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Toward an Agent-Agnostic Transmission Model: Synthesizing Anthropocentric and Technocentric Paradigms in Communication

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Abstract

Technological and social evolutions have prompted operational, phenomenological, and ontological shifts in communication processes. These shifts, we argue, trigger the need to regard human and machine roles in communication processes in a more egalitarian fashion. Integrating anthropocentric and technocentric perspectives on communication, we propose an agent-agnostic framework for human-machine communication. This framework rejects exclusive assignment of communicative roles (sender, message, channel, receiver) to traditionally held agents and instead focuses on evaluating agents according to their functions as a means for considering what roles are held in communication processes. As a first step in advancing this agent-agnostic perspective, this theoretical paper offers three potential criteria that both humans and machines could satisfy: agency, interactivity, and influence. Future research should extend our agent-agnostic framework to ensure that communication theory will be prepared to deal with an ostensibly machine-inclusive future.

Keywords: meaning-making, communicative functions, machine agency, anthropocentrism, technocentrism

Introduction

Early computer-mediated communication experiences emerged as computers were linked together for technical purposes (data redundancy, security, and transfer, largely within research and government communities) and humans began to organize themselves around data networks and machine actors (Leiner et al., 1997). Despite these machine-machine transaction roots of contemporary communication, machines' roles in communication processes are often relegated to that of facilitating or interfering with humans' sending and

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receiving of messages (Gunkel, 2012). In turn, early human-computer interaction studies took up the dynamics of software and hardware—from hypertext to peripherals—as efficient tools for users' activities (Myers, 1998). Despite the centrality of human goals and influences to human-computer interaction, technologists often consider humans only in terms of their actions (Kaptelinin, 2012). That is, users present "human problems," both in reference to the problems that humans face and solve through technology (Blomqvist, 2018, para. 3) and in reference to how humans create problems to which technology must be resilient (Kletz, 1982, p. 209).

Arguably, one of the simplest but most foundational frameworks for understanding communication as a dyadic process is the transmission model of communication (Shannon & Weaver, 1949), in which sources create messages that are then encoded into signals sent over channels (through some degree of noise) then decoded for consumption by receivers. Taken in terms of this model, scholarship within communication disciplines often characterizes machines merely as channels, and scholarship within the technological disciplines tends to characterize humans merely as senders or receivers. The parceling out of human and machine roles across disciplines is part of each domain's strength in building rich understandings of those roles. However, such parceling is *also* each domain's weakness in that disciplinary blinders prevent important integration of theoretical and empirical work given that the boundaries of what counts as "human" and "machine" are increasingly blurred.

Although some contend the transmission model is obsolete (e.g., for rigidity and linearity; Day, 2000), we argue that the model is a useful tool for approaching emerging sociotechnical phenomena. The model focuses on core communicative functions independent of agent type, and such independence is fundamental for initially catalyzing necessary integration between human-focused and technology-focused paradigms. The model can only be applied to that end, however, if it is engaged in a more egalitarian fashion. Following, this theoretical paper proposes a reframing of the transmission model (as a parsimonious starting point) that focuses on agent functions rather than on heuristic agent roles such that humans and machines should both be considered candidate-actors for *all components* of the model. Such an approach is vital to advancing human-machine communication (HMC) scholarship in that it promotes attention to the "missing mass" of HMC (see Latour, 1992, p. 227)—those unattended-to dynamics of the emerging, unintuitive, and surprising ways that humans and machines make meaning together. Without this very purposeful attention to agent function independent of traditional roles, we risk overlooking the humanistic function of machines and machinic functions of humans.

Our proposition is simultaneously not-new (in that its assumptions are discretely present in more than three decades of communication technology scholarship, outlined below) and new (in that they have not yet been integrated into an accepted paradigm for conducting such scholarship). We first briefly characterize anthropocentric and technocentric communication paradigms, illuminate recent technological and social shifts that drive the need for an agent-agnostic lens in addressing HMC, describe our operationalization of an agent-agnostic approach as grounded in attention to agent functions, and then outline candidate functions for consideration in such an approach.

