# Phenomenology and the Philosophy of Technology

## Edited by
## Bas de Boer and Jochem Zwier

https://www.openbookpublishers.com

# 10. Three Embodied Dimensions of Communication: Phenomenological Lessons *for and from* the Field of Augmented and Alternative Communication Technology

*Janna van Grunsven, Bouke van Balen, and Caroline Bollen*

## Introduction

Phenomenologists understand human beings as 'always already' intertwined with a meaningful world that is intersubjectively constituted and shaped by the affordances of tools and technological systems.[1] To take this intertwinement seriously is to recognize that there is an ineluctable link between how human beings experience other people and the sociomaterial world at large, and how they relate to themselves. People are, to speak with Maurice Merleau-Ponty, 'destined to the world' where it is 'in the world that [they] know [themselves]' (2012, Ixxiv). As Merleau-Ponty has compellingly argued, *human embodiment* plays a vital role in the constitution of this experiential interconnectedness of

---

1   To be sure, we can adopt a scientific perspective onto the world, maximally stripped of any traces of subjectivity, for legitimate explanatory purposes. But the world that we experience in our everyday lives is a world shot through with significance; a world that we perceive in terms of the countless possibilities for action, interaction, and engagement afforded by the things and people around us.

self, other, and world. To capture this, he moves us away from a picture of the body as a 'mere physical object among objects', towards a view of the body as 'our general means of having a world' (2012, 147). From a phenomenological Merleau-Pontyan perspective, the body is a site of lived experience and expressive intentional agency. The body, thus understood, is connected to the world through countless 'intentional threads' that are enriched, extended, and maintained via interactions with other people as well as through embodied sensorimotor processes of habituation that enable the incorporation of tools and technologies into the body's 'schema' (Merleau-Ponty's familiar example is that of the blind person's cane, which, during active embodied manipulation, extends a person's experience of the perceived environment and of itself as an agent within that environment).

In the flow of everyday experience, we are typically not thematically aware of the constitutive role played by our embodiment in how we relate to the world and, by the same token, to ourselves. Hence, to make the implicit explicit, Merleau-Ponty and many contemporary phenomenologists with him turn to limit cases in which the dynamical embodied interplay between self and world is in some sense compromised. By pushing the limits of human experience, cases such as illness (Carel, 2016), depression (Ratcliffe, 2014), solitary confinement (Guenther, 2013), or a global pandemic (Van Grunsven, 2021) can reveal structures of ordinary experience that are usually taken for granted but that, when brought into view, can be appreciated for their profound existential significance. Limit cases, in other words, help 'loose[n] the intentional threads that connect us to the world in order to make them appear' (Merleau-Ponty, 2012, p. xxvii).

In this chapter, we too focus on a limit case. Specifically, we turn to the lived embodied experiences of people who are unable to use (some of) their bodily expressive resources due to congenital or acquired disability. People who find themselves navigating these communicative challenges often use some form of *augmentative or alternative communication technology* also called AAC tech. Think of picture boards, communication-supporting apps, eye-tracking technology, or, more recently (and still in the early stages of development and validation),

Brain-Computer Interfaces (BCIs) used for communication.[2] By incorporating AAC tech into their sensorimotor body schema, AAC tech-users can access new ways of relating to the world and to themselves as expressive communicative agents, thus enriching and diversifying their communicative lives.

That said, AAC tech usage can also be experienced as limiting, constricting, and narrowing a communicator's self and world relation. This depends in part on the design of a given AAC tech and its ability to appropriately reflect a user's communication needs. Currently, much AAC tech is designed to restore or augment people's communicative resources by facilitating information-transmissive speech acts that convey propositional content through words or images. Think of the computer-generated utterance 'I am thirsty' being produced by selecting an image of a cup of water or by spelling out a series of letters selected from a screen. Being able to convey such propositional information is undeniably important for AAC tech-users, supporting them in many daily practical activities and increasing their physical safety (cf. Beukelman & Mirenda, 2013). However, if phenomenologists like Merleau-Ponty are right, then interpersonal communication reaches far beyond the transmission of propositional content and is deeply embodied. To highlight the embodied dimension of interpersonal communication, Merleau-Ponty introduces the term *intercorporeality*. Intercorporeality refers to the 'pre-reflective intertwining of lived and living bodies, in which my own is affected by the other's body as much as his by mine, leading to an embodied communication' (Fuchs, 2017, p. 200). In this chapter, we articulate three dimensions within the phenomenon of intercorporeality or 'embodied communication', to put it more colloquially. These dimensions become perspicuous by combining insights from phenomenology with testimonial insights gleaned from the lived experiences of AAC tech-users. We will refer to these dimensions as *embodied mutual address*, *embodied enrichment*, and *embodied diversity*.

