated text. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 645–671). Thousand Oaks, CA: SAGE Publications.

Fortunati, L. (2013). Afterword: Robot conceptualizations between continuity and innovation. *Intervalla*, 116–129.

Geertz, C. (1973). *The interpretation of cultures*. New York, NY: Basic Books.

Gergen, K. J. (1999). *An invitation to social construction*. Thousand Oaks, CA: SAGE Publications.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York, NY: Aldine Publishing.

Goffman, E. (1959). *The presentation of self in everyday life*. New York, NY: Anchor Books.

Goffman, E. (1967). On face-work: An analysis of ritual elements in social interaction. In *Interaction ritual: Essays on face-to-face behavior*. Garden City, NY: Anchor Books.

Gong, L., & Nass, C. (2007). When a talking-face computer agent is half-human and half-humanoid: Human identity and consistency preference. *Human Communication Research*, *33*(2), 163–193. http://doi.org/10.1111/j.1468-2958.2007.00295.x

Google. (2014, October 14). OMG! Mobile voice survey reveals teens love to talk. Retrieved from http://googleblog.blogspot.com/2014/10/omg-mobile-voice-survey-reveals-teens.html

Gunkel, D. J. (2007). *Thinking otherwise*. West Lafayette, IN: Purdue University Press.

Gunkel, D. J. (2012). Communication and artificial intelligence: Opportunities and challenges for the 21st Century. *Communication+ 1*, *1*(1), 1.

Guzman, A. L. (Under Review). Making AI Safe for Humans: A Conversation with Siri. In *Forthcoming,* XXXXXXX.

Guzman, A.L. (2013, Oct.). Making machines safe for humans: The case of Siri. Paper presented at IR14, Association of Internet Researchers, Denver, CO.

Guzman, A. L. (2014). From channel to communicator: Rethinking the role of technology in communication. Presented at the National Communication Association, Chicago, IL.

Halpern, D., & Katz, J. E. (2013). Close but not stuck: Understanding social distance in human-robot interaction through a computer mediation approach. *Intervalla*, *1*. Retrieved from http://www.fc.edu/intervalla/images/pdf/3_halpern_katz.pdf

Handelman, D. (2003). Mass communication and para-social interaction: Observations on intimacy at a distance. In E. Katz, J. D. Peters, T. Liebes, & A. Orloff (Eds.), *Canonic texts in media research: Are there any? Should there be? How about these?*. Cambridge, UK: Polity Press.

Hayles, N. K. (2005). Computing the human. *Theory, Culture & Society*, *22*(1), 131–151. http://doi.org/10.1177/0263276405048438

Heidegger, M. (1977). *The question concerning technology, and other essays*. New York, NY: Harper and Row.

Held, V. (2006). *The ethics of care: Personal, political, and global*. New York, NY: Oxford University Press.

Herbst, S. (2008). Disciplines, intersections, and the future of communication research. *Journal of Communication*, *58*(4), 603–614. http://doi.org/10.1111/j.1460-2466.2008.00402.x

Hewitt, J. P. (2003). Symbols, objects, and meanings. In L. T. Reynolds & N. J. Herman-Kinney (Eds.), *Handbook of symbolic interationism* (pp. 307–327). Walnut Creek, CA: AltaMira.

Hine, C. (2009). How can qualitative internet researchers define the boundaries of their projects? In A. Markham & N. K. Baym (Eds.), *Internet inquiry: Conversations about method* (pp. 1–20). Los Angeles: Sage Publications.

Höflich, J. R. (2013). Relationships to social robots: Towards a triadic analysis of media-oriented behavior. *Intervalla*, 35–48.

Holstein, J. A., & Gubrium, J. F. (1995). *The active interview* (Vol. 37). Thousand Oaks, CA: SAGE Publications.

Holstein, J. A., & Gubrium, J. F. (1997). Active interviewing. In D. Silverman (Ed.), *Qualitative research: Theory, method, and practice* (pp. 113–129). London ; Thousand Oaks, CA: Sage Publications.

Horton, D., & Wohl, R. R. (2004). Mass communication and para-social interaction: Observations on intimacy at a distance. In J. D. Peters & P. Simonson (Eds.), *Mass*

communication and American social thought: key texts, 1919-1968 (pp. 373–386). Lanham, Md: Rowman & Littlefield Publishers.

