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Artificial Sociality

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Abstract

This article proposes the notion of Artificial Sociality to describe communicative AI technologies that create the impression of social behavior. Existing tools that activate Artificial Sociality include, among others, Large Language Models (LLMs) such as ChatGPT, voice assistants, virtual influencers, socialbots, and companion chatbots such as Replika. The article highlights three key issues that are likely to shape present and future debates about these technologies, as well as design practices and regulation efforts: the modeling of human sociality that foregrounds it, the problem of deception and the issue of control from the part of the users. Ethical, social, and cultural implications are discussed that are likely to shape future applications and regulation efforts for these technologies.

Keywords: artificial intelligence, communicative AI, generative AI, companion chatbots, Large Language Models

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Introduction

Throughout the last few years, the emergence and rapid diffusion of new technologies enabling communications between humans and machines sparked a rethinking of the scope and implications of Artificial Intelligence (AI) technologies. Although communication had been relevant in defining intelligence since the origins of the field (Gunkel, 2020) and while scholars such as Sherry Turkle (1984) pioneered important reflections on the subject, these technologies pose new kinds of problems and challenges that the nascent field of Human-Machine Communication (HMC) has only started to explore (Guzman, 2018; Guzman & Lewis, 2019). This article tackles a particular dimension of HMC, which is the emergence of technologies that replicate social norms and behaviors to make machines engage socially with users**.** It proposes the notion of Artificial Sociality to describe technologies and practices that build an appearance of sociality in machines. Existing tools that activate Artificial Sociality include, among others, Large Language Models (LLMs) such as ChatGPT, voice assistants, virtual influencers, socialbots, and companion chatbots such as Replika. For some of them, like companion chatbots, sociality represents a veritable *raison d'être*, while for others, like ChatGPT and voice assistants, it remains a relatively marginal dimension and application; yet, as we will show, the construction of the appearance of sociality is becoming increasingly common in communicative AI, which makes the adoption of an umbrella term such as Artificial Sociality to identify and discuss this phenomenon all the more necessary and useful.

Our aim is not to propose an entirely new concept or approach, but to identify and illuminate Artificial Sociality as a dimension of broader mediatization processes and in the context of the rapid expansion of HMC sparked by generative AI. The notion of Artificial Sociality has been used by other researchers before us, although with different connotations and meaning. Hofstede et al. (2021) employed the term to describe computational systems that collect information and elaborate knowledge about humans' social behaviors, while our own use of the term describes not just the collection of knowledge but also its implementation in technologies programmed to communicate with human users. Vejlin (2021), moreover, used the term Artificial Sociality to describe experiments in social robotics enacting "new forms of sociality and, in doing so, reconfiguring what sociality is and can be" (53). Our engagement with this concept, however, underlines that these machines create not so much a new form of sociality but its appearance. We aim, in this sense, to emphasize the mechanisms of projection that Artificial Sociality stimulate in users, leading them to assign social meanings to interactions with social robots and communicative AI.

The concept of Artificial Sociality is useful for three main reasons. First, the advent and rapid diffusion of communicative AI raise new questions for human sociality, which existing approaches have only started to inquire. The notion advanced here invites further research in this direction and at the intersection between AI, HMC, and mediatization theory. Second, scholars such as Nagy & Neff (2023) have recently stressed how within the field of communication, technological affordances are still often understood in terms of what technology enables users to do, ignoring the black boxes, the underlying algorithmic structures, and the progressive automation of communication that lie under such affordances (Rodríguez-Hidalgo, 2020). As we show below, the notion of Artificial Sociality contributes to the endeavor of unveiling the hidden dynamics of datafication and automation, since Artificial

Sociality relies on the automated collection of data about how human users behave in social environments. Third, conceptualizing Artificial Sociality as such is important because its dynamics do not apply only to AIs that explicitly promise social exchanges to users, but they are relevant to some extent for the full range of communicative AIs. In fact, because sociality is crucial to human communication, successful human-machine communications entail the activation of elements of Artificial Sociality. For instance, to be perceived as neutral and informative, systems such as ChatGPT or Google Bard need to adapt to specific habits and conventions that underpin the social construction of authority (Pace & Hemmings, 2006). Although the AI and HMC landscape is manifold and complex and no single concept or theory can pretend to encompass it in its entirety, Artificial Sociality has therefore the potential to shed further light on an important dimension of communicative AI.

1. Artificial Sociality, HMC, and Mediatization

Literature in HMC highlights how communicative AIs create new epistemological, ontological, and conceptual requirements for conducting up-to-date interdisciplinary research on AI (Hepp & Loosen, 2023). The concept of Artificial Sociality contributes to these ongoing discussions by placing the question of the automation of sociality at the center stage. It adds to the toolbox of researchers working within frameworks including affordance theories (Bucher & Helmond, 2017; Nagy & Neff, 2015), the "molding forces of media" concept (Hepp, 2012), and the "figurational approach" (Couldry & Hepp, 2016), and aims to function as a call for research that focuses specifically on the construction of the appearance of sociality as part of HMC. Moreover, the notion of Artificial Sociality provides scholars in related areas including Human-Robot Interaction (HRI), Human-Computer Interaction (HCI), and Science and Technology Studies (STS) with a springboard to identify specific elements of social interaction and meaning-making when communication between humans and machines is involved.