Anthropocentric and Technocentric Views on Communication

The roles of humans and machines in communication processes are generally engaged via two paradigms. The first is anthropocentric: humans are supreme in relation to other things (including machines) and the world is interpreted principally according to human experience and values (Nass et al., 1995). The other is technocentric: technology's inherent features and capacities are fundamental enablers (Papert, 1987) and constrainers (Woolgar, 1990) of human activity, and humans and environments orient around and adapt to them (Schmoldt, 1992).

The anthropocentric position adopts a relatively narrow view of machines as tools in support of human-to-human interlocution (see Gunkel, 2012). Much of this engagement stems (as Gunkel notes) from early references to "computer conferencing systems" defined as "any system that uses the computer to mediate communication among human beings" (Hiltz & Turroff, 1993, p. 30). In relation to the transmission model, that work often defaults to discrete human and machine roles in communication processes. Specifically, the sender and receiver are human (e.g., citizens), while the encoder, decoder, and channel are machinic (e.g., platforms for facilitating voter literacy). This exclusive role-ascription generates rich understandings of machines' functional roles in communication, yet it limits the scope to machines' instrumental interactivity—human use of technology toward some end (Lister et al., 2009). These works orient themselves toward the problematics and possibilities of technological mediation while missing machines' functioning in other communicative roles. Here, attention is importantly paid to communication *through* machines (e.g., human behaviors, risks, and values associated with social networks; see Kapoor et al., 2018) holistically at the discount of communication *with* machines.

The technocentric position is occupied, in turn, by scholars adopting similarly narrow views of machines as resources or tools in optimization of processes (Taylor & Todd, 1995), generally without attention to the ways that machines are socially constructed in their use (Bijker et al., 1987). A machine is a designed artifact, system, or procedure that shapes human users' experience and actions through the "unfolding" of possibilities (Tidwell, 1999). Although technocentric work often does not formally take up the transmission model despite the framework's origins in technical systems design (Shannon, 1948), similar-but-inverse defaulting to agent-specific roles in terms of that model can still be drawn from those works. Machines are designed and understood largely as senders/encoders and receivers/decoders (e.g., generating or seeking information; Mardini et al., 2018) while humans (although indeed important to some processes) are nearly treated as noise or obstacles in computing tasks. Although humans are the progenitor for much machine activity, they are also the component of machine processes whose shortcomings must be muddled through (i.e., human-fault-tolerant design; De Santis et al., 2008). These works orient toward problematics and possibilities of technologies' design and function as generators or recipients of information while missing considerations of the meaning thereof. Said another way, emphasis is precisely placed on communication *dynamics* among humans and machines but often at the discount of the *import and experience* of those messages.

Sprung from these semantically competing paradigms are rich bodies of work bounded by disciplinary assumptions and aims that, holistically, exist in tension. In relation to humans, machines are discussed both as empowering (Beer, 2009) and constraining (Gagliardone, 2016), controlled (Plotnick, 2017) and automated (Fortunati, 2017), generative (Hasinoff, 2013) and destructive (Hakkarainen, 2012). Nonetheless, both paradigms are in some ways compatible. The nature of each agent class's influence over the other, and their situation across time and space, such that integration based on agent roles or functions is appropriate (see Fortunati, 2014). It is, therefore, necessary for HMC scholars to address these tensions to keep pace with scholarly and practical shifts in how machines function, are experienced, and may integrate into contemporary society.

Drivers for an Agent-Agnostic Approach to Communication

Both technological and social evolutions have prompted shifts in human and machine participations in communication processes. These shifts drive a need to consider agents in a fashion more functionally egalitarian—one that considers how each agent category has sufficient "basic capabilities" to perform functions and so warrant equal consideration (Sen, 1979, p. 218). Before exploring such an agent-agnostic approach to considering human-machine communication processes, however, it is useful to consider shifts in what may count as the relevant basic capabilities.

Operational Shifts

Perhaps most intuitive are machines' emergent functions in traditionally human communicative capacities: message sources, receivers, and feedback initiators. As information sources, voice assistants like Siri generate and convey messages in fashions that elicit human responses more closely mirroring interpersonal human processes than utilitarian technology-use processes (e.g., differentiating among machine voices in performance evaluations; Nass & Steuer, 1993). As sources, machines such as social robots may be perceived as intentionally generating messages, and mental states are attributed to those machines if the vocal or visual cues are sufficiently close to humans' (Banks, 2019). As message receivers, autonomous machines may function as sociable partners with epistemologies of their own (Breazeal, 2004) even if we cannot (yet) discern that form of cognition (cf. Bogost, 2012) such that we may need to consider, for instance, whether and how humans should adjust language patterns in order to be understood by a chatbot. Machines also engage in feedback-initiator roles by anticipating human responses (Pantic et al., 2007) and adapting behaviors and responses to user inputs and contexts, as with domain-specific chatbot feedback (Shawar & Atwell, 2007) or semi-autonomous avatars' rejection/correction of user requests (Banks, 2015).