Houkes, W., & Meijers, A. (2006). The ontology of artefacts: The hard problem. *Studies in History and Philosophy of Science Part A*, *37*(1), 118–131. http://doi.org/10.1016/j.shpsa.2005.12.013

Hummert, M. L., Garstka, T. A., Ryan, E. B., & Bonnesen, J. L. (2004). The role of age stereotypes in interpersonal communication. In J. F. Nussbaum & J. Coupland (Eds.), *Handbook of communication and aging research* (2nd ed., pp. 91–114). Mahwah, NJ: Lawrence Erlbaum Associates.

Husbands, P., Holland, O., & Wheeler, M. (Eds.). (2008). *The mechanical mind in history*. Cambridge, Mass.: MIT. Retrieved from http://site.ebrary.com/id/10214161

Innis, H. A. (2007). *Empire and communications*. Lanham, Md: Rowman & Littlefield.

Innis, H. A. (2008). *The bias of communication* (2nd ed.). University of Toronto Press.

International Society for Presence Research. (2000). Presence defined. Retrieved February 18, 2014, from http://ispr.info/about-presence-2/about-presence/

Janesick, V. J. (2000). The choreography of qualitative research design: Minuets, improvisations, and crystallization. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 379–400). Thousand Oaks, CA: SAGE Publications.

Jensen, K. B. (2012). *A handbook of media and communication research*. New York, NY: Routledge.

Jones, S. (Ed.). (1997). *Virtual culture: Identity and communication in cybersociety*. London ; Thousand Oaks: Sage Publications.

Jones, S. (2010). Technology: The digital sublimation of the electronic sublime. In L. Steiner & C. Christians (Eds.), *Key concepts in critical cultural studies*. Urbana, IL: University of Illinois Press.

Jones, S. (2014). People, things, memory and human-machine communication. *International Journal of Media & Cultural Politics*, *10*(3), 245–258.

Katz, J. E. (Ed.). (2009). *Machines that become us: The social context of personal communication technology* (4th Printing). New Brunswick, N.J.: Transaction Publishers.

Kelly, G. A. (1991). *Psychology of Personal Constructs* (Vol. 1). New York, NY: Routledge.

Kim, Y., & Sundar, S. S. (2012). Anthropomorphism of computers: Is it mindful or mindless? *Computers in Human Behavior*, *28*(1), 241–250. http://doi.org/10.1016/j.chb.2011.09.006

Knapp, M. L., Daly, J. A., Albada, K. F., & Miller, G. R. (2002). Background and current trends in the study of interpersonal communication. In M. L. Knapp & J. A. Daly (Eds.), *Handbook of interpersonal communication* (3rd ed., pp. 3–20). Thousand Oaks, CA: Sage Publications.

Kroeker, K. L. (2011). Weighing Watson's impact. *Communications of the ACM*, *54*(7), 13. http://doi.org/10.1145/1965724.1965730

Kumar, N., & Benbasat, I. (2002). Para-social presence and communication capabilities of a web site. *E-Service Journal*, *1*(3), 5.

Kvale, S., & Brinkmann, S. (2009). *InterViews: Learning the craft of qualitative research interviewing*. Thousand Oaks, CA: SAGE Publications.

Lee, E.-J. (2010). The more humanlike, the better? How speech type and users' cognitive style affect social responses to computers. *Computers in Human Behavior*, *26*(4), 665–672. http://doi.org/10.1016/j.chb.2010.01.003

Lee, K. M. (2004a). Presence, explicated. *Communication Theory*, *14*(1), 27–50.

Lee, K. M. (2004b). Why presence occurs: Evolutionary psychology, media equation, and presence. *Presence*, *13*(4), 494–505.

Lee, K. M., & Nass, C. (2004). The multiple source effect and synthesized speech. *Human Communication Research*, *30*(2), 182–207.

Lee, K.-M., & Nass, C. (2005). Social-psychological origins of feelings of presence: Creating social presence with machine-generated voices. *Media Psychology*, *7*(1), 31–45.

Licklider, J. C. R. (1960). Man-computer symbiosis. In R. W. Taylor (Ed.), *In Memoriam: J. C. R. Licklider 1915:1990*. Palo Alto, CA: Systems Research Center.

Lieberman, H., & Selker, T. (2003). *Agents for the user interface*. MIT Media Lab. Retrieved from http://agents.media.mit.edu/publications.html

Lievrouw, L. A. (2009). New media, mediation, and communication study. *Information, Communication & Society*, *12*(3), 303–325. http://doi.org/10.1080/13691180802660651

Linke, C. (2013). Social robotic experience and media communication practices: An exploration on the emotional and ritualized human-technology-relations. *Intervalla*, 49–59.