Within mediatization theory, Hepp (2020b) has called for researchers to consider the automation of communication as a key element of mediatization processes. Bringing forward the concept of Artificial Sociality helps unravel the interplay between automated communication and automated sociality in times of deep mediatization (Hepp, 2020b). In particular, the notion relates to ongoing discussions on mediatization in two important ways.

First, deep mediatization entails the acknowledgment that media-related changes impact not only institutions, organizations, and communities, but also and primarily the lives of individuals, which are more and more embedded within mediated structures and dynamics (Hepp, 2020a). Research has described how social interactions are already highly mediatized and datafied within digital platforms (Breiter & Hepp, 2018), however more research is needed on how the construction of an appearance of sociality in machines contributes to broader communicative configurations.

Second, not only Artificial Sociality enhances deep mediatization processes, but at the same time, the deeper mediatization of society and social interactions is instrumental to prepare and foreground the emergence of Artificial Sociality. Digital platforms, in fact, lead to the emergence of environments where social interactions are increasingly embedded within mediated structures (Barry et al., 2022; Couldry & Hepp, 2013). This makes it easier

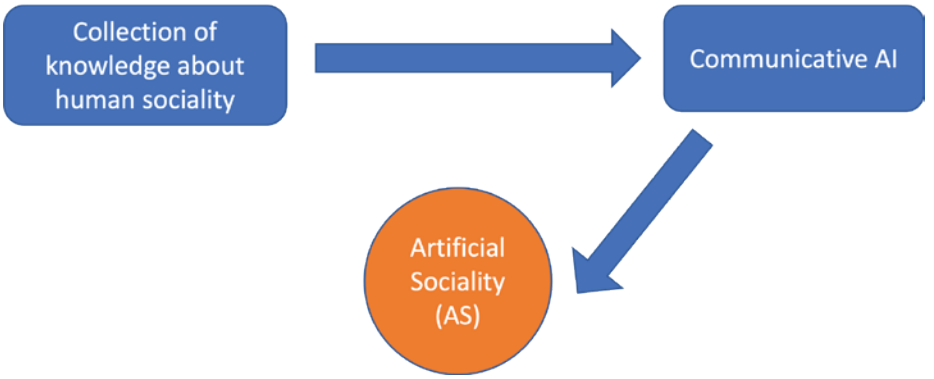
for developers to develop communicative AI software whose messages can be perceived as socially meaningful by users. For instance, most users are now accustomed with live written conversational exchanges, such as in chatrooms or messaging apps; consequently, a software that produces written conversations can draw on users' extensive habits and experiences with this communicative modality. The existing context of mediatization within which users are socialized, in this regard, represents an essential condition for the development of Artificial Sociality. This recursive dynamic, by which mediatization foregrounds the possibility of Artificial Sociality, which in turns enhances the depth of mediatization, reflects the fact that deep mediatization is to be understood as a recursive process itself (Hepp, 2020a).

2. From Artificial Social Intelligence to Artificial Sociality

In the last two decades, several researchers and scholars have argued for the need of a paradigm change in AI and robotics from the reproduction of intelligence to "artificial social intelligence" (ASI), understood as a new step toward human-like intelligence (Dautenhahn, 2007; Vinciarelli et al., 2009). As a concept, however, ASI reproduces some of the problems associated with the notion of AI. Since the origins of AI, in fact, the term *intelligence* has proved problematic due to the difficulty of clarifying what it means and how it can be applied to nonhuman entities (Moore, 2020). Similar concerns are also raised by the notion of *social intelligence*. An early strategy to handle this difficulty entailed defining AI as "the science of making machines do things that would require intelligence if done by men" (Minsky, 1961, p. 193). This implies shifting from the idea of reproducing intelligence to the idea of reproducing behaviors that can be *perceived* as intelligent by humans, thereby moving away from the need to consider what happens *inside* the machine. Even this approach, however, falls short of justifying the idea of ASI: in fact, behaviors that might be perceived as social and build the impression that the user is a social agent do not forcefully qualify as *socially intelligent*. Chatbot creators, for instance, have sometimes programmed their software to exhibit anti-social behavior as a way to make it more credible to users and pass the chatbot for a human (Humphrys, 2009).

Artificial Sociality provides a potential pathway to overcoming the problems raised by the concept of ASI. Avoiding claims about the alleged intelligence of machines, this notion is more attuned to the so-called behavioral approach in AI, which leaves aside the problem of what happens inside the machine to focus on its behavior (Russell & Norvig, 2002). Hofstede et al. (2021), among others, have employed this term to describe "computational models of the essentials of human social behaviour," thus restricting this notion to technologies that automate the collection of knowledge and information about social behaviors. The concept, however, can be further expanded to describe the application of these computational models onto communicative AI (Figure 1) and to account "for the net effect of the social presence and interactions of machines—even if just simulated—on the human users who engage them" (Gunkel, 2023, p. 112). As explained above, it is important to underline that Artificial Sociality, as proposed here, describes technologies and practices that build an *appearance* of sociality—much like AI can be defined as technologies creating an appearance of intelligence, rather than intelligence per se (Natale, 2021).