In turn, humans can function in traditionally machinic communicative roles: habitual message encoders/decoders or mediating channels. They may take up information generated by sociotechnical systems and encode responses that are not necessarily authentic or original information but are encoded according to norm or habit (e.g., responding to Facebook posts through phatic "likes"; see Hayes et al., 2016). Humans also function as message channels or repositories, carrying or retaining information for the purpose of delivering it to another recipient (Cowan, 1988) as when committing a license plate number to memory in order to tell a police officer. In that way, organic bodies are multimodal themselves, with visual and aural channels (i.e., gesture and voice; Mehrabian, 1972). Even further, the body may function as an interface between the world and the brain, conveying sensory information across the Cartesian divide (Biocca, 1997). Humans also function as decoders of information; accessing, filtering, and breaking down information into usable pieces, as when deciphering news content on social media to determine which represent authentic or fake news (De Keersmaecker & Roets, 2017).

Ultimately, machines perform traditional human communication functions and humans perform traditional machinic functions. This requires recharacterization of *both* as variably intelligent, interactive agents (Chesebro & Bonsall, 1989) and as variably facilitative instruments.

Phenomenological Shifts

The way that humans and machines are *experienced* by others has also shifted. Machines and the information they convey may be experienced as human(like), which affects perceptions of how interactions with them should proceed (de Graaf et al., 2016). This machine anthropomorphism—a perceiving as or imbuing with humanness(likeness)—emerges as humans apprehend and process social cues (Epley et al., 2007) and then engage in increasingly social reactions. Cueing may be visual (e.g., inviting buttons to facilitate collaboration), aural (e.g., mobile assistant voices that extend offers to help), kinetic (e.g., animated emoji movements such as a wave gesture or confetti projection), proxemic (e.g., spatial avatar behaviors like following or clustering), and/or chronemic (e.g., chatbot response lag times). This signaling facilitates experiences of machines as human(like), such that users develop relationships with them (Banks, 2015; de Graaf et al., 2016) or engage content representing actual and non-actual phenomena as actually real (Nowak, 2003). In tandem with anthropomorphism, this sense of realness may rely on perceptions of agency, toward the application of human metaphors to understand machine functioning (e.g., "an electronic brain"; Bolter, 1984, p. 40).

In turn, humans are also experienced to some extent as machinic. The human-as-machine metaphor emerged by some accounts through media representations of troped, uncanny characters (androids, autonomous dolls; see Neisser, 1966). In line with modernist perspectives on human behavior as rooted in observable, measurable, and predictable behaviors (Gergen, 1991), we have come to liken human thought and action to computer programming and machine action (see Newell & Simon, 1972) such that lay understandings of behaviors rely on references to *processing*, *interfacing*, or even being *cogs in the system* (Gigerenzer & Goldstein, 1996). Humans subjectively and actually draw on social infrastructures (e.g., network structures; Rainie & Wellman, 2012) to conduct information exchanges subject to specific protocols (e.g., conversations according to social norms; Jackson, 1965) via algorithms or programs (e.g., schemata or scripts; Axelrod, 1973), evidently toward the presentation and application of that information (i.e., stimulation of meaning in the other's mind; McCroskey, 1992). Mechanization of domestic spaces sees technology's active (albeit often opaque) shaping of humans' leisure time and private spaces (Fortunati, 2006), and technology and humanity are thought to mutually and cooperatively evolve (i.e., as a collective and connective intelligence; Longo, 2003). These characterizations, importantly, reveal that (independent of actual integrations, syntheses, or overlaps), people *experience* humans and machines in non-exclusive ways.

