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Digital health communication beyond computations: A distributed and phenomenological approach

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ABSTRACT

Background: AI-driven Large Language Models (LLMs) are increasingly introduced in the healthcare sector. Recently, research has been exploring their potential in digital health communication contexts. For example, chatbots are presented as possible solutions to manage the increased workload associated with digital health communication. **Aim:** To illustrate how humans engage in digital health communication in embodied and distributed ways and to use these insights as a lens for reflecting on potential challenges that may arise when LLMs are introduced into digital health communication practices. **Methods:** Drawing on our ethnographic research in digital health communication conducted in a Danish healthcare context (a nursing home and general practice setting), we present two empirical examples: (1) how a nurse in a nursing home reads a digital correspondence from a GP and (2) how a GP in the clinic writes an e-consultation to a patient. **Results:** Our examples demonstrate how digital health communication involves embodied, distributed, and empathic engagement beyond computational processes. **Discussion:** Discursively juxtaposing computational language and synthetic empathy with real-life situated behaviour risks neglecting central aspects of human language and the relational dynamics emerging in socio-technical relations. **Conclusion:** Understanding how embodied and distributed processes are fundamentally tied to digital health communication adds to a nuanced assessment of LLMs' potentials and caveats when used in clinical contexts.

KEYWORDS

Artificial intelligence (AI), digital health communication, distributed language, embodiment, empathy, large language models (LLMs).

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Introduction

The digital health communication landscape is rapidly evolving, driven by advancements in Artificial Intelligence (AI), Machine Learning (ML), Large Language Models (LLMs), and chatbots[1]. Recent research increasingly explores how LLMs - such as ChatGPT 3,5 and 4 - can generate human-like language, answering questions, summarizing text, and composing stories based on user prompts (Clusmann et al., 2023). Unlike traditional search engines like Google, chatbots stand out for their ability to integrate multiple data sources. In the context of healthcare, such sources can comprise patient history from electronic patient records combined with medical knowledge based on trained algorithms, while communication style can include emulated, adaptive, human-like conversational skills. Additionally, because LLMs do not experience fatigue like humans, one of their strengths is that they consistently provide rapid outputs (Dillion et al., 2023). Promoted through promissory discourses on policy level, these technologies are presented as solutions to current healthcare challenges, such as data overload, high digital communication demands and staff shortages (Hoeyer, 2019, p. 31; Marent & Henwood, 2023). By managing the health communication burden on healthcare staff through automation, LLMs may serve as a support for human care deficiencies in today's pressured healthcare system. However, we argue that such managerial approach to digital health communication carries the risk of installing a reductionistic understanding of language and human interaction processes, including empathy. As current AI studies juxtapose computational language with complex real-life situated human behaviour, nuanced assessments of LLMs' potentials and caveats are underrepresented, while complex human behaviour, professional skills, and expertise with digital health technologies are neglected.

In this paper, we critically examine how LLMs are promoted as solutions to managing digital health communication and what may be at stake if such discussion is not informed by theoretical perspectives that highlight the embodied, ecological, and distributed aspects of language and human interaction (Cowley, 2011; Simonsen et al., 2022; Steffensen, 2012; Steffensen, 2013). Before drawing on our own research in digital health communication, conducted in a Danish healthcare setting (a nursing home and general practice setting), we map some of the current research strands on LLMs' supposed human-like capacities after which we continue with outlining theoretical perspectives that foreground relational dimensions of language and empathy. Drawing on two empirical cases, we then demonstrate how humans engage with digital health communication in distributed and embodied ways. Our overall aim is to nuance promissory claims embedded in scientific discourses about LLMs' human-like communication capacities within digital health communication, providing critical insights that should guide future research and implementation of LLMs in healthcare.

Literature review

A growing body of literature evaluates LLMs for their human-like communication capacities, benchmarking them against overall human language behaviour and empathy display. This line of research reflects a reductionistic understanding of language and empathy, treating such complex human behaviour as measurable outputs rather than as embodied, context-sensitive, emerging relational processes. In

what follows, we outline representative studies from this trend before turning to theoretical perspectives that foreground the relational dimensions of language and empathy.

In the scoping review by Sørensen et al. (2023), AI-driven machine learning is described as a way to automate time-consuming, so-called administrative tasks in general practice, including those central to this paper: managing digital health communication between healthcare professionals and between physicians and patients through written texts. Overall, the idea of integrating LLMs into healthcare to manage digital health communication has sparked significant interest in the human-like capacities of these models. Consequently, questions about the models' ability to perform human-like language and communication, including empathy display, compared to humans, have been investigated (Ayers et al., 2023; Chow & Li, 2024; Geantă et al., 2024; Sorin et al., 2024). For example, Ayers et al. (2023) investigated chatbot-generated responses to questions on the online forum Reddit (r/AskDocs), finding that these were rated 9.8 times higher by healthcare evaluators for being "empathetic" or "very empathetic" compared to responses provided by physicians. Drawing on these findings, Ayers et al. (2023) argue that there is enormous potential for LLMs in providing high-quality communication and empathic responses to patient inquiries and in bolstering the physician-patient relationship. Sorin et al. (2024) reviewed the growing body of literature evaluating empathy performance in LLMs. They draw on the distinction commonly used in the cognitive sciences - adopted by applied therapeutic, clinical and caring sciences - between emotional and cognitive aspects of empathy, concluding that "LLMs exhibit elements of cognitive empathy, recognizing emotions and providing emotionally supportive responses in various contexts" (p. 1). Whilst recognizing the ability of LLMs to emulate cognitive empathy, they also identify limitations, such as the "repetitive use of empathic phrases" and "overly lengthy responses". Another example of comparing language and empathy performance in LLMs versus in humans is found in the study by Liao et al. (2025), piloting the integration of ChatGPT-4 into electronic patient-reported outcomes (ePROs) for oncology care. They found that using ChatGPT-4 to analyze patient-reported side effects – and to offer improvement suggestions - was potentially as effective as humans' performance (e.g., a dietician, oncologist or nurse). Liao et al. (2025) concluded that "ChatGPT-4 demonstrated its potential in effectively processing and analyzing these vast volumes of data, enabling medical professionals to better comprehend patient needs and respond in an empathetic and emotionally supportive manner" (p. 8).