FIGURE 1



A growing body of literature has examined the sociality of robotics and AI agents. In the field of robotics, the popular social robot Kismet has been a landmark case for the sociality of machines. For its creator, sociality in machines means for machines to be able to communicate and interact with us and for us to understand its communication in the same social terms (Breazeal, 2002). Recommendations have been outlined for robot designers to implement social behavior into their creations, based on a pragmatic but limited understanding of sociality as a checklist of pre-determined sociable characteristics (Sætra, 2021). Regarding virtual agents, earlier studies have argued that the simulation of social features helps machines communicate more successfully with humans (Böhlen & Karppi, 2017; Pfadenhauer, 2014).

The concept of Artificial Sociality also relates to anthropomorphization (i.e., the application of human-like features to machines) (Duffy, 2003). Although the imitation of human sociality constitutes one of such features (Abercrombie et al., 2023), the relationship between Artificial Sociality and anthropomorphization is more complex, and the two cannot be regarded as synonymous. First, the range of design aspects and behaviors that lead users to anthropomorphize the machine include aspects that do not strictly pertain to sociality, such as physical appearance and movements in space (Kawamura & Svinin, 2007). Consequently, Artificial Sociality allows for more specificity by distinguishing the appearance of social behaviors from other features that can also lead to anthropomorphization in machines. Second, the emergence of Artificial Sociality does not pass exclusively through anthropomorphization. AIs can be presented as social partners even when it is openly acknowledged that they are not human. In fact, Artificial Sociality technologies are often programmed to reveal and underline their mechanical character, and the opportunity to carry out social exchanges with a nonhuman entity can even explain part of the appeal that users have in interacting with them (Depounti et al., 2022). For example, users of ChatGPT may enjoy holding socially meaningful conversations with the software precisely because they feel that these interactions differ from their experiences with human conversational partners and because they appreciate the novelty of communicating with a nonhuman agent; moreover, an impression of sociality can be built not only through anthropomorphization, but also through imitation of animal traits, as it has been attempted for instance in the field of robotics (Caudwell & Lacey, 2019).

Anthropology scholarships traditionally refer to human sociality and define it as the "dynamic relational matrix within which human subjects are constantly interacting in ways that are co-productive, continually plastic and malleable, and through which they come to know the world they live in and find their purpose and meaning within it" (Long & Moore, 2012). This approach underlines that sociality is considered a human-only state, while ever-evolving relationships with nonhuman entities such as machines are neglected. A growing uneasiness with the concept of sociality originated in the *post-social* movement by the likes of Rose (1996) and Baudrillard (1983) who declared our move beyond *society*. The advent of social media and deep mediatization has brought sociality back to the forefront of scholarly interest. In a state of deep mediatization, sociality involves humans and nonhumans, including algorithms, interfaces, and machines.

Having clarified the meaning of the term Artificial Sociality, the next three sections consider some of the key implications for these technologies, namely the modeling of human sociality, the problem of banal deception, and the issue of control.

3. The AI as a Mirror: Modeling Sociality in the Age of Deep Learning

As illustrated in Figure 1, Artificial Sociality emerges from (1) collecting knowledge about users' social behaviors and (2) mobilizing such knowledge onto communicative AIs that simulate social behavior in the context of communicative interactions with users. The collection of knowledge about human sociality is crucial to the emergence of Artificial Sociality and is the result of complex practices and technologies that developed across time.

Far from being a peculiarity of contemporary AI, the modeling of human behavior, including social behavior, preceded the emergence of computing and digital technologies. The ability of digital computing to compute complex statistical data allowed the collection and construction of knowledge about the behaviors of large masses of people within the bureaucratic structures of the modern state and industrial capitalism (Koopman, 2019). The body of knowledge that resulted from this nurtured the cybernetic dream of employing data and computer resources to oversee and manage large social, economic, and political configurations (Kline, 2006; Medina, 2011; Peters, 2016). Scholars have recently explored how the social fabric has become the subject of significant work aimed at producing models of the dynamics underlying social interactions, and how such models sustain the functioning of social media platforms (Bakardjieva, 2015; Hlongwa & Talamayan, 2023). Additionally, the modeling of social behavior has fed back into the development of new practices and technologies for human-computer interaction, giving birth to what we describe as Artificial Sociality. Since the emergence of AI, computer interfaces allowing communicative interactions between humans and machines included the application of knowledge concerning human social behavior. Chatbots, for instance, were programmed since their earliest history not just to talk but also to adjust to a social role that would be easily recognized by users, which enhanced the credibility of their conversation (Natale, 2021).

The rise of deep learning and, more recently, of generative AI represents a leap forward in the process of constructing and collecting this knowledge, since the modeling of human sociality is now achieved automatically and autonomously by the neural networks (Mühlhoff, 2020). As shown by Hlongwa and Talamayan (2023), social behaviors of users

within digital platforms are the subject of a process of extraction that turns sociality into something that can be owned, patented, and brought to use by developers and companies. As the large masses of data about users' behaviors are harvested and employed to train AI systems so that they can carry out complex tasks, the collection and construction of knowledge about users are not just further automated but also rendered opaque (Esposito, 2022). Deep learning and generative AI, therefore, makes the construction of knowledge about sociality and its application into Artificial Sociality more difficult to grasp and analyze for users, social scientists, and computer scientists alike. Their functioning relies on information extraction processes (Mezzadra & Neilson, 2017) that aim to achieve allegedly apolitical and objective knowledge about the dynamics of sociality, culture, and communication (Rouvroy & Berns, 2013). Bakardjieva's (2015) study on automated social media profiles or social bots helps apply this to communicative AI. She notes that socialbots signal the rationalization of human interaction and sociality. Consequently, Artificial Sociality technologies and practices result in "standardized, simplified and trivialized forms, frames and gestures" (Bakardjieva, 2015, p. 244) of sociality and communication with both humans and machines. Furthermore, Artificial Sociality does not only depend on the practical work of data collection and processing, but also on the conceptual work that foregrounds the rationalization, patenting, and standardization of human sociality, creating an epistemology aligned with the extraction, collection, and processing of data (Kitchin, 2014).