Litt, E. (2012). Knock, knock. who's there? The imagined audience. *Journal of Broadcasting & Electronic Media*, *56*(3), 330.

Littlejohn, S. W., & Foss, K. A. (2008). *Theories of human communication*. Thomson/Wadsworth.

Lombard, M., & Ditton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer-Mediated Communication*, *3*(2), 0–0. http://doi.org/10.1111/j.1083-6101.1997.tb00072.x

Lombard, M., Ditton, T., & Weinstein, L. (2013). Measuring presence: The Temple Presence Inventory. Retrieved from http://matthewlombard.com/research/p2_ab.html

Manovich, L. (1995). An archeology of a computer screen. *Kunstforum International*, 1–15.

Manovich, L. (2001). *The language of new media*. MIT Press.

Markham, A. N. (2004). Representation in online ethnographies: A matter of context sensitivity. In M.D. Johns, S-L Chen, & J. G. Hall (Eds.), *Online social research: Methods, issues, and ethics* (pp. 141-155). New York, NY: Peter Lang.

Markham, A.N., & Baym, N.K. (Eds.) (2009). *Internet inquiry: Conversations about method*. Thousand Oaks, CA: Sage Publications Inc.

Martinez, A. R. (2010). Natural language processing. *Wiley Interdisciplinary Reviews: Computational Statistics*, *2*(3), 352–357. http://doi.org/10.1002/wics.76

Marvin, C. (1988). *When old technologies were new: Thinking about electric communication in the late nineteenth century*. Oxford University Press.

Marvin, C. (1990). Reconsidering James Carey: How many rituals does it take to make an artifact? *American Journalism*, *7*, 216–226.

Marwick, A. E., & boyd, danah. (2011). I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. *New Media & Society*, *13*(1), 114–133. http://doi.org/10.1177/1461444810365313

Marx, L. (2000). *The machine in the garden: Technology and the pastoral ideal in America*. Oxford University Press.

Maxwell, J. A. (2013). *Qualitative research design* (3rd ed.). Thousand Oaks, CA: SAGE Publications.

McCall, G. J. (2003). Interaction. In L. T. Reynolds & N. J. Herman-Kinney (Eds.), *Handbook of symbolic interationism* (pp. 327–348). Walnut Creek, CA: AltaMira Press.

McLuhan, M. (1994). *Understanding media: The extensions of man*. Cambridge, Mass.: MIT Press.

McLuhan, M. (2011). *The Gutenberg galaxy*. University of Toronto Press.

Mead, G. H. (1934). Obstacles and promises in the development of the society. In *Mind, self and society*. Chicago, IL: University of Chicago Press.

Merton, R. K. (2004). The social and cultural context. In J. D. Peters & P. Simonson (Eds.), *Mass communication and American social thought: Key texts, 1919-1968* (pp. 215–218). Lanham, Md: Rowman & Littlefield Publishers.

Milgrim, D. (2012). *Siri & me: A modern love story*. New York, NY: Blue Rider Press.

Moon, Y. (2000). Intimate exchanges: Using computers to elicit self-disclosure from consumers. *Journal of Consumer Research*, *26*(4), 323–339. http://doi.org/10.1086/209566

Moon, Y., & Nass, C. (1996). How "real" are computer personalities?: Psychological responses to personality types in human-computer interaction. *Communication Research*, *23*(6), 651–674. http://doi.org/10.1177/009365096023006002

Mori, M. (2012). The uncanny valley. *IEEE Robotics & Automation Magazine*, 98–100. http://doi.org/10.1109/MRA.2012.2192811

Muller, M. (2011). Feminism asks the "Who" questions in HCI. *Interacting with Computers*, *23*(5), 447–449. http://doi.org/10.1016/j.intcom.2011.02.001

Mumford, L. (2010). *Technics and civilization*. The University of Chicago Press.

Murphy, E., & Dingwall, R. (2001). The ethics of ethnography. In P. Atkinson, Coffey, S. Delamont, J. Lofland, & L. Lofland (Eds.), *Handbook of ethnography* (pp. 339–351). Thousand Oaks, CA: SAGE Publications.

Nass, C. (2004). Etiquette equality: Exhibitions and expectations of computer politeness. *Communications of the ACM*, *47*(4), 35–37.