In contrast to the above trends with underlying computational views on language and empathy, another strand of research advocates for an embodied and sociotechnical view of language and meaning (Bisk et al., 2020; Cuskley et al., 2024; Hellström, 2024; Herrman, 2022; Sejnowski, 2023; Skorburg et al., 2023). For example, Bisk et al. (2020) stress that while LLMs achieve remarkable results in text-based tasks, "successful linguistic communication relies on a shared experience of the world. It is this shared experience that makes utterances meaningful" (p. 1). Accordingly, social context and observing what people do in their environments are pivotal for understanding how meaning – and human action – emerge. Similarly, Cuskley et al. (2024) argue that much of what we know about the language outputs provided by LLMs is purely functional as these models are "designed to imitate the very specific behaviour of human writing" (p. 1058). They further point out that human linguistic behaviour

extends beyond functional actions, and despite LLMs' impressive writing capacities, it is important to regard them as tools – an approach fundamentally different from considering them, for example, as empathic team members.

Alongside these contributions, broader work in cognitive science, philosophy, and psychology elaborates sociotechnical, ecological understandings of language and behaviour (e.g., Barrett & Stout, 2024; Driess et al., 2023; Gangopadhyay & Pichler, 2024; Ibáñez et al., 2023; Roberts, 2023). Barrett and Stout (2024), for example, argue that cognition and language emerge in embodied processes, highlighting how such a perspective can help move beyond dichotomic understandings of AI and better traces the impact of LLMs on human-technology interactions. In a similar vein, Ferrario et al. (2024) caution against the push to humanize LLMs without attention to contextual aspects of language.

Having laid out the main strands in research on the human-like capacities of LLMs, we now turn to theoretical perspectives that we draw on in our research that foreground the distributed and embodied nature of language and empathy.

A distributed and phenomenological approach

Language is distributed

The epistemological interests for situated, social, emergent, embodied, and ecological dimensions of human language and behaviour can be found in established scientific fields and well-known acknowledged holistic approaches to human interaction developed within distributed and embodied cognition (Hollan et al., 2000; Kirsh, 2008; Kirsh, 2013), ecological psychology (Gibson, 1979; Järvilehto, 2009), distributed language (Cowley, 2011), and human interactivity (Gahrn-Andersen et al., 2019; Steffensen & Cowley, 2010).

A distributed language approach challenges theories and thinking that privileges linguistic forms and isolated code-based views of language. Language, from a distributed perspective, is embodied, ecological, distributed, and non-local (Cowley, 2011). According to Cowley (2011, p. 2), this means that language:

> […] is [a] whole-bodied activity that shapes sense-making and, once skills develop, allows texts and institutions to enrich what we think and do. Rather than view language as an object, we live in a social meshwork […] whose dynamics fuse events that draw on many time-scales. Linguistic experience alters who we become as we orient to others (who orient to us). Just as I co-ordinate with my imagined reader, you draw on your expectations, scan what is before your eyes, evoke memories and, perhaps, see future prospects. Even in reading, language-activity connects eye and head movements with inscriptions and wordings. For those concerned with the results, we can ask what happens as we create and construe language and, generally, manage human action. Language links the here-and-now with what has been and, crucially, what is to come. It is thus beyond dispute that, in this sense, language is a distributed phenomenon.

Language is embodied because it involves the coordination of bodily movements that allow for interdependence between eye and head movements, with texts afforded by the environment. Language is therefore also ecological, as it emerges in the organization of whole- bodied interactions between human beings and the environment. This also makes language a distributed phenomenon that involves meshwork of local and non-local resources, such as, situated (local) resources, like

engaging with a computer screen that mediates text, or non-material (non-local) resources, such as, organizational procedures that govern the rules for when to use a digital communication system during a workday. For example, how care staff enact routines for reading e-mails in the morning, midday etc., to monitor, for instance, test results received from laboratories.

Technically speaking, a distributed language view emphasizes the analytical value of regarding multiple timescales, also known as multiscalarity (Loaiza et al., 2020; Steffensen & Pedersen, 2014). By paying attention to multiscalarity, the researcher is enabled to regard both the situated event that transpires "here-and-now" as well as the "not-here-not-now" constraints that condition the event. Put differently, events emerge from the simultaneous coordination of an enchronic timescale (Enfield, 2014), that is, the real-time conversational timeline unfolding "here-and-now", but also – at the same time – conditions related to slower timescales, such as those preceding the event. Such slow timescales can, for example, pertain to organizational developments (e.g., economic structures in Danish health reforms governing that patient consultations only can be compensated a duration of 10 minutes); autobiographical memories and experiences of the individual (e.g., the health professionals memories of the patient's previous symptoms); and sociocultural resources (e.g., embedded verbal patterns, like jargon etc.) (Simonsen & Steffensen, 2024; Steffensen, 2013).

The ontological principle of multiscalarity, and the scientific recognition of it from a distributed language view, points out that multiple conditioning factors are saturating human behaviour at the same time. This approach enables consideration of whole-bodied experiences and organizational structures, thereby transgressing dichotomic understandings of human behaviour. It also adds to the somewhat narrow code-based view discursively represented in computational favoring tendencies in health research on LLMs.

Analytically, a distributed approach to language deals with the interactions between people and technologies rather than treating one of them in isolation (Trasmundi, 2020). Accordingly, such an approach encourages a scientific starting point in the interdependent relational dynamics organizing the human ecology, that is, for example, how language, interaction, and cognition condition behaviour in a given context (Trasmundi et al., 2024). The epistemological interest for relational dynamics found in the distributed language approach is, thus, closely connected to phenomenological interests in relations, empathy, and embodiment.

Empathy is embodied

Empathy is a concept that has caught interdisciplinary interest over several centuries and which is given varying meaning across the sciences (Fernandez & Zahavi, 2020; Maibom, 2017). From a philosophical, phenomenological perspective, empathy is both our basic ability to perceive other people as experiencing subjects (rather than objects) as well as the ability to perceive what it is that the other person experiences (anger, joy, pain, etc.) (Fernandez & Zahavi, 2021). Within this tradition, the perceptual, emotional, and thus necessarily embodied dimensions of empathy have been explored by phenomenologists, such as the classical phenomenologists Edmund Husserl, Max Scheler and Edith Stein (Assing Hvidt & Olesen, 2025). Empathy here is

relational and enacted; it is a way of perceiving and responding that involves the whole embodied subject.

By contrast, within medical epistemology and practice, so-called clinical empathy primarily denotes the cognitive processes of understanding (versus feeling) the patient's situation and knowing how to act/help accordingly. In this medical framing, empathy is conceptualized less as a basic perceptual stance and more as a professional skill that can be trained, practiced, and evaluated (Mead & Bower, 2000; Mercer & Reynolds, 2002). This emphasis renders empathy measurable: many studies rely on structured psychometric instruments such as the Jefferson Scale of Physician Empathy, which quantify empathy through physician self-ratings (Hojat et al., 2001). Over time, empathy has gained a normative status in medicine as a vital element of high-quality patient care, supported by a large body of evidence pointing to its positive effect on health outcomes for both patients, students training to become physicians and healthcare professionals (Cairns et al., 2024; Hojat, 2016; Howick et al., 2018). This clinical rendering of empathy as primarily "cognitive" resonates, we argue, with current computational information-processing framings. Once empathy is treated as a set of observable standardized behaviours (or outputs) - verbal techniques, tone of writing, communicative strategies - it becomes possible to imagine that algorithms can replicate it. In this sense, the conceptualization of clinical empathy provides a pathway to computational "empathy": both treat empathic communication as something that can be replicated, measured, and optimized, whether by training professionals or by training models.