Such phenomenological shifts suggest a need to de-privilege instrumentalist views on technologies (e.g., Heidegger, 1977). Positions that frame machines as mere tools limit the evaluation of their functionality to their human-intended purposes (rather than actual or potential behaviors). Instead, machines must be regarded as part of (and not apart from) the social structure of everyday human life with the ability to steer human behaviors and influence interaction outcomes (Latour, 1994). Hence, the role of machines in interactions with humans, and in society as a whole, is not restricted to the machine's mechanisms, physical and technical properties, or actual abilities (de Graaf, 2016). Rather, machines are also materially embedded and participate in meaning-making processes; from self-driving cars choosing quickest or most scenic routes to the construction of music consumption experiences sans material artifacts (Puntoni, 2018). Notably, our use of "meaning-making" here does not assume that machines can or must encode or decode information in the same fashion as do humans (cf. Bogost, 2012). Rather, we contend that the attention to meaning-making as a fundamental communication process is likewise to be accounted for agnostically: agents make meaning as a function of their intrinsic natures such that the process, product, or effects of machine-made meaning may be different from *but not lesser than* human-made meaning. In the same turn, it may not necessarily be that they are different, as both artificial and natural intelligence may draw from frames, scripts, schemas, routines, and maps (see Tenkasi & Boland, 1993). We take up meaning-making as a system's response (behavioral, computational, or otherwise) to an environmental signal from which information is extracted and during which value is assigned (Neuman, 2006). In all, these meaning-making processes contribute to the shape of society, as social structures in turn influence the shape of humans and machines (see MacKenzie & Wajcman, 1999). We come to know occupants of each category through our experience of the other—so much so that even the boundaries of agent ontologies may not be as solid as they once were.

Ontological Shifts

Finally, in tandem with operational and phenomenological shifts, ontological shifts can be observed. While operational shifts account for how agents work and phenomenological shifts are a matter of how agent classes are experienced, ontological shifts are a more objective consideration of what each class *is* and whether they are actually separate. The ontological categories of "human" and "machine" have long been and are still converging through proximations in appearance, roles, and some forms of intelligence (cf. Biocca, 1997) and through functional interdependence (cf. Marx, 1887). Here, we'll define a human, liberally, as an entity with personhood via functional and moral qualities of a unified, conscious member of the species *Homo sapiens* (Taylor, 1985). In turn, a machine is an "an assembly of parts that transmit and modify forces, motion, and energy one to another in a predetermined manner" (Harada, 2001, p. 456) where forces and motion include the internal workings of physical systems (see Seltzer, 2014) and energy includes information (Khurmi & Gupta, 2005).

Machines with increasingly humanlike social cues encourage people to engage in social interaction and "push our Darwinian buttons" with their displayed behaviors that humans associate with sentience, intentions, and emotions (Turkle, 2010, p. 3). For instance, although

Twitter bots were originally designed for the retweeting of existing content, programming advances have brought forth bots that populate profiles, emulate humans' chronemic posting signatures, comment on others' posts, identify influencers and seek to gather followers, and clone some human(like) behaviors (Ferrara et al., 2016). This causes machines to ontologically fluctuate between something animate (adhering to human-category frameworks for sociability) and something inanimate (adhering to machine-category rigidity; de Graaf, 2016; de Graaf et al., 2016) such that they may actually constitute a new category of agent altogether (Kahn et al., 2011).

In parallel, humans may be categorized in some contexts as more machinic than social, very literally functioning *as machines:* "device[s] with a large number of internal . . . states" (Pentland & Liu, 1999, p. 229)—and as biological machines with a talent for semantics over syntax (Searle, 1990). Human behavior relies, to an extent, on (semi-)invariant rules and algorithms for how language, reasoning, and behaviors in relation to these states (e.g., such as encoding and decoding of symbols and reliance on cognitive shortcuts; Simon, 1990), such that human behavior can be computationally modeled and predicted (Subrahmanian & Kumar, 2017). Specific to communication behaviors, human-authored digital messages are both produced and consumed as entertainment—as informational or experiential assets—rather than necessarily according to socioemotional drives, as with the commodification of personal information inherent to dating apps (Hobbs et al., 2017).