---

2    In the United States alone, 2 million people make use of AAC tech 'to gain access to their human and civil right to communicate'. *National Institute on Deafness and Other Communication Disorders* (2022, July 20), https://www.nidcd.nih.gov/directory/united-states-society-augmentative-and-alternative-communication-ussaac
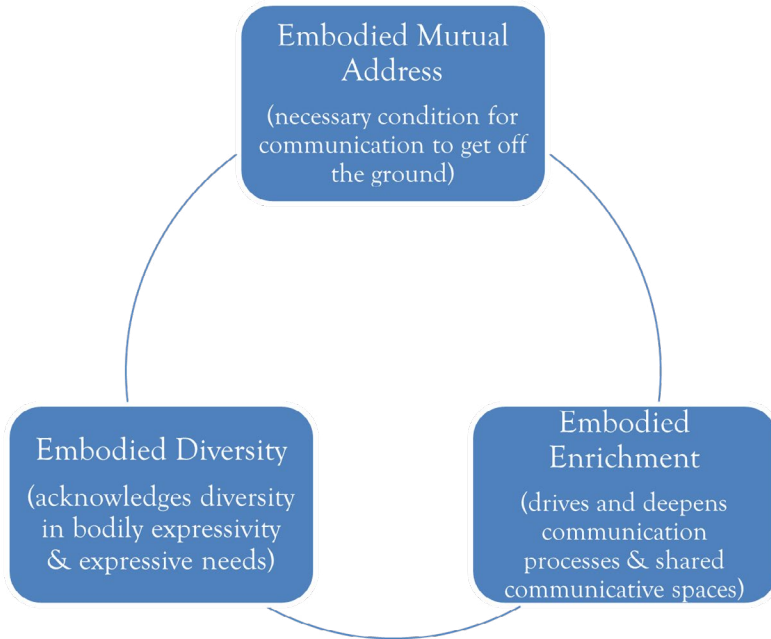
Fig. 10.1 Diagram illustrating the three interrelated dimensions of embodied communication. Figure created by authors (2024).

We propose that these three dimensions are vital for a robust understanding of the notion of embodied interpersonal communication and the existential significance it holds in human life. These embodied dimensions, which are overlooked when we understand communication primarily as the transmission of propositional content through speech, can have significant implications for the experience, design, policy, and socio-ethical decision-making surrounding AAC tech. As such, our chapter is in part a call for those working in the field of AAC tech to learn from phenomenological insights regarding the rich concept of embodied communication. These phenomenological insights are in part borrowed from Merleau-Ponty, but we also incorporate insights from Edmund Husserl as well as contemporary phenomenological thinkers. While we turn to phenomenological insights regarding embodied communication in order to reflect on the potential and limits of AAC tech, we simultaneously deepen the concept of intercorporeality (or embodied communication), within which we distinguish the above-

mentioned three dimensions, in light of testimonial evidence provided by AAC tech users. As such, our chapter also calls on phenomenologists to attend to the lived experiences of people whose embodied and technologically-mediated lives are situated differently from those whose embodiment is more in line with what is typically considered as 'normal'.[3] In doing so, our chapter also takes a critical look at the methodological use of disabled embodied communication as a 'limit case'. More specifically, we problematize the use of disabled embodied communication as a limit case *understood primarily in terms of experiential deficiency or lack* and how it falls short of the 'normal'.[4] Instead, via the notion of embodied diversity, we propose an engagement with disabled embodied communication that takes seriously the rich lived experiential perspectives of those whose expressive bodily lives are lived on the margins of what is typically considered 'normal' and the diversity of ways in which technologies can be incorporated into the lived communicative body. Although our discussion is focused on a niche subfield of communication technology, we believe that our insights—much like other insights that have been gleaned from phenomenological discussions of limit cases—can be applied more broadly, offering a fine-grained embodied perspective on a range of mainstream and emerging communication technologies.