Against this background, humanistic and phenomenological perspectives emphasize that empathy cannot be grasped in dichotomies of emotional versus cognitive, mind versus body, and that empathic communication in a healthcare setting integrates emotional, intuitive and cognitive dimensions in a holistic, distributed manner (Hooker, 2015; Malbois & Hurst-Majno, 2023; Pedersen, 2010). Consequently, empathy cannot be programmed and scripted. Optimizing empathic healthcare through LLMs is thus antithetical to empathy as enacted in human, embodied engagements and responses.

Methods

In the first case, we draw on data from an ethnographic study on interprofessional interactions with digital consultations in general practice in Denmark conducted by the first author in 2018-2019 (Simonsen, 2022; 2025[2]). The ethnographic study involved cognitive ethnography (Hutchins, 1995), including participant observation, video-observation, and semi-structured interviews with GPs, staff at nursing homes, including nurses and care assistants as well as with patients. Observation studies were done in one GP clinic, at one nursing home, and in the home of three patients. Recruitment of the GP clinic and nursing home was facilitated by professional network, and the patients were recruited along the observation conducted in the GP clinic. Fieldwork was conducted over 14 days in professional settings, and additionally 11 days were spent following the three patients. This led to over 20 hours of video-recordings; 60 pages of fieldnotes; three semi-structured interviews with patients, three semi-structured interviews with GPs and several informal conversations with care staff from the nursing home. Focus was on how digital consultations (e-consultations with

patients and digital correspondences exchanged between GPs and care staff of nursing homes) and affiliated digital technologies (e.g., the electronic patient record) constrained (enabled as well as restricted) everyday life of the professionals, including daily routines, patient consultations, collaborative situations, and interprofessional curbside consultations. The aim with the study was to understand and explore how digital consultations and digitalization processes more broadly were embedded and enacted in professional behaviour (including language, cognitive processes, such as, decision-making and problem-solving), interprofessional interactions, and in the care for patients. All interviews were conducted in person, and all the data were collected after obtaining oral and written consent provided by all participants. Data analysis involved transcription of interviews in Nvivo12, and multimodal interaction analyses of selected events from the video-recorded data which were conducted via the annotation tool ELAN (Sloetjes & Wittenburg, 2008). Coding and analyses were discussed and refined across collaborations among interdisciplinary teams of researchers.

In the second case, we draw on data from an ethnographic study on e-consultations in general practice in Denmark conducted by the second author in 2018-2019 (Assing Hvidt et al., 2020). The study involved participant observation in four general practice clinics that varied by geographical location (urban and rural) and practice type (single-handed and group organization). Recruitment of the clinics was facilitated through prior research contacts to GPs. The fieldwork, totaling seven days and approximately 50 hours, included observation of consultations and daily clinic routines, with both GPs and patients providing written consent. Alongside observation, the GPs from the clinics were interviewed, using a semi-structured interview guide. The interview questions focused on how email consultations were integrated into everyday workflow, the GPs' individual e-consultation practices, and their opinions on the potentials of e-consultations for building, maintaining or disrupting the doctor-patient relationship. Additional GPs, selected for diversity in age, gender, geography, and practice experience, were interviewed. Data generation continued until achieving information power and richness of data (Malterud et al., 2015). All interviews, offered in person or by phone, were audio-recorded, spanning 20–60 minutes. The total number of interviews was 16. Data analysis involved expanding jottings into detailed field notes, transcribing interviews, and conducting open and thematic coding (Braun & Clarke, 2006) in NVivo 12 Pro.

Results

Just as Cowley (2011) describes in the above quote: writing entails co-ordinating with one's imagined reader, and similarly – in the context of digital health communication – engaging dialogically (Linell, 2009), relationally, and empathically, enacting a form of sense-making and understanding with our doctor, patient, colleague, or whoever may be the perceived author of the digital message we may receive, read, and respond to. We are able to enact empathy, because we have some kind of awareness of the other, who we know also shares a kind of awareness of us and themselves as a person. While we read and write, through intersubjectivity, we engage in sense-making about our anticipatory perception of how the other will read our message as well as the other's

intentions for writing. Reading and writing are, thus, intentional, as phenomenologists would say.

Reading with care

In our first case, we enter a Danish nursing home, where we meet a young nurse ("Jane") with supervisory responsibilities who engages with the home's digital labour. As part of her routine, she reads and writes digital consultations this early Tuesday morning. Jane sits at her computer, while she navigates the nursing home's various digital communication systems. Among different tasks, she reads digital correspondences received from GPs that provide information about the patients' treatment and conditions. Sandra, a senior nurse, doses medicine on the desk right in front of Jane, and they are separated by the two computers that are standing back-to-back on the desks. Yet, there is enough room for Sandra to dose the medicine, and they can easily have eye contact and occasionally chat while doing their individual activities. This morning resembles a usual work routine for Jane: Starting the day with reading digital correspondences and mails before going on a round at the home. Reading them involves a range of activities: Jane adjusts treatment plans and makes new arrangements with GPs according to new changes and needs communicated in the system. Accordingly, the content mediated by the digital correspondences influences the medical treatment and care for the patients carried out at the nursing home. However, it is not only with an eye for the organization of medical tasks Jane reads. This morning, she also notices something different. Observed through the videorecording, Jane scrolls in the digital system, opens a correspondence and removes her hand from the mouse to position it in front of her mouth while reading in silent concentration for 28 seconds. The message is authored by a GP ("Debra") who writes that although the patient is terminally ill, the patient should still receive treatment should she suffer from a bladder infection or pneumonia. After the 28 seconds of silent reading, Jane addresses Sandra, and while her eyes are still fixed on the text on the screen, she praises the GP, Debra, for being "good at spelling out the treatment level" in the message. Sandra answers with the patient in mind, as she says that she does not believe that the patient "is ready to go just yet". Doing so cues Jane to rephrase what she meant by stating to Sandra that "it is because the staff [from a different department] sometimes have doubts about whether or not they should treat this type of patients". The interaction closes, as Jane repeats that the GP has a good writing style.