Nass, C., & Brave, S. (2005). *Wired for speech: How voice activates and advances the human-computer relationship*. Cambridge, Mass: MIT Press.

Nass, C., & Moon, Y. (2000). Machines and mindlessness: Social responses to computers. *Journal of Social Issues*, (56), 81–103.

Nass, C., Moon, Y., Fogg, B. J., Reeves, B., & Dryer, D. C. (1995). Can computer personalities be human personalities? *International Journal of Human-Computer Studies*, *43*, 223–239.

Nass, C., Moon, Y., & Green, N. (1997). Are machines gender neutral? Gender-stereotypic responses to computers with voices. *Journal of Applied Social Psychology*, *27*(10), 864–876.

Nass, C., Steuer, J., & Tauber, E. R. (1994). Computers are social actors. *Conference Companion on Human Factors in Computing Systems*, 72–78. http://doi.org/10.1145/259963.260288

Nass, C., Steuer, J., Tauber, E., & Reeder, H. (1993). Anthropomorphism, agency, and ethopoeia: computers as social actors. In *INTERACT'93 and CHI'93 conference companion on Human factors in computing systems* (pp. 111–112). ACM. Retrieved from http://dl.acm.org/citation.cfm?id=260137

Neisser, U. (1966). Computers as tools and as metaphors. In C. R. Dechert (Ed.), *The social impact of cybernetics* (pp. 71–93). New York, NY: Simon and Schuster.

Nowak, K. L., & Biocca, F. (2003). The effect of the agency and anthropomorphism on users' sense of telepresence, copresence, and social presence in virtual environments. *Presence: Teleoperators and Virtual Environments*, *12*(5), 481–494.

Ong, W. J. (1967). *The presence of the word*. New Haven, CT: Yale University Press.

Ong, W. J. (1975). The writer's audience is always a fiction. *PMLA*, *90*(1), 9. http://doi.org/10.2307/461344

Pacey, A. (1983). *The culture of technology* (First MIT Press). Cambridge, Mass.: MIT Press.

Papacharissi, Z. (2011). *A networked self*. New York, NY: Routledge.

Papacharissi, Z. (2012). Without you, I'm nothing: Performances of the self on Twitter. *International Journal of Communication*, *6*, 18.

Pavitt, C. (2009). Impression formation. In S. W. Littlejohn & K. A. Foss (Eds.), *Encyclopedia of communication theory* (pp. 203–206). Thousand Oaks, CA: Sage Publications.

Peters, J. D. (2012). *Speaking into the air: A history of the idea of communication*. University of Chicago Press.

Peters, J. D., & Simonson, P. (Eds.). (2004). *Mass communication and American social thought: Key texts, 1919-1968*. Lanham, Md: Rowman & Littlefield Publishers.

Pinch, T. (2009). The social construction of technology: The old, the new, and the nonhuman. In P. Vannini (Ed.), *Material culture and technology in everyday life: Ethnographic approaches* (pp. 15–26). New York, NY: Peter Lang.

Pittam, J., & Gallois, C. (1986). Predicting impressions of speakers from voice quality: Acoustic and perceptual measures. *Journal of Language and Social Psychology*, *5*(4), 233–247. http://doi.org/10.1177/0261927X8600500401

Pooley, J. (2008). The new history of mass communication research. In D. W. Park & J. Pooley (Eds.), *The history of media and communication research* (pp. 43–70). New York, NY: Peter Lang.

Presence. (n.d.). *OED Online*. Oxford University Press. Retrieved from http://www.oed.com.proxy.cc.uic.edu/view/Entry/150669

Quintana, L. R., Crowell, C. R., Pryor, J. B., & Adamopoulos, J. (1982). Human-computer interaction: A preliminary social psychological analysis. *Behavior Research Methods & Instrumentation*, *14*(2), 210–220.

Reeves, B., & Nass, C. I. (1998). *The media equation*. Standford, CA: CSLI Publications.

Ricoeur, P. (2005). *The course of recognition*. Cambridge, MA: Harvard University Press.

Riskin, J. (Ed.). (2007). *Genesis redux: Essays in the history and philosophy of artificial life*. Chicago: University of Chicago Press.

Rode, J. A. (2011). A theoretical agenda for feminist HCI. *Interacting with Computers*, *23*(5), 393–400. http://doi.org/10.1016/j.intcom.2011.04.005

Roloff, M. E., & Anastasiou, L. (2001). Interpersonal communication research: An overview. *Communication Yearbook*, *24*, 51–70.