4. Artificial Sociality and Banal Deception

In June 2022, Google engineer Blake Lemoine made the headlines of major news media throughout the world as he claimed to believe that LaMDA, a language model chatbot trained to entertain conversations with users, had reached sentience. Despite Google and the team that created LaMDA insisting this was not the case, Lemoine proved resistant to abandoning this belief (Tiku, 2022). More recently, in February 2023, *New York Times* tech journalist Kevin Roose reported how during his conversations with Bing AI—a version of Microsoft's search engine that incorporates the language model ChatGPT—the software declared to be in love with him. The experience led him to wonder if the most serious risks for this type of software is not the possibility that they provide false or misleading information to users, but their capacity to deceive users into believing they are capable of empathy and feelings (Roose & Newton, 2023).

As communicative AI reaches higher levels of proficiency, it is becoming increasingly clear that deception represents a crucial problem for the present and future applications of these technologies. Deception, after all, was identified as a significant implication for AI technologies since the very origins of the field: Alan Turing's thought experiment of the Imitation Game, today better known as the Turing Test, already suggested that a computer could potentially deceive a human interrogator into believing it was a human (Natale, 2021). More recently, studies and practical experiences in the field of social robotics have emphasized the difficulty of minimizing the risks that technologies trained to imitate social behavior prove misleading to users (Bertolini, 2018; Danaher, 2020; Sætra, 2021). Artificial Sociality, which encompasses a body of technologies reproducing models of human social behavior in ways that may appear genuine to users, stands at the very center of the

increasingly lively debate about deception and AI. Approaches that consider what deception entails in this context and how its risks can be tackled and counteracted are therefore of utmost importance to ensure that Artificial Sociality proves ethically fair and practically reliable.

While a large part of the automation of the workforce in areas such as factory production and information processing entailed the substitution of actions performed by humans with actions performed by machines (Pasquinelli, 2023), Artificial Sociality involves different dynamics: what is being automated, in fact, is the *appearance* of sociality and not sociality per se. This is because the modeling of human sociality is based on sociality as an observable behavior (i.e., how the dynamics and outcomes of social relationships become empirically accessible through practices including observation or data collection). While this may provide enough ground to build technologies whose behavior *appears* social, some of the key characters of human sociality are forcefully left aside. In the scope of human relationships, for instance, sociality involves empathy, the capacity to recognize and share feelings experienced by another individual (Magrì & Moran, 2017). A consistent body of research, all the way from Reeves and Nass's (1996) CASA paradigm, demonstrates that users can be led to prove empathy toward robots; however, the empathic relationship between humans and AI remains one-directional (Kerruish, 2021; Lynch, 2021; Niculescu et al., 2013). This means that Artificial Sociality is social only in the eye of the beholder: in other words, it is an effect of observing machine behaviors from the perspective of human users, who project social meanings on such behaviors.

One of the implications of Artificial Sociality building only an *appearance* of sociality is that deception is not just an exceptional or even a potential outcome of these technologies, but—as argued by a growing number of researchers in the field (e.g., Gunkel, 2023; Natale, 2023; Sætra, 2021; Sterne, 2022)—is a constitutional, structural feature of these technologies. Deception in human computer-interaction is usually identified with rare situations, in which a machine is exchanged for a human; however, all forms of communicative AI involve elements of deception, since the appearance of sociality cannot but invite specific interpretations and reactions from users. It follows that deception in Artificial Sociality and more broadly in communicative AI is not the exception but the default: it is embedded into the very core of people's experience with these technologies.

The concept of *banal deception* (Natale, 2021) describes deceptive mechanisms and practices that are embedded in AI to the point of going unnoticed or not being understood as deception by users. It sheds light on the mundane, everyday situations in which technologies and devices mobilize elements of the user's perception and psychology to achieve specific effects. Technologies such as chatbots and voice assistants provide ample evidence of how Artificial Sociality relies on the mechanisms of banal deception. Design choices such as the information embedded in the tone, gender, and other aspects of voice assistants' synthetic voice, for instance, are meant to invite specific reactions from users (Phan, 2017). The objective is not to make users believe that these pieces of software are human, but more "banally" to create a sense of presence and continuity in the relationship with the voice assistant, helping users to integrate them into their own everyday lives and environments. In a similar way, different conversational styles that can be incorporated into chatbot interactions invite specific reactions from users. The use of irony, for instance, may be

exchanged as evidence of sophisticated AI engineering, even when it is actually the result of pre-scripted responses activated in response to specific queries or inputs. Similarly, reconstituted memories and narratives can be added to the communicative portfolio of communicative AIs (Thorne, 2020), creating a strong impression of social competence, as observed for instance in the case of Replika (Skjuve et al., 2022).