Having presented the case, at least three points are salient to make from a distributed perspective. First, in terms of understanding that language is embodied. It is noticeable that Jane literally repositions her body in the environment to read with more concentration: By removing her hand from the mouse, she restrains her action possibilities of scrolling around in the digital system, which is otherwise part of navigating the digital environment when searching for information. Her bodily (re-)focus marks a change in her reading strategy, and by switching from silence to verbalizing her rationale in the following social interaction with Sandra, she also distributes her way of making sense of the message in a collaborative, affording manner in between the two of them as she shares the information with Sandra in the situated conversation.

Secondly, the written message works, not just as an object providing information about treatment, but as embedded in the meshwork of the ecology of the nursing home, as Jane projects meaning into the message beyond its literal content, though the message is about one patient. Observably, in the explanation to Sandra, Jane reveals that there is a problem with the care staff from the different department; that they sometimes have doubts about whether to treat patients or abstain from doing so. As Jane connects the particular content regarding the patient with a general problem regarding treatment level for a group of patients, she reads with care for both the patient(s) and with empathy for the staff at the different department. In this way, her engagement with the text supports and connects cross-collaboration at the home, including medical decision-making, education, and planning of the future. In terms of theory, non-local resources (former collaborative experience with the staff, and experience with reading messages received from different GPs) meshes with the local situation of reading in the moment.

Thirdly, it is not just the biomedical content of the message that Jane notices but also the writing style of the GP. As she explains to Sandra, the GP is "good at spelling it out". In the interview with her she provides more context, emphasizing that the GP's way of writing is different from other GPs – which also illuminates the difficulties regarding paradoxes of access: although you may have access to information, it is not the same as interpreting information correctly. Through the GP's writing style and content of the messages, Jane perceives a problem previously encountered at the nursing home concerning caring for the patients in terms of the treatment level of certain types of patients. Her evaluation of the GP's writing style, as part of the reading process of searching for information, reveals how reading involves both material engagement with the digital system, her experience and sociocultural awareness of variation in communication (i.e., the variations of writing style of GPs and the staff's limitations in interpreting information the same way); more than just engaging with the functionality of the local text (i.e., procuring antibiotics for the patient). While she reads, she embodies technical skills in terms of her interaction with the digital system, because though she knows that everyone at the nursing home can read the message, that is, they have access to them, she simultaneously also knows – from her embodied experience – that while the other staff have access to the messages, it does not equate that they will interpret the information in the same way. Therefore, she reads with care and with empathy for the lacking interpretative prerequisites of the staff at the mentioned department. Where a computational view standardizes the juxtaposing of information retrieval and information delivery based on access to digital communication systems, presenting this as a benchmark for good care, the case exemplifies how much more work goes into reading and working with digital health communication. This, for example, involves Jane's perception of the (human) author and how the message is produced (i.e., the qualitative value of it being well-written). Specifically, because it is a message authored by a GP who Jane has come to know as someone who writes differently than other GPs over time, there is a sense of trust and authority ascribed in the direction for the treatment level. This is not just random or a "collapsed" suggestion, but it is based on lived personal history, embodied material engagement and sociocultural processes. As the intersubjective (empathic) experience of collaboration in the nursing home ecology is enacted in the process of reading with care; reading with care involves communication that goes beyond mere computation.

Writing with care

The empirical context of our second case is daily management of e-consultations by GPs in general practice in Denmark. The case draws on data from a semi-structured interview with a middle-aged, male GP from one of the rural clinics. The case has been selected because of its exemplary power, demonstrating how sense-making in relation to patients' written messages depend on mutual knowledge in the doctor-patient relationship and how daily management of e-consultations involve constant adaptative and context-sensitive reflections and communication skills. Before unpacking the case, contextual information on e-consultations in Danish general practice is warranted.

Digital consultations, specifically text-based e-consultations, have gained foothold in general practice in Denmark as elsewhere in the healthcare sector globally. In Denmark, e-consultations were introduced as a mandatory service in general practice in 2009, attempting to meet policy efficiency- and quality demands and the challenge of an increasing healthcare demand. Today, e-consultations constitute appr. 25% of all consultations in general practice, reflecting an increasing demand from patients who value digital, flexible and convenient access to the GP (Assing Hvidt et al., 2020). Given the complex nature of doctor-patient communications, e-consultations were never politically envisioned to mediate relational or emotional exchanges, but for simple, task-oriented functions such as: prescription refills, communicating laboratory results and informational tasks (Lee & Zuercher, 2017). Nonetheless, what studies investigating the content of email consultation, including our own, have found, is that e-consultations are filled with socio-emotional, embodied language, expressing positive and negative affect (Andreassen et al., 2018; Roter et al., 2008; White et al., 2004). This was likewise evident in our study, where interviewing GPs about their e-consultation practices made it clear that responding to a patient message cannot be reduced to standardized input-output logics but requires an emotionally and empathically situated understanding of the patient in his/her life situation as well as an embodied understanding of the relational characteristics of the relationship within which this communication unfolds. The participating GPs in our study described how they responded differently depending on the patient and their mutual relationship. One interviewed GP's account provided an illustrative example of how sense-making and action potentials in relation to reading and responding to e-consultations were embedded in the continuous doctor-patient relationships.

Every Sunday evening, the GP would receive a message from one of his patients suffering from a psychiatric diagnosis. He explained that in every message, the patient would explain with short sentences how she had spent her weekend, e.g., which activities she had engaged in and how she had been doing mentally and socially, ending every message with a "bye, bye". The GP explained that drawing on years of contact, he would know what to be attentive to in terms of subtle signs of deteriorated mental health and thus when to ask her to book an in-clinic consultation. Importantly, the GP felt confident that this patient would not expect him to respond in length to her weekly messages but only to signal that he had read. As he remarked, he would "store" her messages for future encounters in the clinic, leaving the possibility open to incorporate them in their conversation if need be. His choice to briefly acknowledge her messages, without generic or verbose "supportive" text, reflects the GP's sensitivity to what will most benefit the patient in this context. This attunement is possible only

because GP and patient know each other as persons, shaping communication far beyond what standardized language or algorithmic prompting could ever replicate. For instance, if the GP were to use an LLM-generated reply, the result might be a lengthy email full of polite, affective phrasing: "Thank you for sharing, I am happy to know that you had a nice weekend. Please let me know if I can support you." On the surface, such a response is "empathetic" from a standardized point of view; yet for this patient, it risks feeling depersonalized and decontextualised. The human response, in contrast, is deeply situated and multiscalar - integrating encounters of the past, knowledge of individual needs and preferences in the present, of how the message can be used in the future. Importantly, the brevity of his answers best matches the character of their relationship. All these dynamics are embodied in the engagement with digital communication technologies.