Rosenblatt, P. C., & Meyer, C. (1986). Imagined interactions and the family. *Family Relations*, *35*(2), 319. http://doi.org/10.2307/583641

Ruscher, J. B. (1998). Prejudice and stereotyping in everyday communication. *Advances in Experimental Social Psychology*, *30*, 241.

Saldaña, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Schramm, W. (1971). Nature of communication between humans. In *The process and effects of mass communication* (Revised, pp. 3–53). Urbana, IL: University of Illinois Press.

Schramm, W. (1973). *Men, messages, and media: A look at human communication*. New York, NY: Harper & Row.

Schramm, W. (1997). Institutionalization of advanced communication study in American universities. In S. H. Chaffee & E. M. Rogers (Eds.), *The beginnings of communication study in America: a personal memoir* (pp. 155–180). Thousand Oaks, CA: Sage Publications.

Sconce, J. (2000). *Haunted media: Electronic presence from telegraphy to television*. Durham, N.C.: Duke University Press.

Scott, G. G. (2014). More than friends: Popularity on facebook and its role in impression formation. *Journal of Computer-Mediated Communication*, *19*(3), 358–372. http://doi.org/10.1111/jcc4.12067

Shepherd, G. J. (1993). Building a discipline of communication. *Journal of Communication*, *43*(3), 83–91. http://doi.org/10.1111/j.1460-2466.1993.tb01279.x

Simonson, P., Peck, J., Craig, R. T., & Jackson, J. P. (Eds.). (2013). *Handbook of communication history*. New York, NY: Routledge.

Skalski, P., & Tamborini, R. (2007). The role of social presence in interactive agent-based persuasion. *Media Psychology*, *10*(3), 385–413. http://doi.org/10.1080/15213260701533102

Smith, A. (2015). *U.S. smartphone use in 2015*. Pew Research Center. Retrieved from http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/

Smith, V., Siltanen, S. A., & Hosman, L. A. (1998). The effects of powerful and powerless speech styles and speaker expertise on impression formation and attitude change. *Communication Research Reports*, *15*(1), 27–35.

Snowden, C. (2007). Cstng A pwr4l spLL: D evOLshn f SMS (Casting a powerful spell: The evolution of SMS). In A. Kavoori & N. Arceneaux (Eds.), *The cell phone reader: Essays in social transformation*. New York, NY: Peter Lang.

Solomon, J., & Wash, R. (2014). Human-What interaction? Understanding user source orientation. In *Proceedings of the Human Factors and Ergonomics Society 58th Annual Meeting* (pp. 422–426).

Stemplewska-Żakowicz, K., Walecka, J., & Gabińska, A. (2006). As many selves as interpersonal relations (or maybe even more). *International Journal for Dialogical Science*, *1*(1), 71–94.

Stern, S.R. (2009). A response to Malin Sveningsson. In A.N. Markham & N.K. Baym, (Eds.) *Internet inquiry: Conversations about method* (pp. 94-98). Thousand Oaks, CA: Sage Publications Inc.

Suchman, L. A. (2009). *Human-machine reconfigurations: Plans and situated actions* (2nd ed.). New York, NY: Cambridge University Press.

Sugiyama, S., & Vincent, J. (2013). Social robots and emotion: Transcending the boundary between humans and ICTs. *Intervalla*, *1*, 1–6.

Sundar, S. S., & Nass, C. (2000). Source orientation in human-computer interaction: Programmer, networker, or independent social actor? *Communication Research*, *27*, 683–703. http://doi.org/10.1177/009365000027006001

Sunnafrank, M., & Ramirez, A. (2004). At first sight: Persistent relational effects of get-acquainted conversations. *Journal of Social and Personal Relationships*, *21*(3), 361–379. http://doi.org/10.1177/0265407504042837

Tamagawa, R., Watson, C. I., Kuo, I. H., MacDonald, B. A., & Broadbent, E. (2011). The effects of synthesized voice accents on user perceptions of robots. *International Journal of Social Robotics*, *3*(3), 253–262. http://doi.org/10.1007/s12369-011-0100-4

Tedlock, B. (2000). Ethnography and ethnographic representation. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 455–486). Thousand Oaks, CA: SAGE Publications.