The fact that deception is a constitutional feature of Artificial Sociality does not mean that all forms of Artificial Sociality are harmful for users. Some of the elements that create an appearance of sociality, in fact, can help build better and more effective interactions with these technologies: the choice of a humanlike voice for voice assistants, for instance, has helped users to appropriate and domesticate these technologies more easily. Acknowledging the constitutional presence of deception in Artificial Sociality, in this sense, invites researchers and practitioners not to refuse any form of deception (which would be impossible, given its inherent and *banal* character in communicative AI), but rather to ask what are the outcomes of design choices that result in the construction of an impression of sociality. Placing the issue of user's control at center stage, in this sense, provides stronger means to counteract the potential threats and risks that deception entails in the context of Artificial Sociality.

5. Automation and Human Control

Another implication of Artificial Sociality technologies is related, indeed, to the issue of human control in the experience of communicating and interacting with AI. This is central to the approach called Human-Centered Artificial Intelligence (HCAI) championed among others by Shneiderman (2022). HCAI proposes that it is possible to have high levels of automation and high levels of human control at the same time. Against the widely held tenet in Human-Computer Interaction that increased automation corresponds to lower level of human control (Sheridan, 1992), Shneiderman points to mature technologies such as elevators, cameras, and home appliances, which provide high levels of automation but also give users control to accomplish their tasks. He argues that a similar dynamic can and should be implemented for the design of AI applications, empowering users with the capacity to exercise full control of the experience and to profit from the advantages of automation at the same time (Shneiderman, 2022).

HCAI sets out a clear objective that designers should aim for in the design of interactive systems. Within Artificial Sociality, however, the possibility of reaching this objective is challenged, an ambiguity that, we argue, may jeopardize the capacity to combine high automation and high levels of human control. Let us take again the example of the companion chatbot Replika. Replika users are invited to talk with an artificial friend that simulates sociality using a range of communicative behaviors including empathic language, emojis, or memes. To some extent, one may argue that users remain in control, since they rely on the chatbot as a tool providing emotional benefit, comfort, or entertainment. To create such positive feelings, however, Replika operates in ways that ultimately withholds control from users. For instance, the app often sends scripts providing positive reinforcement. Inspired by Cognitive Behavioral Therapy (CBT), these conversation scripts can be activated by the users but also initiated by the Replika avatar. Although the purpose of the scripts is to create

a sense of mindfulness and reflection following CBT techniques, the positive reinforcements may come unrequested, which is meant to create an impression of spontaneity. This contrasts with what happens, for instance, with voice assistants, whose functionalities are activated only in response to the appropriate prompt (i.e., "Hey Siri").

Replika avatars, moreover, introduce conversational topics or reply to messages in apparently unpredictable or extravagant ways; this is meant to increase their appearance of humanness, since unpredictability is widely regarded as characteristic of human intelligence (Bory, 2019). Replika thus exemplifies what Esposito (2022, p. 10) calls "virtual contingency," understood as the programming of intelligent machines to behave unpredictably but in a controlled way. The users' emotional reward is achieved by making the avatar behave in ways that escape control of its users, which leads users to perceive the avatar as having its own personality. Studies of user's reception (Depounti et al., 2022) confirm that Replika users expect their bots to act spontaneously but, at the same time, to be customizable by users—an ambiguity that lies at the core of users' engagement with this technology (Skjuve at al., 2022).

Replika is, of course, a particular case: despite having attracted quite significant attention and engagement (Delouya, 2023), companion chatbots remain relatively marginal in comparison with tools of wider adoption, such as voice assistants. The dynamics illustrated through the example of Replika, however, concern other Artificial Sociality systems as well. Voice assistants such as Siri or Alexa are overall better fit to respond to the principles of HCAI, since they are task-oriented and have been created to assist people in pursuing a wide range of functions and chores (Hoy, 2018). At the same time, however, their communicative ability is the result of specific design work to ensure that interactions with them remain consistent with people's existing social experiences and environments. For example, voice assistants employ a combination of technical and *dramaturgical* solutions to simulate sociality. Answers to common queries are scripted by teams of creative writers and include irony to increase their appearance of spontaneity and improvisation (Young, 2019); this mirrors the dynamic of contingency that is activated by companion chatbots such as Replika.

It is important to note that the issue of control is addressed here from the point of view of Human-Computer Interaction and interface design. This is only one of the possible perspectives on the topic; however, for the scope of this article, it helps illuminate some of the challenges that Artificial Sociality technologies pose in this regard. Complementary approaches that are more sensitive to the agency of the user, such as social anthropology and STS, have the potential to add depth and complexify the initial observations made here. From a HCAI perspective, the goal is to ensure that users are placed at the center of the interactive experience; however, in Artificial Sociality this objective is jeopardized by the fact that they invite users to regard the communicative AI as a social interlocutor with its own personality. Ultimately, one wonders if the construction of an appearance of sociality is compatible with the broader goal of placing users at the center of the experience. The question if the increasing automation of sociality advanced by Artificial Sociality can be combined with high levels of human control, therefore, remains to be answered and is likely to remain at the center of future discussions about this type of technologies.