## Smiles and Blinks: The Significance of Embodied Mutual Address

As mentioned, we will introduce *embodied mutual address, embodied enrichment*, and *embodied diversity* as three vital dimensions of embodied communication, which can inform how people experience, design, evaluate, and implement technologies that purport to mediate between people in communication. We begin, in this section, with the notion of embodied mutual address.

---

3     In that sense our chapter aligns with the project of critical phenomenology (cf. Guenther, 2021; Young, 1980).

4     The status of limit cases in Merleau-Ponty is complicated. While we can find reductive gestures in his work, he equally insists on the importance of understanding the lived experience of illness on its own terms, i.e., in its full existential significance, and not just in terms of what it is lacking in contrast with 'the normal'.

## 1. The Phenomenon of Embodied Mutual Address

Mutual address is constitutive of communication. That is, in order for your communicative acts to contribute to a communicative exchange, these acts need to be 'taken up' by a social other who sees you and who is seen by you as a minded subject whose communicative acts in turn warrant a response. Husserl articulates this point when he states, 'in an act in which one I addresses the other [...] I see the other as seeing and understanding me, and it is further in this that I "know" that the other in turn also knows himself as seen by me' (Husserl, 1973, p. 211). Husserl highlights that such mutual address requires 'engaged listening', where the addresser's expressive acts in turn 'motivate' a responsiveness in the addressee to genuinely engage 'with the aim of what is communicated' (Husserl, cited in Meindl & Zahavi, 2023). This makes acts of mutual address beholden to normative standards, where we can, in the midst of a communicative exchange, succeed or fail to properly attend to the other's communicative efforts. As our discussion below will indicate, such successes and failures can occur within multiple strata of embodied communication.

One's orientation towards the other, attending to her (listening to her, seeing her) as someone who aims to communicate something to us worth attending to, requires a particular stance towards the embodiment of the other.[5] The communicative other's body must be seen as more than a 'mere physical object among objects' (a *Körper*); it has to be seen as the expressive locus of an inner life (a *Leib*), as 'the place of a certain elaboration and somehow a certain "view" of the world' (Merleau-Ponty, 2012, p. 369). That is, the 'bodily comportment' of the addresser must be able to express a desire to communicate, which must be visible, and the bodily comportment of the addressee must be able to convey to the addresser that their act of address has been taken up—that they are heard or seen as an expressive communicator (Meindl & Zahavi, 2023). In the flow of everyday interaction, many of us can take for granted that our body is indeed seen by others in this way. It is predominantly in limit cases, discussed below, that the human body's primordial visibility

---

[5]    This is especially the case when communication unfolds in-person, but, as Lucy Osler convincingly discusses (2021), it is even the case in digitally-mediated 'offline' forms of communication.

*as* lived is replaced with a stance towards the body as first and foremost a 'mere' physical object. Typically, *when things go as they should*, we are directed at the body of another (and the other is directed at us) as the locus of personhood, where the other's bodily behaviour and expressive gestures are directly seen and felt as imbued with psychological meaning. In Merleau-Ponty's words:

> the communication […] of gestures comes about through the reciprocity of my intentions and the gestures of others, of my gestures and the intentions discernible in the conduct of other people. It is as if the other person's intentions inhabited my body and mine his. (Merleau-Ponty, 1962, p. 215)

In the course of everyday communication, people are typically attuned to and invested in the embodied expressive other as an addressable interlocutor, who, in turn, shapes the addressee, 'co-determin[ing] me in his gaze, touch, attitude, etc' (Fuchs & De Jaegher, 2009, p. 477). To flag, the phenomenon of *embodied diversity* (section 4, below) complicates the picture of effortless embodied communication sketched here.

As Merleau-Ponty already argued, and as many developmental psychologists have concurred, this attunement to the other's expressive body as addressable is manifest from early childhood onward (Merleau-Ponty, 1963; Reddy, 2008; Trevarthen, 1979; Tronick, 2007). Developmental psychologist Vasu Reddy draws attention to the experience of being the target of address:

> The breath-catchingness and warmth in receiving [a] smile are likely to be rather different from *observing* that smile directed at someone else. […] Not only is the experience of the other person more immediate and more powerful in direct engagement, but it calls out from you a different way of being, an immediate responsiveness, a feeling in response, and an obligation to 'answer' the person's acts. (Reddy, 2008, p. 27)