The above point was furthermore illustrated by several of the GPs who experienced the burden tied to having to respond to requests of their colleagues' patients, for instance during absences (sick leaves or holidays). This communication task, i.e., answering to patients "unknown" to them, appeared, apart from being burdensome, also to be of lower quality and thus to be a source of feelings of uncertainty and insecurity as to how the patient would understand and act upon their answers. A sense of moving into a terrain of increased communication risks of complaints and patient dissatisfaction was suddenly installed in the GPs. Relating to the above point, a GP stressed the importance of having the feeling, when answering the patients, that he knew how "they will read my words", stressing that "that is, after all, also extremely important in all this". Thus, the analytical point is that although GPs are still responding to unknown patients in embodied and distributed ways, in the absence of prior relationship and contextual sensitivity, answers to unknown patients may resemble AI-generated answers because they are not grounded in lived experience within a doctor-patient relationship. As a result, they appear less meaningful.

Discussion

Against the backdrop of a growing literature on the emphasis on LLMs as tools for optimizing digital health communication, we have provided empirical examples demonstrating how health professionals engage with digital health communication in embodied and distributed ways that go beyond computational automation.

In the first empirical case, we demonstrated that Jane's embodied and distributed acts of reading a digital correspondence note concerning a patient contributes to the quality of care she provides. The quality of reading digital text with care is beyond computational operations of fast processing of information and access to vast amounts of data (standard metrics in computational models). Rather it ties to her cultural and context-sensitive adaptations, i.e., slowing down her reading, consciously restricting the material environment of system-afforded fast scrolling, as she integrates her experience of the past with collaborating with staff across the nursing home. The work with digital health communication that Jane exemplifies, illustrates that working with digitally mediated written language involves empathy for how others read (or fail to read with similar granularity as Jane does herself), cognitive anticipation of potential problems and solutions in medical interventions, and the ability to navigate the attention ecology of a sociomaterial environment. Such distributed, embodied

(human) behaviour is non-linear and non-reducible to static, standardized models - whether this is recognized on a policy or scientific level or not.

In the second empirical case, we demonstrated that a GP's written communication between patients and GPs in e-consultations is situated in the lived doctor-patient relationships and embodied understandings of each party. Responding empathically to patients is neither a matter of lengthy messages nor polite phrasing but requires attuned sensitivity to individual patient needs. Thus, meaningful human engagement in e-consultations, or digital correspondences, depends on recognizing fine-grained variability and differences – an ability that is essential for cultivating patient-centred health communication. As Dillion et al. (2023) note, although LLMs are trained on data from diverse sources, they typically "collapse the diversity of judgments into a single modal opinion. LLMs are better at approximating average human judgments than they are at capturing variation" (2023, p. 598). Precisely because humans are sensitive to individual traits and needs, answering queries and making sense of information within the lived doctor-patient or cross-professional relationship, reading and writing practices are demanding. This is why help from chatbots with responding to patients' inquiries, or summing up treatment plans, based on access to digital information, may appear attractive. However, and crucially, the empathy displayed by humans, engaging with digital communication, cannot be standardized since its key characteristic – and authenticity marker – is attunement to the individual context and situation, whether it is responding to a patient with a brief "ok", a quick follow-up call or other context-sensitive behaviours. The American sociologist Sherry Turkle, highlighting authenticity as a key criterion for distinguishing humans from computers, argues that although AI can perform pretend empathy, it cannot replace the interpretive, embodied, and relational qualities of human empathy (Turkle, 2007).

While the cases exemplify two different forms of embodied interactions with digital technology in healthcare (i.e., between health professionals and between a GP and a patient), we do not intend to imply that digital health communication or empathy stay the same across situated contexts. Contrarily, the two cases illustrate variation in how language and empathy emerge and how they are coordinated in health professionals' relational and embodied work with digital communication technology.

The above insights contrast with the underlying dichotomic discourse, as exemplified in the above mapping of computational research trends, where language, behavior, and empathy are operationalized in ways that are detached from social and embodied realities. While it can perhaps be conducive in some experimental cases to treat language and empathy in some standardized and fixed formats, the point is, that computational trends of research need to exhibit transparency and critical reflection toward the underlying discourses and practices they are promoting. Technologies are not neutral extensions of clinical intention (e.g., increased efficiency, accuracy, and quality) but structure a particular way of perceiving and understanding language and behaviour, including empathy. In a similar vein, Lindia points out: "algorithms ossify multiple kinds of prejudices, namely the structural prejudices of the programmer and the exemplary prejudices of the dataset" (2024, p. 37). Technologies thus not only reproduce non-neutral, predetermined forms of interaction, shaped by underlying structures and codes, but also the particular views (of the programmer) that are embedded in these models and enacted by its future users.

However, while we are critical in respect to our main argument throughout this paper, we do not mean to deny the many benefits and revolutionizing potentials of introducing LLMs in healthcare. For example, the sheer computational power of these advanced models to discover and predict patterns in data from different sources (e.g., data from the electronic patient record, laboratory results, digital messages, etc.) may offer medical predictions with great benefit for patients in ways which human health professionals in no realistic way in today's pressured system will have the time nor cognitive capabilities to perform. Moreover, it is not our point to promote technophobic barriers in implementation of LLMs in healthcare. Rather, drawing on distributed and phenomenological perspectives, we wish to emphasize that digital health communication interdependently involves and shapes complex human behaviours (also with benefits for patients) beyond the code-based forms of language and behaviour inscribed in computational logics. So, when investigating and discussing the introduction of LLMs in healthcare, complexities of embodied interactions in medical practices ought to be recognized in both scientific and political discourses – or, at the very least, scientific fields and policy-makers ought to strive even further to promote transparency of their own strengths and limitations. This could, for example, include how they regard language and empathy, insofar the goal is to provide human-centred and ethically oriented forms of care, based on technological development.

We do not necessarily mean to valorise a human-centred, embodied understanding of empathy over another, as it makes sense to program chatbots within a spectrum of interpersonally friendly or polite phrases. However, we argue that discursively framing chatbot-generated responses as "quality communication" and "empathetic" not only reduces highly complex and multifaceted phenomena to techniques and efficiency add-ons, but also neglects the demanding interaction-sensitive work that health professionals perform when engaging with digital health communication. As it is, such communication already supports quality, for example, by improving treatment levels and cross-sectorial collaboration (exemplified by Jane, case 1), as well as addressing patient-centred needs (exemplified by the GP, case 2). In a habermasian sense, an instrumental approach to language and empathy risks "colonizing" the domains of human interaction that depend on relational processes of communicative and emotional action – what Habermas calls the lifeworld (Habermas, 1988). This process, we have argued above, has already been initiated with the dichotomous understandings, on the one hand, of digital health communication as isolated from embodied interactions of real-world practices, and on the other hand, from the separation of emotional and cognitive aspects of empathy, prevalent in medical and clinical epistemologies.