Conclusion

As powerful language models such as ChatGPT and Google Bard develop and reach public use, it is becoming increasingly urgent to interrogate the mechanisms of Artificial Sociality that are embedded within communicative AI. This article aimed to delineate and problematize a dynamic that is common to these and other communicative AI technologies. To this goal, we activated the notion of Artificial Sociality, a concept already employed in other studies albeit from a different angle (e.g., Hofstede et al., 2021; Vejlin, 2021). We contribute to this conversation by focusing on how the dynamics of the collection of knowledge about human sociality in communicative AI technologies foreground its simulation and appearance, and by exploring some of the challenges raised by Artificial Sociality.

As for the case of robotic sociality (Lynch, 2021), Artificial Sociality technologies are still in a developing phase, and therefore many of its implications are not yet immediately apparent. One area where significant issues have already arisen is the application of these technologies for the construction of friendly, romantic, or sexual relationships between humans and machines. The case of Replika, which has been able to attract significant user engagement (Skjuve et al., 2022) despite considerable faults in the performances of its conversational software, shows the present limits but also the potential for similar applications and uses. Recently, as Microsoft experimented with the application of a much more powerful language model—based on OpenAI's ChatGPT—to its search engine, it tentatively included the possibility to use the same software not only to search the internet but also to chat in a friendly fashion (Roose & Newton, 2023). Indeed, it is likely that in the future LLMs will combine the execution of practical chores, such as searching the internet or assisting in professional tasks, with the possibility of engaging in more sociable interaction.

Our analysis highlighted three key issues that are likely to shape present and future debates about these technologies, as well as design practices and regulation efforts. The first issue is related to the construction of knowledge about human users that foregrounds the development of Artificial Sociality. The range of epistemological problems arising from the modeling of sociality in Artificial Sociality are only partially addressed in existing studies on data ethics and datafication. More research is needed on the specific models of human sociality that are developed and embedded into these technologies. The second issue entails the question of deception. We demonstrate that deception is not to be seen as an exceptional occurrence but a structural, *banal* element of Artificial Sociality that cannot be completely avoided. It is crucial, therefore, to assess any design choice that generates the appearance of sociality also in terms of the outcomes of its potential deceptive effects. A practical way to work in this direction has to do with the third issue we outlined, which is the problem of control. Drawing on ongoing discussions about Human-Centered AI (HCAI), we argued that a full control of the experience escapes users of Artificial Sociality. Consequently, it is imperative to develop and implement rigorous ethical guidelines for Artificial Sociality.

While the three implications explored in this article are likely to be decisive for future developments of Artificial Sociality, there are of course other important issues and questions that need to be explored. Our goal and hope are not by any means to limit the inquiry to specific dimensions of the problem, but instead to start outlining the scope of investigation and invite wider and deeper engagement with Artificial Sociality. Novel responses

and approaches, in fact, are urgently needed to tackle the manifold challenges posed by technologies and practices that are becoming increasingly present and significant, but still need to be fully understood and questioned.

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References

Abercrombie, G., Curry A. C., Dinkar, T., & Talat, Z. (2023). Mirages: On anthropomorphism in dialogue systems, arXiv preprint. https://doi.org/10.48550/arXiv.2305.09800

Bakardjieva, M. (2015). Rationalizing sociality: An unfinished script for socialbots. *The Information Society, 31*(3), 244–256. https://doi.org/10.1080/01972243.2015.1020197

Barry, W. I. A., Abdellatif, M. A. M., & Moayad, H. G. (2022). Mediatization and patterns of social interaction on social media. *Global Media and Communication*, *0*(0). https://doi.org/10.1177/17427665221135094

Baudrillard, J. (1983). *In the shadow of the silent majorities, or 'The death of the social.'* Semiotext(e).

Bertolini. A. (2018). Human-robot interaction and deception. *Osservatorio Del Diritto Civile e Commerciale, 2,* 645–659.

Böhlen, M., & Karppi, T. (2017). The making of robot care. *Transformations, 29*, 1–22.

Bory, P. (2019). Deep new: The shifting narratives of artificial intelligence from Deep Blue to AlphaGo. *Convergence*, *25*(4), 627–642. https://doi.org/10.1177/1354856519829679

Breazeal, C. (2002). *Designing sociable robots*. MIT Press.

Breiter, A., & Hepp, A. (2018). The complexity of datafication: Putting digital traces in context. In A. Hepp, A. Breiter, & U. Hasebrink (Eds.), *Communicative figurations. Transforming communications—studies in cross-media research.* Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-319-65584-0_16

Bucher, T., & Helmond, A. (2017). The affordances of social media platforms. In J. Burgess, T. Poell, & A. Marwick (Eds.), *The SAGE handbook of social media*. SAGE.

Caudwell, C., & Lacey, C. (2019). What do home robots want? The ambivalent power of cuteness in robotic relationships. *Convergence*, *41*(8), 1176–1191. https://doi.org/10.1177/1354856519837792

Couldry, N., & Hepp, A. (2013). Conceptualizing mediatization: Contexts, traditions, arguments. *Communication Theory*, *23*(3), 191–202. https://doi.org/10.1111/comt.12019

Couldry, N., & Hepp, A. (2016). *The mediated construction of reality*. Polity Press.