Whatever else happens once we've answered the call of second-person address and we (attempt to) enter into a more sustained communicative process, the very moment of mutual embodied address is significant in its own right. Reddy links it to 'a different [responsive] way of being' and Husserl, at times, characterizes it as being *in contact*: 'in an act in which one I addresses the other […] we understand each other and are spiritually together in mutual understanding, *in contact*' (Husserl, 1973b,

p. 211, our emphasis). Though touched on by Husserl, the phenomenon of *contact* has not received much phenomenological attention to the best of our knowledge.[6] Its fleeting and somewhat enigmatic nature makes it admittedly difficult to analyze in terms of structural experiential features. However, as we will now propose by looking at locked-in syndrome (LIS) as a limit case of embodied communication, the existential significance of contact—established in embodied mutual address—is hard to over-estimate.

## 2. The Breakdown of Embodied Mutual Address: The Case of Locked-In Syndrome

LIS is a rare medical condition most often caused by neurodegenerative diseases such as amyotrophic lateral sclerosis (ALS).[7] People with LIS have very limited muscle control and cannot move nor speak (anarthria). They do, however, have intact visual and auditory perception, consciousness, cognitive, and emotional abilities, and bodily sensations (American Congress of Rehabilitation Medicine, 1995).[8] In its most extreme form, i.e., when *complete*, LIS is characterized by a total loss of muscle-control, with even a person's eyes lacking the ability to blink.[9] In the future, people with complete LIS may be able to use a BCI to express some of their basic communication needs. BCIs are devices that can be controlled with brain activity in real time. It is, for instance, possible to control a computer with 'brain clicks' that are voluntarily generated by

---

6   Within the work of Husserl, the notion of 'contact' (or 'we-contact') doesn't appear as a recurring key technical term. In the *Oxford Handbook of Contemporary Phenomenology*, the notion of 'we-contact' is indexed only twice.

7   Numbers are estimated at 0.73 patients per 100.000 inhabitants in the Netherlands (Pels et al., 2017). ALS is a subtype of motor neuron disease (MND), which is sometimes also referred to as Lou Gehrig's disease.

8   We should note that it is not so straightforward to assess this 'inner intactness'. For instance, people who suffer from a stroke may transition from an unconscious coma towards a locked-in state (this was the case of Julia Tavalaro, discussed below). Moreover, in cases of ALS, there is a chance that patients develop comorbid neurological conditions such as dementia, which, when they become locked-in, is hard to assess.

9   There are three forms of LIS: classic, incomplete, and complete (Bauer, 1979). Physicist Stephen Hawking (1942–2018), who suffered from the neurodegenerative disease ALS, may be the most famous example of someone who was in *incomplete* LIS. He used AAC tech that he controlled with residual muscle control in his cheek.

the attempt to move a hand (Oxley et al., 2021; Vansteensel et al., 2016). Although this technology is still in its infancy, it is already allowing some research participants with LIS to produce speech-utterances without the usual requirement of moving their mouths, tongues, and breathing air through their vocal cords.[10]

If Merleau-Ponty is right about the body's constitutive role in our self and world relation, one would expect that being locked-in profoundly impacts upon a person's experiential life. Indeed, medical anthropologist Fernando Vidal, who works on the phenomenology of LIS, observes that 'for locked-in individuals, their medical condition represents a new manner of self-conscious existence and a novel experience of being in the world' (Vidal, 2020, p. 122). Devastatingly, one dimension of this new self and world experience recounted by many patients who recover from LIS is the experience of being treated as a mere physical object, not as an addressable subject (Nizzi, Blandin, & Demertzi, 2020).[11] The implications of finding oneself outside the space of contact, of *experiencing* one's own body as lived and addressable and yet *seen* by others as a mere Körper, is powerfully captured by Julia Tavalaro (1935–2003). Tavalaro became locked-in because of two strokes that paralyzed her from head to toe. For six excruciatingly long years, Tavalaro was misdiagnosed as being in a vegetative state (VS). VS and LIS are outwardly similar, in the sense that both conditions are characterized by the (near total) absence of motoric abilities and activity. However, whereas patients in VS have lost their conscious intentional directedness at the world as a space of meaning, a space where contact can be established, patients in LIS have not. For years, Tavalaro thus underwent the experience of being regarded as wholly un-addressable by her medical staff, hearing herself being referred to as 'the vegetable'. In her autobiography, which she was able to co-author using an AAC device called a 'switch-based scan', Tavalaro recounts the moment that one of her nurse practitioners finally recognized that she was in fact addressable:

---

10    For now, implantable speech-BCIs rely on large and heavy computers, which make them unfeasible for home-use.

11    This survey-study on the experience of personhood of people with LIS found that a large majority of the participants experience interactions that leave them feeling '"not respected as persons" but rather "treated as objects"' (Nizzi, Blandin, & Demertzi, 2020).