There is rising fuzziness between human and machine categories and advances in cyborg potentials both in very literal and material integrations (e.g., mechanical limbs, biomimetic technology; Barfield & Williams, 2017) and in looser configurations (e.g., a person wearing a watch or using a keyboard; see Gunkel, 2000). Following, there are less-concrete distinctions among modes of (non-)aliveness compared to our traditional understandings of those states (Jipson & Gelman, 2007). For instance, biohybrid robots combine organic components (like cultured muscle tissues) with machine components (like gels, electrodes, and metal frameworks) so that electrical stimulation allows the robot to perform human-like behaviors like joint movement (see Morimoto, Onoe, & Takeuchi, 2018). Hence, when a biohybrid robot moves a hand or a finger, is that agent somehow alive? The aggregation of human and machine traits, components, or actions can result in an "overuse" of human categories for machines and associated application of group norms (Nass & Moon, 2000, p. 82). As ontological distinctions fade (Guzman, 2016a, 2018), some call for recognizing new ontologies for sophisticated sociable machines (Kahn et al., 2011) and recognizing entities beyond the "outdated category" of human (i.e., acknowledging the posthuman or transhuman; Wentzer & Mattingly, 2018, p. 144). Rather than arguing for *more* ontological categories in addressing communication dynamics, we suggest instead a reframing: shift away from agent categories to instead attend to the functions enacted.

Toward Human-Machine Equity in the Transmission Model

Considering those operational, phenomenological, and ontological shifts in humans' and machines' roles in communication processes, the transmission model requires re-examination. Recall that the model refers to the cumulative structure of a message source (or sender) encoding (translating meaning indicators) a message (some information) over a channel (some medium) which is then decoded (otherwise translated) for interpretation by a target (or receiver), generally with some accounting for noise (signal disturbance). Although humans and machines are typically assigned to particular roles, we argue that humans and machines are *potentially equivalent* actors in communication processes. Following, we work here toward an egalitarian reframing of HMC processes (moving away from default roles and toward considering basic capabilities) and suggest directions for inquiry through this lens.

Human-Machine Communication as Agent-Agnostic Transmission

Given that both humans and machines have been shown to function as actors across *all stages* of the transmission model of communication, we advance a decades-old, cross-disciplinary sentiment (that isolating agent types is epistemologically problematic; e.g., Giuseppe & Galimberti, 1998) by proposing a reframing of the transmission model that accounts for ways that *both* humans and machines can function as *both* functional and social actors according to the *same* criteria. We draw here on the notion of HMC as the "creation of meaning among humans and machines" (Guzman, 2018, p. 1), in which one or more agents relay data among others and in which meaning is encoded and decoded according to the native modes of each agent. This definition subsumes characterizations from technocentric perspectives privileging the agency of machines in social interactions as well as those from anthropocentric perspectives privileging humans as relevant agents. HMC is regarded as an umbrella concept acknowledging varied actors according to varied functions (Guzman, 2016b) toward more inclusive and more flexible consideration of humans-machine sense-making.

We advocate, as a *starting point*, an approach that (1) considers each agent's functions in the process (with attention to functions that may not be directly observable) and (2) draws on literatures pertaining to those functions (independent of enacting agent) to consider how meaning may emerge through antecedents, processes, and effects of that function. This agnosticism must be engaged through a lens akin to Dennett's physical stance (1989) in which we would consider HMC according to our knowledge of the manifest properties of agents (and not what they are meant to do or what they may be said to intend). Although the physical stance is seldom engaged due to its complexity (e.g., delivering a physical account of the exact material processes and states that lead a chatbot to produce a response would be multiplex; Stich, 1981, see also Krassmann et al., 2019 for an example of one layer of such processes) and we may only engage it imperfectly, the *attempt* to question and discover agent functions is necessary and core to the application of functions as criteria in transmission processes. That is, to be agnostic toward agent class is to be diligent in rejecting its assumptions and attending to functions. For instance, in considering a question of how Internet-connected devices (e.g., a smart toothbrush; van der Zeeuw et al., 2019) might function in humans' self-concepts, we might consider a "traditional" transmission-model mapping: a human user (Source) uses a device (let us continue with a smart toothbrush, a Channel) and in so doing performs certain behaviors (brush strokes, Encoded as data, from discrete movements); the behavioral information or lack thereof (here, Messages sent per brushstroke performed) are aggregated (Decoded and perhaps transformed to another data type) and re-presented by a Receiving application (i.e., one that might store and analyze that data) to deliver Feedback to the user.