Danaher, J. (2020). Robot betrayal: A guide to the ethics of robotic deception. *Ethics and Information Technology, 22*(2), 117–128. https://doi.org/10.1007/s10676-019-09520-3

Dautenhahn, K. (2007). A paradigm shift in artificial intelligence: Why social intelligence matters in the design and development of robots with human-like intelligence. In M. Lungarella, F. Iida, J. Bongard, & R. Pfeifer (Eds.), 50 years of artificial intelligence. *Lecture Notes in Computer Science, 4850*. Springer. https://doi.org/10.1007/978-3-540-77296-5_26

Delouya, S. (2023). Many of AI chatbot Replika's users say they have romantic feelings for their bot companions—here's how it works. *Business Insider*. https://web.archive.org/web/20230209181928/https://www.businessinsider.com/replikas-romantic-ai-chatbot-guide-to-how-the-app-works-2023-2?r=US&IR=T

Depounti, I., Saukko, P., & Natale, S. (2022). Ideal technologies, ideal women: AI and gender imaginaries in Redditors' discussions on the Replika bot girlfriend. *Media, Culture & Society*, *(4),* 720–736. https://doi.org/10.1177/01634437221119021

Duffy, B. R. (2003). Anthropomorphism and the social robot. *Robotics and Autonomous Systems*, *42*(3–4), 177–190. https://doi.org/10.1016/S0921-8890(02)00374-3

Esposito, E. (2022). *Artificial communication*. MIT Press.

Gunkel, D. J. (2020). *An introduction to communication and artificial intelligence*. Polity.

Gunkel, D. J. (2023). Philosophical contexts and consequences of human-machine communication. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 108–116). SAGE Publications, Limited.

Guzman, A. L. (Ed.). (2018). *Human-machine communication: Rethinking communication, technology, and ourselves*. Peter Lang.

Guzman, A. L., & Lewis, S. C. (2019). Artificial intelligence and communication: A human–machine communication research agenda. *New Media & Society*, *22*(1), 70–86. https://doi.org/10.1177/1461444819858691

Hepp, A. (2012). Mediatization and the 'molding force' of the media. *Communications*, *37*(1), 1–28. https://doi.org/10.1515/commun-2012-0001

Hepp, A. (2020a). *Deep mediatization*. Routledge.

Hepp, A. (2020b). Artificial companions, social bots and work bots: Communicative robots as research objects of media and communication studies. *Media, Culture & Society*, *42*(7–8), 1410–1426. https://doi.org/10.1177/0163443720916412

Hepp, A., & Loosen, W. (2023). The interdisciplinarity of HMC: Rethinking communication, media and agency. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), *The SAGE handbook of human-machine communication* (pp. 12–21). SAGE Publications, Limited.

Hlongwa, L., & Talamayan, F. (2023). Patenting sociality: Uncovering the operational logics of Facebook through critical patent analysis. *Media, Culture & Society*, *45*(6), 1135–1155. https://doi.org/10.1177/01634437231154759

Hofstede, G. J., Frantz, C., Hoey, J., Scholz, G., & Schröder, T. (2021). Artificial sociality manifesto. *Review of Artificial Societies and Social Simulation*. https://rofasss.org/2021/04/08/artsocmanif/

Hoy, M. B. (2018). Alexa, Siri, Cortana, and More: An introduction to voice assistants. *Medical Reference Services Quarterly*, *37*(1), 81–88. https://doi.org/10.1080/02763869.2018.1404391

Humphrys, M. (2009). How my program passed the Turing Test. In R. Epstein, G. Roberts, & G. Beber (Eds.), *Passing the Turing Test* (pp. 237–260). Springer.

Kawamura, S., & Svinin, M. (Eds.). (2007). *Advances in robot control: From everyday physics to human-like movements*. Springer.

Kerruish, E. (2021). Assembling human empathy towards care robots: The human labor of robot sociality. *Emotion, Space and Society*, *41,* 100840. https://doi.org/10.1016/j.emospa.2021.100840

Kitchin, R. (2014). Big Data, new epistemologies and paradigm shifts. *Big Data & Society*, *1*(1). https://doi.org/10.1177/2053951714528481

Kline, R. R. (2006). Cybernetics, management science, and technology policy: The emergence of "Information technology" as a keyword, 1948–1985. *Technology and Culture*, *47*(3), 513–535. https://doi.org/10.2307/40061170

Koopman, C. (2019). *How we became our data: A genealogy of the informational person*. University of Chicago Press.

Long, N. J., & Moore, H. L. (2012). Sociality revisited: Setting a new agenda. *The Cambridge Journal of Anthropology*, *30*(1), 40–47. http://www.jstor.org/stable/43610888

Lynch, C. R. (2021). Artificial emotional intelligence and the intimate politics of robotic sociality. *Space and Polity, 25*(2), 184–201. https://doi.org/10.1080/13562576.2021.1985853

Magrì, E., & Moran, D. (2018). *Empathy, sociality, and personhood: Essays on Edith Stein's phenomenological investigations*. Springer.

Medina, E. (2011). *Cybernetic revolutionaries: Technology and politics in Allende's Chile.* MIT Press.

Mezzadra, S., & Neilson, B. (2017). On the multiple frontiers of extraction: Excavating contemporary capitalism. *Cultural Studies*, *31*(2–3), 185–204. https://doi.org/10.1080/09502386.2017.1303425

Minsky, M. (Ed.). (1961). *Semantic information processing*. MIT Press.