'Can you close your eyes, Mrs. Tavalaro?'

With these words, I am shocked back into reality. This is no dream. I'm actually *being spoken to*. I close my eyes. I open them and see Arlene's face.

'Can you blink twice?'

I do it. Silence fills the space between us. Her face shows shock and grief and happiness at once. In the previous six years, no one had thought to ask me these simple questions.

'Okay, Mrs. Tavalaro. I'd like you to respond with eye movements. Can you move your eyes up, like this?'

She rolls her eyes towards her forehead. I watch her do this. Then, with a quick movement of my eyes I feel my mind rise from the ocean depths of pain. For the first time in six years, *I feel whole*. (Tavalaro & Tayson, 1997, p. 121, our emphasis)

Here we witness a first-personal testimony of what it is like to go from being seen as un-addressable to establishing contact in mutual embodied address; to have one's blinks recognized as expressive and taken up by an other, whose face expresses in return 'with shock, grief, and happiness all at once'. As we saw earlier, Husserl proposes that the addresser and addressee unify when they are in contact. Tavalaro, who describes feeling 'whole' and attuned to reality again in the moment of contact establishing mutual embodied address, seems to suggest something more fundamental: not only do we unify with the other, but we also become unified within ourselves and with the world as a shared reality (recall Merleau-Ponty's claim that people are 'destined to the world' where it is 'in the world that [they] know [themselves]').[12] Talavaro's testimony urges us to take seriously that when a person finds herself outside the space of contact, when a person's bodily visibility as addressable is hidden from view, her grip on the experiential world and her grip on herself as a unified subject of experience are tenuous at best. By the same token, it urges us to recognize the deep meaning of what could easily be dismissed as a mere fleeting moment of embodied communication: in the blink of an eye, contact can be established through mutual embodied address. This contact has a profound existential significance, enabling not just an act of communicative exchange but unifying and reopening a locked-in person's compromised self and

---

12   This aligns with work from phenomenologists Richard Zaner (2003) and Lisa Guenther (2013).

world relation. Dramatically put, even though it only requires the smallest of gestures, what is at stake in the moment of embodied mutual address is, in a sense, *everything*.

## 3. 'I Wanna Be Able to Sound Sarcastic': How AAC Tech Constrains Embodied Enrichment

In the previous section we made a case for the transformative significance of contact, established through mutual embodied address. Being seen as a target of address and having one's response taken up by the communicative other seems capable of transforming one's experiential relationship to oneself and the world in profound ways. While address is, in that sense, *everything*, we must simultaneously acknowledge its limits. Mutual embodied address, established in a moment of contact, constitutes just the (enabling) beginning of embodied interpersonal communication. As Husserl proposes, 'every successful understanding of what occurs in others has the effect of opening up new associations and new possibilities of understanding; and conversely [...] every such understanding uncovers my own psychic life in its similarity and difference and, by bringing new features into prominence, makes it fruitful for new associations' (Husserl, 1960, §54). The enrichment of our understanding of the other, of our own psychic life and of 'new associations', described here by Husserl, is often unlocked through pre-reflective embodied processes of interpersonal responsiveness, with interlocutors perceiving and responding with near automaticity to the expressive embodied other. Unless our expressive resources are severely compromised, as for instance in the case of LIS, the lived expressive human body—unaided by additional expressive tools and technologies—shapes communicative processes in a vastly rich nuanced way, through:

- Movement, gesture, and positioning: e.g., pointing, waving, hugging, rocking, turning away, leaning in, etc.
- Posture: crouching, hunching, etc.
- Facial expressions: smiling, smirking, seducing, etc.
- Gaze (or the avoidance thereof)

- Sound: screaming, whispering, humming, laughing, crying, singing, etc.

- Tone: sounding funny, mad, engaged, etc.

- Rhythmic turn-taking (i.e., the temporal intervals with which we take up and respond the other's address), etc.