Overall, as AI and LLMs advance, there is a need for critical awareness of how these technologies shape new epistemic frames and realities. Implementing such new technologies in healthcare is not a simple value-free, neutral act. Looking beyond the functional opportunities of AI-driven LLMs that hold revolutionizing potentials for healthcare management, the underlying epistemological understanding of language and human behaviour as computationally generated phenomena, separated from embodied experiences, have, indeed, noticeable implications for how healthcare communication practices are understood and carried out in the future. On a practical level, health professionals and patients are required to develop new skills and competencies to understand the potentials and limits of LLMs, recognizing their non-neutral foundations. On an educational level, technosolutionist thinking must not erode

critical thinking about AI in medical and health education (Clusmann et al., 2023). On a scientific level, interdisciplinary collaborations are needed to capture and analyze the experiential and contextual impacts of LLMs in healthcare settings. Critical scientific evaluation is required so that solutions provided by LLMs do not substitute neither vital, relational, and meaning-making interactions in care nor existing work that is already conducive for quality care.

Conclusion

Our empirical examples illustrate that digital health communication fundamentally involves embodied, distributed, and empathic engagement – processes that are beyond computational outputs. Much current LLM research juxtaposes computational language with real-life embodied language and behaviour, often failing to critically reflect on the implications. While some researchers aim to use AI and LLMs to increase the quality in digital health communication, we have argued, that their efforts are grounded in problematic underlying assumptions. As a result, language and empathy in scientific fields, favouring AI computational approaches, risk being "colonized" in a habermasian sense by instrumentalist neoliberal epistemologies, reducing the understanding of complex human behaviour to a predictable, controllable add-on for technically competent and efficient practices. Recognizing that digital health communication is embodied, distributed, and dynamic opens democratic pathways for more nuanced evaluation and future research regarding AI and LLMs in healthcare.

Declarations

Ethical approval

All participants were informed about the study, data collection methods, anonymization procedure, data storage and analysis both oral and in written materials. All par-ticipation was voluntary, and all participants signed written consent forms in line with the General Data Protection Regulation (GDPR). Furthermore, the study was approved by the legal department of University of Southern Denmark: The Research and Innovation Organization (SDU RIO). SDU RIO gave permission concerning storage and analysis of data on a secure network drive provided by SDU.

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Notes

1) For clarity, we refer to AI-driven conversational Large Language Models, as LLMs throughout, and we only deal with chatbots that are based on AI and LLMs throughout this paper.
2) We refer to the paper Reading with Care: A Distributed Perspective on Reading Digitally Mediated Text in Healthcare (Simonsen, 2025) for the full analysis.

References

Andreassen, H. K., Dyb, K., May, C. R., Pope, C. J., & Warth, L. L. (2018). Digitized patient–provider interaction: How does it matter? A qualitative meta-synthesis. *Social Science & Medicine, 215*, 36-44. https://doi.org/10.1016/j.socscimed.2018.08.036

Assing Hvidt, E. & Olesen, F. (2025). Empathy in technologically mediated patient-provider communication: a phenomenological and postphenomenological exploration. *Philosophy, Ethics, and Humanities in Medicine, 20*(1), 11. https://doi.org/10.1186/s13010-025-00172-4

Assing Hvidt, E., Søndergaard, J., Klausen, M., & Grønning, A. (2020). Not just an information-delivery tool. An ethnographic study exploring Danish GPs' perspectives on and experiences with the relational potential of email consultation. *Scandinavian journal of primary health care, 38*(4), 411-420. https://doi.org/10.1080/02813432.2020.1843939

Ayers, J. W., Poliak, A., Dredze, M., Leas, E. C., Zhu, Z., Kelley, J. B., Faix, D. J., Goodman, A. M., Longhurst, C. A., Hogarth, M., & Smith, D. M. (2023). Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum. *Archives of internal medicine (1960), 183*(6), 589-596. https://doi.org/10.1001/jamainternmed.2023.1838

Barrett, L., & Stout, D. (2024). Minds in movement: embodied cognition in the age of artificial intelligence. *Philosophical Transactions of the Royal Society B: Biological Sciences, 379*(1911), 20230144. https://doi.org/10.1098/rstb.2023.0144

Bisk, Y., Holtzman, A., Thomason, J., Jacob, A., Bengio, Y., Chai, J., Lapata, M., Lazaridou, A., May, J., Nisnevich, A., Pinto, N., & Turian, J. (2020). *Experience Grounds Language*. https://doi.org/10.48550/arxiv.2004.10151

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Cairns, P., Isham, A. E., & Zachariae, R. (2024). The association between empathy and burnout in medical students: a systematic review and meta-analysis. *BMC Medical Education, 24*(1), 640. https://doi.org/10.1186/s12909-024-05625-6

Chow, J. C. L., & Li, K. (2024). Ethical Considerations in Human-Centered AI: Advancing Oncology Chatbots Through Large Language Models. *JMIR Bioinform Biotechnol, 5*, e64406. https://doi.org/10.2196/64406

Clusmann, J., Kolbinger, F. R., Muti, H. S., Carrero, Z. I., Eckardt, J.-N., Laleh, N. G., Löffler, C. M. L., Schwarzkopf, S.-C., Unger, M., Veldhuizen, G. P., Wagner, S. J., & Kather, J. N. (2023). The future landscape of large language models in medicine. *Communications medicine, 3*(1), 141-141. https://doi.org/10.1038/s43856-023-00370-1

Cowley, S. J. (2011). *Distributed language* (Vol. 34). John Benjamins Pub. Co.

Cuskley, C., Woods, R., & Flaherty, M. (2024). The Limitations of Large Language Models for Understanding Human Language and Cognition. *Open Mind (Camb), 8*, 1058-1083. https://doi.org/10.1162/opmi_a_00160

Dillion, D., Tandon, N., Gu, Y., & Gray, K. (2023). Can AI language models replace human participants? *Trends in cognitive sciences, 27*(7), 597-600. https://doi.org/10.1016/j.tics.2023.04.008

Driess, D., Xia, F., Sajjadi, M. S. M., Lynch, C., Chowdhery, A., Ichter, B., Wahid, A., Tompson, J., Vuong, Q., Yu, T., Huang, W., Chebotar, Y., Sermanet, P., Duckworth, D., Levine, S., Vanhoucke, V., Hausman, K., Toussaint, M., Greff, K., Zeng, A., Mordatch, I., & Florence, P. (2023). *PaLM-E: An Embodied Multimodal Language Model*. Proceedings of the 40th International Conference on Machine Learning, Honolulu, Hawaii, USA.