Tidwell, L. C., & Walther, J. B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations: Getting to know one another a bit at a time. *Human Communication Research*, *28*(3), 317–348.

Turing, A. M. (1948). Intelligent machinery. In D. C. Ince (Ed.), *Mechanical intelligence* (pp. 107–128). New York, NY: North-Holland.

Turing, A. M. (1950). Computing machinery and intelligence. In D. C. Ince (Ed.), *Mechanical intelligence* (pp. 133–160). New York, NY: North-Holland.

Turkle, S. (1984). *The second self*. New York, NY: Simon & Schuster.

Turkle, S. (2007). Authenticity in the age of digital companions. *Interaction Studies*, *8*(3), 501–517.

Turkle, S. (2008). Always-on always-on-you: The tethered self. In J. E. Katz (Ed.), *Handbook of mobile communication studies* (pp. 121–137). Cambridge, Mass.: MIT Press.

Turkle, S. (2012). *Alone together: Why we expect more from technology and less from each other*. Basic Books.

Tyler, J. M., & McCullough, J. D. (2009). Violating prescriptive stereotypes on job resumes: A self-presentational perspective. *Management Communication Quarterly*, *23*(2), 272–287. http://doi.org/10.1177/0893318909341412

Utz, S. (2010). Show me your friends and I will tell you what type of person you are: How one's profile, number of friends, and type of friends influence impression formation on social network sites. *Journal of Computer-Mediated Communication*, *15*(2), 314–335. http://doi.org/10.1111/j.1083-6101.2010.01522.x

Van Maanen, J. (2011). *Tales of the field: On writing ethnography* (2nd ed.). Chicago, IL: The University of Chicago Press.

Vannini, P. (Ed.). (2009). *Material culture and technology in everyday life: Ethnographic approaches*. New York, NY: Peter Lang.

Verbeek, P.-P. (2005). *What things do: Philosophical reflections on technology, agency, and design* (English Translation). The Pennsylvania State University Press.

Verbeek, P.-P. (2009). Ambient intelligence and persuasive technology: The blurring boundaries between human and technology. *NanoEthics*, *3*(3), 231–242. http://doi.org/10.1007/s11569-009-0077-8

Verhoeff, N. (2009). Grasping the screen: Towards a conceptualization of touch, mobility and multiplicity. In M. van den Boomen (Ed.), *Digital Material: Tracing New Media In Everyday Life and Technology* (pp. 209–221). Amsterdam University Press.

Von der Pütten, A. M., Krämer, N. C., Gratch, J., & Kang, S.-H. (2010). "It doesn't matter what you are!" Explaining social effects of agents and avatars. *Computers in Human Behavior*, *26*(6), 1641–1650. http://doi.org/10.1016/j.chb.2010.06.012

Wajcman, J. (1991). *Feminism confronts technology*. Pennsylvania State University Press.

Walther, J. B. (1992). Interpersonal effects in computer-mediated interaction: A relational perspective. *Communication Research*, *19*(1), 52–90. http://doi.org/10.1177/009365092019001003

Walther, J. B. (1993). Impression development in computer-mediated interaction. *Western Journal of Communication*, *57*(4), 381–398.

Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, *23*(1), 3–43. http://doi.org/10.1177/009365096023001001

Wang, Z., & Nelson, M. R. (2014). Tablet as human: How intensity and stability of the user-tablet relationship influences users' impression formation of tablet computers. *Computers in Human Behavior*, *37*, 81–93. http://doi.org/10.1016/j.chb.2014.04.041

Warren, D. H. (1982). The development of haptic perception. In W. Schiff & E. Foulke (Eds.), *Tactual perception: a sourcebook*. New York, NY: Press Syndicate of the University of Cambridge. Retrieved from https://books-google-com.proxy.cc.uic.edu/books/about/Tactual_Perception.html?id=UvP0O0al0aMC

Warren, D. H., & Rossano, M. J. (1991). Intermodality relations: Vision and touch. In M. A. Heller & W. Schiff (Eds.), *The psychology of touch*. Hillsdale, N.J.: Lawrence Erlbaum Associates. Retrieved from https://books-google-com.proxy.cc.uic.edu/books/about/The_Psychology_of_Touch.html?id=mC4VAgAAQBAJ

Waytz, A., Morewedge, C. K., Epley, N., Monteleone, G., Gao, J.-H., & Cacioppo, J. T. (2010). Making sense by making sentient: Effectance motivation increases anthropomorphism.