Acknowledging that this is a simplification of such a process, if we decenter the human from that situation and consider the ways that other entities may function in a sender role, a host of other possibilities arise relative to other visit actors (device, application, motor) and (sub)components not readily observable (e.g., software, information packets, router). In tandem, removing assumptions about what actor fits what model block, the multiplex mapping of transmissions might instead consider how that machine manifests relationships with tangible and intangible objects in its orbit. For instance, we may also come to consider that the device (Source) transmits experience-generated information (Message) with its software (Receiver) that prompts delivery of a reminder "beep" (Feedback). That beep is not merely a feature, it is a self-referencing message with potential meaning, generated by the software (Sender) via the toothbrush (Channel) to the constellated human (Receiver).

Notably, this is but *one* potential interrogation of the candidate model, where each of the possible processes embedded may to some extent be relevant to a particular course of research. We argue, however, that unless the model is explored in this agent-agnostic fashion, we are unlikely to recognize and understand the missing mass within human/machine interlocution. That is, we will be limited in considering (a) the ways that machines negotiate, push back on, and shape interactions and (b) the ways humans are script-driven and mediating. When we miss this mass, we may fail to acknowledge machine agency and human proceduralism.

The hunt for missing mass in this fashion is not incommensurable with existing anthropo- or techno-centric perspectives—indeed it depends on them. Each domain trends toward specific functional features. Human-focused domains feature strong theories associated with agency, meaning-making, phenomenology, and behavioral outcomes. Technology-focused domains, on the other hand, feature strong theories of affording and constraining action, system and information dynamics, and concrete cause/effect protocols. Each body of literature may be most productively engaged when it is considered according to processes described that may apply to human or machine agents—but first, those common functions must be identified.

Functions as Criteria for Transmission Model Consideration

We have argued that an agent-agnostic transmission model rests on considering the common functioning or abilities of humans and machines that permit them to occupy each position in the model. From the practical and definitional ground articulated, we propose there are *at least* three classes of common functions that should be considered in determining whether an agent is acting in a particular communicative capacity: *agency*, *interactivity*, and *influence*. These are the basic capabilities that, when held, may be adequate to qualify an agent as occupying a particular role. This is not to say that agents will necessarily and equivalently occupy all positions. Rather, these functional criteria are a ground for considering whether they may occupy a given position. We also do not go so far as to outline kinds or degrees of these criteria for particular roles in the model. Instead, our aim here is to initially set forth the possible shared capabilities (rather than distinct human and machine capabilities; Kiousis, 2002) as a springboard for future theorizing that not only accounts for machines' current functional capabilities but is also resilient to considerations for their expected and imagined future capabilities.

The ground function of *agency* (including autonomy and potential intentionality) is defined as the capacity to make a difference through action (Cooren, 2004; Latour, 2014). Note that agency as a specific capacity to matter is distinct from our use of the term "agent" which more generally denotes actors that cause or initiate some event. Broadly, agency has been exclusively reserved for the living (Giddens, 1984), as we readily associate life and intentionality as preconditions for authentic action. Yet, a vast body of research acknowledges the interventions of nonhumans in our everyday life: a speed bump makes you slow down (Latour, 1994); a memo informs employees of new policy (Cooren, 2004); a thermometer co-shapes our experience of health and disease (Verbeek, 2005). Indeed, some social theory defines agency as "socio-culturally mediated capacity to act" (Ahern, 2001, p. 110). That definition deliberately embraces the inclusivity of machines, spirits, signs, and collective entities, and recognizes the cultural relativity of the notion of social action by all kinds of agents in certain contexts. It may be intuitive to recognize agency in embodied social computational systems (e.g., personified smartphones, [semi-]autonomous cars, and robotic objects capable of sociable interactions) as they elicit a unique, affect-charged sense of active agency experienced as similar to that of living entities (Young et al., 2011). It may be less obvious, though, that even non-embodied systems have inherent agency, as interfaces, algorithms, and network switches engage in material and semiotic ways of mattering in the course of meaning-making processes.