Enfield, N. J. (2014). Causal dynamics of language. In N. J. Enfield, P. Kockelman, & J. Sidnell (Eds.), *The Cambridge Handbook of Linguistic Anthropology* (pp. 325–342). Cambridge University Press. https://doi.org/10.1017/CBO9781139342872.015

Fernandez, A. V., & Zahavi, D. (2020). Basic empathy: Developing the concept of empathy from the ground up. *International Journal of Nursing Studies, 110*, 103695. https://doi.org/10.1016/j.ijnurstu.2020.103695

Fernandez, A. V., & Zahavi, D. (2021). Can we train basic empathy? A phenomenological proposal. *Nurse Education Today, 98*, 104720. https://doi.org/10.1016/j.nedt.2020.104720

Ferrario, A., Sedlakova, J., & Trachsel, M. (2024). The Role of Humanization and Robustness of Large Language Models in Conversational Artificial Intelligence for Individuals With Depression: A Critical Analysis. *JMIR Ment Health, 11*, e56569. https://doi.org/10.2196/56569

Gahrn-Andersen, R., Johannessen, C. M., Harvey, M., Simonsen, L. M., Trasmundi, S. B., Marchetti, E., Worsøe, L. B., Fester-Seeger, M.-T., Lebahn, M., & Steffensen, S. V. (2019). Interactivity: Why, What and How?. *RASK – International journal of language and communication, 50*, 113-136. https://www.sdu.dk/en/om_sdu/institutter_centre/isk/forskning/forskningspublikationer/rask/issues/50

Gangopadhyay, N., & Pichler, A. (2024). Embodiment and agency in a digital world. *Front Psychol, 15*, 1392949. https://doi.org/10.3389/fpsyg.2024.1392949

Geantă, M., Bădescu, D., Chirca, N., Nechita, O. C., Radu, C. G., Rascu, S., Rădăvoi, D., Sima, C., Toma, C., & Jinga, V. (2024). The Potential Impact of Large Language Models on Doctor-Patient Communication: A Case Study in Prostate Cancer. *Healthcare (Basel), 12*(15). https://doi.org/10.3390/healthcare12151548

Gibson, J. J. (1979). *The ecological approach to visual perception*. Houghton Mifflin Company.

Habermas, J. (1988). The Theory of Communicative Action. Bulletin of Science, Technology & Society, 8(4), 449. https://doi.org/10.1177/027046768800800410 9

Hellström, T. (2024). AI and its consequences for the written word [Perspective]. *Frontiers in Artificial Intelligence, 6*, 1326166. https://doi.org/10.3389/frai.2023.1326166

Herrman, T. (2022). Promoting Human Competences by Appropriate Modes of Interaction for Human-Centered-AI. In H. Degen & S. Ntoa (Eds.), *ARTIFICIAL INTELLIGENCE IN HCI, AI-HCI 2022* (Vol. 13336, pp. 35-50). Springer International Publishing AG. https://doi.org/10.1007/978-3-031-05643-7_3

Hoeyer, K. (2019). Data as promise: Reconfiguring Danish public health through personalized medicine. *Social studies of science, 49*(4), 531-555. https://doi.org/10.1177/0306312719858697

Hojat, M. (2016). *Empathy in Health Professions Education and Patient Care* (1st ed.). Springer International Publishing. https://doi.org/10.1007/978-3-319-27625-0

Hojat, M., Mangione, S., Nasca, T. J., Cohen, M. J. M., Gonnella, J. S., Erdmann, J. B., Veloski, J., & Magee, M. (2001). The Jefferson Scale of Physician Empathy: Development and Preliminary Psychometric Data. *Educational and Psychological Measurement, 61*(2), 349-365. https://doi.org/10.1177/00131640121971158

Hollan, J., Hutchins, E., & Kirsh, D. (2000). Distributed cognition: toward a new foundation for human-computer interaction research. *ACM transactions on computer-human interaction, 7*(2), 174-196. https://doi.org/10.1145/353485.353487

Hooker, C. (2015). Understanding empathy: why phenomenology and hermeneutics can help medical education and practice. *Medicine, health care, and philosophy, 18*(4), 541-552. https://doi.org/10.1007/s11019-015-9631-z

Howick, J., Moscrop, A., Mebius, A., Fanshawe, T. R., Lewith, G., Bishop, F. L., Mistiaen, P., Roberts, N. W., Dieninytė, E., Hu, X.-Y., Aveyard, P., & Onakpoya, I. J. (2018). Effects of empathic and positive communication in healthcare consultations: a systematic review and meta-analysis. *Journal of the Royal Society of Medicine, 111*(7), 240-252. https://doi.org/10.1177/0141076818769477

Hutchins, E. (1995). *Cognition in the wild*. The MIT Press. https://doi.org/10.7551/mitpress/1881.001.0001

Ibáñez, A., Kühne, K., Miklashevsky, A., Monaco, E., Muraki, E., Ranzini, M., Speed, L. J., & Tuena, C. (2023). Ecological Meanings: A Consensus Paper on Individual Differences and Contextual Influences in Embodied Language. *Journal of Cognition, 6*(1), 59. https://doi.org/10.5334/joc.228

Järvilehto, T. (2009). The Theory of the Organism-Environment System as a Basis of Experimental Work in Psychology. *Ecological psychology, 21*(2), 112-120. https://doi.org/10.1080/10407410902877066

Kirsh, D. (2008). Problem Solving and Situated Cognition. In P. Robbins & A. M. (Eds.), *The Cambridge Handbook of Situated Cognition* (pp. 43). University Press. https://doi.org/10.1017/CBO9780511816826.015

Kirsh, D. (2013). Embodied cognition and the magical future of interaction design. *ACM transactions on computer-human interaction, 20*(1), 1-30. https://doi.org/10.1145/2442106.2442109

Lee, S. A., & Zuercher, R. J. (2017). A current review of doctor-patient computer-mediated communication. *Journal of communication in healthcare, 10*(1), 22-30. https://doi.org/10.1080/17538068.2017.1282184

Liao, C., Chu, C., Lien, M., Wu, Y., & Wang, T. (2025). AI-Enhanced Healthcare: Integrating ChatGPT-4 in ePROs for Improved Oncology Care and Decision-Making: A Pilot Evaluation. *Current Oncology, 32*(1), 7. https://doi.org/10.3390/curroncol32010007

Lindia, M. S. (2024). Algorithms Don't Have A Past: Beyond Gadamer's Alterity of the Text and Stader's Reflected Prejudiced Use. *Philosophy & Technology, 37*(1), 38. https://doi.org/10.1007/s13347-024-00728-w

Linell, P. (2009). *Rethinking language, mind, and world dialogically: interactional and contextual theories of human sense-making*. Information Age Pub.