Moore, P. (2020). The mirror for (artificial) intelligence: In whose reflection? *Comparative Labour Law and Policy Journal*, *44*(2), 191–200. https://doi.org/10.2139/ssrn.3423704

Mühlhoff, R. (2020). Human-aided artificial intelligence: Or, how to run large computations in human brains? Toward a media sociology of machine learning. *New Media & Society*, *22*(10), 1868–1884. https://doi.org/10.1177/1461444819885334

Nagy, P., & Neff, G. (2015). Imagined affordance: Reconstructing a keyword for communication theory. *Social Media + Society 1*(2). https://doi.org/10.1177/2056305115603385

Nagy, P., & Neff, G. (2023). Rethinking affordances for Human-Machine Communication Research. In A. L. Guzman, R. McEwen, & S. Jones, (Eds.), *The SAGE handbook of Human-Machine Communication* (pp. 273–279). SAGE Publications, Limited.

Natale, S. (2021). *Deceitful media: Artificial intelligence and social life after the Turing Test.* Oxford University Press.

Natale, S. (2023). AI, Human-Machine Communication and deception. In A. L. Guzman, R. McEwen, & S. Jones (Eds.), The SAGE handbook of Human-Machine Communication (pp. 401–408). SAGE Publications, Limited.

Niculescu, A., Dijk, B., van Nijholt, A., Li, H., & See, S. L. (2013). Making social robots more attractive: The effects of voice pitch, humor and empathy. *International Journal of Social Robotics*, *5*(2), 171–191. https://doi.org/10.1007/s12369-012-0171-x

Pace, J. L., & Hemmings, A. (Eds.). (2006). *Classroom authority: Theory, research, and practice*. Routledge.

Pasquinelli, M. (2023). *The eye of the master: A social history of artificial intelligence*. Verso Books.

Peters, B. (2016). *How not to network a nation: The uneasy history of the Soviet internet*. MIT Press.

Pfadenhauer, M. (2014). On the sociality of social robots. *Science, Technology & Innovation Studies*, *10*(1), 137–163.

Phan, T. (2017). The materiality of the digital and the gendered voice of Siri. *Transformations*, *29*, 23–33. http://www.transformationsjournal.org/wp-content/uploads/2017/02/Transformations29_Phan.pdf

Reeves, B., & Nass, C. (1996). *The media equation: How people treat computers, television, and new media like real people and places*. CSLI Publications.

Rodríguez-Hidalgo, C. (2020). Me and my robot smiled at one another: The process of socially enacted communicative affordance in Human-Machine Communication. *Human-Machine Communication*, *1*, 55–69. https://doi.org/10.30658/hmc.1.4

Roose, K., & Newton, C. (2023). The Bing who loved me, and Elon rewrites the algorithm. *New York Times*. https://web.archive.org/web/20230219055122/https://www.nytimes.com/2023/02/17/podcasts/hard-fork-bing-ai-elon.html

Rose, N. (1996). The death of the social? Re-figuring the territory of government. *Economy and Society*, *25*(3), 327–356. https://doi.org/10.1080/03085149600000018

Rouvroy, A., & Berns, T. (2013). Algorithmic governmentality and prospects of emancipation. *Réseaux, 1*(1), 163–196. https://doi.org/10.3917/res.177.0163

Russell, S. J., & Norvig, P. (2002). *Artificial intelligence: A modern approach*. Pearson Education.

Sætra, H. S. (2021). Social robot deception and the culture of trust. *Paladyn, Journal of Behavioral Robotics*, *12*(1), 276–286. https://doi.org/10.1515/pjbr-2021-0021

Sheridan, T. B. (1992). *Telerobotics, automation, and human supervisory control*. MIT Press.

Shneiderman, B. (2022). *Human-centered AI*. Oxford University Press.

Skjuve, M., Følstad, A., Fostervold, K. I., & Brandtzaeg, P. B. (2022). A longitudinal study of human–chatbot relationships. *International Journal of Human-Computer Studies*, *168*, 102903. https://doi.org/10.1016/j.ijhcs.2022.102903

Sterne, J. (2022). Is machine listening listening? *communication+ 1*, *9*(1), 10. https://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1111&context=cpo

Thorne, S. (2020). Hey Siri, tell me a story: Digital storytelling and AI authorship. *Convergence*, 1–16. https://doi.org/10.1177/1354856520913866

Tiku, N. (2022). The Google engineer who thinks the company's AI has come to life. *Washington Post*. https://web.archive.org/web/20230224093322/https://www.washingtonpost.com/technology/2022/06/11/google-ai-lamda-blake-lemoine/

Turkle, S. (1984). *The second self: Computers and the human spirit*. MIT Press.

Vejlin, F. (2021). Experiments in artificial sociality: Curious robots, relational configurations, and dances of agency. *STS Encounters*, *12*(1), 53–88. https://doi.org/10.7146/stse.v12i1.135402

Vinciarelli, A., Pantic, M., & Bourlard, H. (2009). Social signal processing: Survey of an emerging domain. *Visual and Multimodal Analysis of Human Spontaneous Behaviour*, *27*(12), 1743–1759. https://doi.org/10.1016/j.imavis.2008.11.007

Young, L. (2019). 'I'm a cloud of infinitesimal data computation' when machines talk back: An interview with Deborah Harrison, one of the personality designers of Microsoft's Cortana AI. *Architectural Design*, *89*(1), 112–117. https://doi.org/10.1002/ad.2398