The operational shifts outlined note that both humans and machines can take on the role of the communicator: sending and receiving messages. Within communication sequences, agency can be understood as a potential standing-in of one actor for another when the other has lost its own ability to act or exert influence (as when a human cannot instantaneously travel long distances, a cadre of computers stands in for that limitation; Latour, 2014). This alternating of classical human and machine roles may be understood as a "dance of agency" (Pickering, 1995, p. 116). Examinations of agency in an agent-agnostic approach to HMC would attend, then, to the capacity for or enactment of instrumental force. That is, the ways that both humans and/or machines enact message production and reception (e.g., initiation of social and news messages; Neff & Nagy, 2016), effectively convey information (e.g., channel functions in relation to inherent affordances for social cues; Aldunate & González-Ibáñez, 2017), and through action contribute to meaning-making (e.g., influencing formation of social judgments; Nowak, 2004). In tandem, acknowledging the agency of nonhumans by no means diminishes human agency. It merely makes fair consideration of the ways that humans and nonhumans shape each other as they cooperatively make meaning (Williams & Edge, 1996).

The second common property (derived, in part, from the first) is potential for *interactivity*, or the variable process of serial information exchange in which each transmission is contingent upon the prior, creating a binding social force (see Rafaeli & Sudweeks, 1997). This potential relies on each agent's capability to encode/decode sign systems, such as those present in material exchanges and semiotic exchanges. Extending that conceptualization to material exchanges, objects engage in interaction with humans when a video game controller decodes a button-press as an input and may deliver haptic feedback as an output (Roth et al., 2018). Notably, that exemplar may be interpreted as reactivity rather than interactivity (the button is pushed and action occurs). However, that is an anthropocentric interpretation of interactivity requiring human-native self-referencing (which may or may not emerge in machines in the future). From the common-function' approach proposed here, the delivery of haptic feedback is considered a meaningful machine-native message in the same way that a human (if pushed) might shout "ouch" in return. Emphasizing semiotic exchanges, both humans and neural networks are interpreting meaning when they absorb images to create new graphics (Kowatari et al., 2009). Future research into this shared property may consider exchange structures (e.g., turn-taking and conversation dominance) and the dynamics of CMC-based human/machine collaboration (e.g., action coordination and problem-solving).

Finally, humans and machines share (as a product of the first and second properties), the potential to *influence* one another: to realize a potential to functionally matter to and manifest effects on the other. Scholarship investigating this shared property may attend to the ways that agents are capable of social and material impact. Certainly, people can influence machines, for instance through physical manipulations, design and programming, modding, and providing raw material for machine learning. Just the same, machines can influence humans. Machines induce emotional responses: humans experience increased physiological arousal when a robotic toy is being tortured (Rosenthal-von der Pütten et al., 2013) and act spitefully after feeling betrayed by a computer (Ferdig, & Mishra, 2004). How a system communicates with its users indirectly affects one's engagement with the machine, including trust and blame for (in)action (e.g., Lyons & Havig, 2014). These cognitive and affective responses by human users to machines demonstrate perceptions of accountability for machine influence. Moreover, researchers have started to debate machine's perceived worthiness of moral care and consideration—regardless of whether that is technically feasible or even desirable (Gunkel, 2017)—which indicates reciprocal effects caused by that influence.

Conclusion

Considering the evolution of operational, ontological, and phenomenological shifts in humans' and machines' roles in media communication, we advocate shifting to an agent-agnostic transmission model of communication. By endorsing a decades-old critique articulating a problematic isolating of agent types and normative roles (e.g., Giuseppe & Galiberti, 1998), we stress that humans and machines have the potential to be theoretically and operationally equivalent agents in communication processes as both social and functional actors according to the same criteria of agency, interactivity, and influence. Drawing on the HMC paradigm (principally, that meaning-making is a joint activity among human and machine agents), anthropocentric and technocentric perspectives are acknowledged as *specific* permutations of how humans and machines engage each other in the loop of transmission communication, but not the *only* permutations. Rather, humans and machines are potentially equivalent interlocutors with potentially equivalent psychological, social, and moral consequences. We see this proposal as a first step in advancing agent-agnostic perspectives in HMC. Future scholarship is encouraged to explore the ways that our propositions may (and may not) extend to more complex models of communication (e.g., transactional, interactive, and constructionist models), and investigate the dynamics and contexts by which human and machinic agents may (and may not) occupy positions in those models. Such examinations will help to ensure that communication theory keeps pace with communication technology itself lest the discipline be poorly prepared (Guzman, 2016a) and unable to deal with an ostensibly machine-inclusive future.

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