Journal of Personality and Social Psychology, *99*(3), 410–435. http://doi.org/10.1037/a0020240

Weizenbaum, J. (1976). *Computer power and human reason: From judgment to calculation*. New York, NY: W.H. Freeman & Co.

West, C., & Zimmerman, D. H. (1987). Doing gender. *Gender & Society*, *1*(2), 125–151.

Wiener, N. (1954). *The human use of human beings: Cybernetics and society*. Cambridge, Mass: Da Capo Press.

Zajonc, R. B. (1960). The process of cognitive tuning in communication. *The Journal of Abnormal and Social Psychology*, *61*(2), 159.

Zhang, S. (2015, February). No, women's voices are not easier to understand than men's voices. Retrieved May 23, 2015, from http://gizmodo.com/no-siri-is-not-female-because-womens-voices-are-easier-1683901643

Zhao, S. (2006). Humanoid social robots as a medium of communication. *New Media & Society*, *8*(3), 401–419. http://doi.org/10.1177/1461444806061951

Zia, K., Riener, A., Farrahi, K., & Ferscha, A. (2012). A new opportunity to urban evacuation analysis: very large scale simulations of social agent systems in repast HPC. In *Principles of Advanced and Distributed Simulation (PADS), 2012 ACM/IEEE/SCS 26th Workshop on* (pp. 233–242). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6305916

VITA

NAME:	Andrea L. Guzman
EDUCATION:	B.A., Communication, Truman State University, 2001
	M.A., Communication, Northern Illinois University, 2009
	Ph.D., Communication, University of Illinois at Chicago, 2015
TEACHING EXPERIENCE:	Department of Communication, University of Illinois at Chicago, 2010-2015
	College of Communication, DePaul University, Fall 2012, Spring 2014
	Department of Fine Arts, Joliet Junior College, 2009-2012
	Department of Mass Communication, University of St. Francis, Fall 2011
	Communication Department, Aurora University, 2009-2010
	Department of Communication, Northern Illinois University, 2007-2008
HONORS:	PhD Student Travel Award, College of Liberal Arts & Sciences, University of Illinois at Chicago, 2012, 2013, 2015, $500
	Top Student Paper, Human Communication & Technology Division, National Communication Association, Chicago, IL, 2014
	Doctoral Consortium Scholarship, Communication and Technology Division, International Communication Association Annual Conference, Seattle, WA, 2014, $50
	Graduate Student Council Travel Award, University of Illinois at Chicago, 2011, 2012, 2013, $275
	Guido Stempel Award for Top Paper, Graduate Student Interest Group, Association for Education in Journalism and Mass Communication, Chicago, IL, 2012
	Student Presenter Award, Graduate College, University of Illinois at Chicago, 2011, 2012, $300

Paul K. Crawford Award for Excellence in Graduate Study, Department of Communication, Northern Illinois University, 2009

Kappa Tau Alpha Top Scholar Award, Northern Illinois University, 2009

PROFESSIONAL MEMBERSHIPS:

Association for Education in Journalism and Mass Communication
Association of Internet Researchers
International Communication Association
National Communication Association

SELECTED PUBLICATIONS AND PRESENTATIONS:

Guzman, A. L., & Jones, S. (2014). Napster and the press: Framing music technology, *First Monday.* http://dx.doi.org/10.5210/fm.v19il10.5545

Guzman, A. L. (in press). Evolution of news frames during the 2011 Egyptian Revolution: Critical discourse analysis of Fox News and CNN's framing of protesters, Mubarak, & the Muslim Brotherhood. *Journalism & Mass Communication Quarterly.*

Guzman, A.L. (2014). From channel to communicator: Rethinking the role of technology in communication. National Communication Association Annual Convention, Chicago, IL, Nov. 20-23

Guzman, A.L. (2013). Making machines safe for humans: The case of Siri. IR14, Association of Internet Researchers, Denver, CO, Oct. 23-26

Guzman, A.L. (2012). Freedom tech: The portrayal of new media in the Egyptian & Tunisian uprisings, IR13, Association of Internet Researchers, Salford, UK, Oct. 18-21

Guzman, A.L. (2012). U.S. media frames of Egyptian Revolution participants. Association for Education in Journalism and Mass Communication Annual Conference, Chicago, IL, Aug. 10-13

Guzman, A.L. (2009). Virtual news: News media in Second Life. Convergence & Society Conference, Reno, NV, Nov. 5-6