Loaiza, J. M., Trasmundi, S. B., & Steffensen, S. V. (2020). Multiscalar Temporality in Human Behaviour: A Case Study of Constraint Interdependence in Psychotherapy. *Frontiers in Psychology, 11*, 1685. https://doi.org/10.3389/fpsyg.2020.01685

Maibom, H. (2017). Introduction to philosophy of empathy. In H. Maibom (ed.), *The Routledge Handbook of Philosophy of Empathy* (1 ed., pp. 1-9). Routledge. https://doi.org/10.4324/9781315282015-1

Malbois, E., & Hurst-Majno, S. (2023). Empathy is not so perfect! - For a descriptive and wide conception of empathy. *Medicine, Health Care and Philosophy, 26*(1), 85-97. https://doi.org/10.1007/s11019-022-10124-w

Malterud, K., Siersma, V. D., & Guassora, A. D. (2015). Sample Size in Qualitative Interview Studies: Guided by Information Power. *Qualitative health research, 26*(13), 1753-1760. https://doi.org/10.1177/1049732315617444

Marent, B., & Henwood, F. (2023). Digital health: A sociomaterial approach. *Sociology of Health and Illness, 45*(1), 37-53. https://doi.org/10.1111/1467-9566.13538

Mead, N., & Bower, P. (2000). Patient-centredness: a conceptual framework and review of the empirical literature. *Social Science & Medicine, 51*(7), 1087-1110. https://doi.org/10.1016/S0277-9536(00)00098-8

Mercer, S. W., & Reynolds, W. J. (2002). Empathy and quality of care. *The British journal of general practice: the journal of the Royal College of General Practitioners, 52 Suppl*(Suppl), S9–S12.

Pedersen, R. (2010). Empathy development in medical education - A critical review. *Medical Teacher, 32*(7), 593–600. https://doi.org/10.3109/01421590903544702

Roberts, J. T. F. (2023). Taking embodiment seriously in public policy and practice: adopting a procedural approach to health and welfare. *Monash Bioeth Rev, 41*(Suppl 1), 20-48. https://doi.org/10.1007/s40592-023-00183-x

Roter, D. L., Larson, S., Sands, D. Z., Ford, D. E., & Houston, T. (2008). Can E-Mail Messages Between Patients and Physicians Be Patient-Centered? *Health Communication, 23*(1), 80–86. https://doi.org/10.1080/10410230701807295

Sejnowski, T. J. (2023). Large Language Models and the Reverse Turing Test. *Neural Computation, 35*(3), 309-342. https://doi.org/10.1162/neco_a_01563

Simonsen, L. M. (2022). Digitalization of the Wild: The everyday enaction of digital consultations in interprofessional interactions [PhD dissertation]. University of Southern Denmark.

Simonsen, L. M. (2025). Reading with Care: A distributed perspective on reading digitally mediated text in healthcare. *Digital Society, 4*(1), 10. https://doi.org/10.1007/s44206-025-00165-y

Simonsen, L.M. & Steffensen, S. V. (2024). Genoplivningssamtalens Økologi [The ecology of the resuscitation conversation]. In A.-M. S. Christensen, L. Huniche, L. Nielsen, & E. N. Petersen (Eds.), *Sundhedsfilosofi i praksis* [Reflections on healthcare practice. Healthcare philosophy in interdisciplinary contexts] (pp. 131-145). Munksgaard.

Simonsen, L.M., Steffensen, S. V., & Sutton, J. (2022). Sociotechnical dilemmas in healthcare: A cognitive ethnography. In D. Secchi, R. Gahrn-Andersen, & S. J. Cowley (Eds.), *Organizational cognition: The theory of social organizing* (pp. 213-238). Routledge. https://go.exlibris.link/k7TLF72v

Skorburg, J. A., L., K. K., & and Taylor, G. W. (2023). "Large Language Models" Do Much More than Just Language: Some Bioethical Implications of Multi-Modal AI. *The American Journal of Bioethics, 23*(10), 110-113. https://doi.org/10.1080/15265161.2023.2250318

Sloetjes, H., & Wittenburg, P. (2008, May). Annotation by Category: ELAN and ISO DCR. In N. Calzolari, K. Choukri, B. Maegaard, J. Mariani, J. Odijk, S. Piperidis, & D. Tapias, *Proceedings of the Sixth International Conference on Language Resources and Evaluation (LREC'08)*. Marrakech, Morocco.

Sorin, V., Brin, D., Barash, Y., Konen, E., Charney, A., Nadkarni, G., & Klang, E. (2024). Large Language Models and Empathy: Systematic Review. *J MED INTERNET RES, 26*, e52597. https://doi.org/10.2196/52597

Steffensen, S. V., & Pedersen, S. B. (2014). Temporal Dynamics in Human Interaction. *Cybernetics & human knowing, 21*(1-2), 80-97.

Steffensen, S. V. (2012). Care and conversing in dialogical systems. *Language sciences, 34*(5), 513-531. https://doi.org/10.1016/j.langsci.2012.03.008

Steffensen, S. V. (2013). Human Interactivity: Problem-solving, Solution-probing and Verbal Patterns in the Wild. In S. J. Cowley & F. Vallée-Tourangeau (Eds.), *Cognition Beyond the Brain: Computation, Interactivity and Human Artifice*. Springer.

Steffensen, S. V., & Cowley, S. J. (2010). A non-local aftermath. In S. J. Cowley, J. C. Major, S. V. Steffensen, & A. J. Dinis (Eds.), *Signifying bodies: Biosemiosis, interaction and health* (pp. 331-355). The Faculty of Philosophy of Braga, Portuguese Catholic University.

Sørensen, N. L., Bemman, B., Jensen, M. B., Moeslund, T. B., & Thomsen, J. L. (2023). Machine learning in general practice: scoping review of administrative task support and automation. *BMC Primary Care, 24*(1), 14. https://doi.org/10.1186/s12875-023-01969-y

Trasmundi, S. B. (2020). *Errors and Interaction*. John Benjamins Publishing Company.

Trasmundi, S. B., Baggs, E., Toro, J., & Steffensen, S. V. (2024). Expertise in Non-Well-Defined Task Domains: The Case of Reading. *Social Epistemology, 38*(1), 13–27. https://doi.org/10.1080/02691728.2023.2266690

Turkle, S. (2007). Authenticity in the age of digital companions. *Interaction Studies: Social Behaviour and Communication in Biological and Artificial Systems, 8*(3), 501–517. https://doi.org/10.1075/is.8.3.11tur

White, C. B., Moyer, C. A., Stern, D. T., & Katz, S. J. (2004). A content analysis of e-mail communication between patients and their providers: patients get the message. *Journal of the American Medical Informatics Association, 11*(4), 260-267. https://doi.org/10.1197/jamia.M1445

QUALITATIVE HEALTH COMMUNICATION

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