These expressions, movements, and rhythms are not mere 'bodily embellishments' of the content-transmissive speech acts that are typically highlighted when we think about communication and that figure prominently in AAC tech development (see Metzger et al., 2023). Perceived by the communicative other, they co-shape how communicative address is taken up and responded to in return. They inform the quality and direction of communicative interaction, as well as the ways in which we see the other, relate to ourselves, and attend to the world together. We introduce the notion of *embodied enrichment* to capture this embodied dimension of intercorporeality, where enrichment carries at least two meaningful aspects of communication: (1) embodied interaction *enriches* our individual experiential access to the world and the significances we perceive in it; (2) this experiential enrichment typically depends upon a mutual responsiveness to the mind-bogglingly *rich* array of expressive modalities that the human body is capable of.[13] Mentioning just a subset of the rich embodied expressions sketched above, Thomas Fuchs and Hanne de Jaegher, in their phenomenological analysis of intercorporeality, point out that:

> Grasping, pointing, handing over, moving towards, etc., are inherently meaningful and goal-directed actions [...] [that] invite a certain range of meaningful reactions (e.g., pointing to → gaze- following, handing over → accepting, moving forward → moving backward, etc.), *thus creating a common space of co-varying intentional movements.* (2009, pp. 470–472, our emphasis)

This common space of co-varying intentional movements, which presupposes the space of contact enabled by embodied mutual address,

---

13    In the field of 4E cognition, this is also referred to as *participatory sense-making* (De Jaegher & Di Paolo). We use the term embodied enrichment here for several reasons: (1) to emphasize that this concerns an embodied dimension of communication, (2) that what is at stake is enrichment, and (3) we also add two additional dimensions to the notion of enrichment in the next section that are not typically contained within the notion of participatory sense-making.

can depend enormously on the subtleties we can detect in one another's expressive bodies. It isn't just 'grasping, pointing, handing over, moving towards' that opens up a range of different communicative exchanges, it is grasping, pointing, and moving towards *in a particular way, with a particular rhythm and style*. There is, for instance, a perceivable qualitative difference (for those who possess the required visual machinery) between a grasping gesture performed with the intention to *compete* for an object versus the grasping gesture performed with the intention to *share* an object (Becchio et al., 2012). Such perceptually available subtle differences will have a decisive impact upon how we experience ourselves, others, and the interaction space in which we are embedded and to which we contribute as expressive interacting beings (Di Paolo & De Jaegher, 2007).

The frustration one can feel when losing access to one's rich range of expressive styles and habits, and the ability to fluidly respond to the bodily expressions of others, is captured powerfully by the late Colin Portnuff, a former software engineer and ALS patient who used his experience as an AAC tech user to educate AAC developers. Portnuff describes how many of the embodied dimensions of communication that typical communicators are able to take for granted are disrupted in AAC-mediated communication (e.g., eye-contact; the flow of rhythmic turn-taking; keeping up with the dynamics of group-communication). He also captures the embodied expressive limitations that he experiences as an AAC-user: 'I wanna be able to sound sensitive or arrogant, assertive or humble, angry or happy, sarcastic or sincere, matter of fact or suggestive and sexy' (Portnuff, 2006). Similar observations were made by two different AAC users interviewed by Caroline Bollen, one of the co-authors of this chapter:[14]

> sometimes people misinterpret what I think or how I feel when I'm using the [device]. I think it's because my body and my expressions don't always match what I'm saying. Sometimes people assume they know how I feel based on what my body is doing and they don't listen to what I'm telling them. One downside of the [device] is that it's hard to be expressive with it—for example to sound angry, sad, excited, etc. (Interviewee 1)
>
>     What would make it so that I can identify with my device more would

---

14    The conduction of these interviews was approved by the Human Research Ethics Committee of TU Delft.

> be the possibility to change the intonation on the basis of the context. […]
> Theoretically this is possible: there are three versions of [my device's]
> voice: a neutral one, a happy one, and a sad one. As far as I know there
> are no programs that make use of this, but I think it should be possible to
> indicate which emotion belongs to which part of the message. One could
> work with emoticons for extra accessibility.[15] (Interviewee 2)

While AAC tech has been invaluable in terms of supporting non-speaking
people's communicative relations to the world, these testimonies
underscore that this can nevertheless fall short of the embodied
communicative enrichment many of us depend on for maintaining and
deepening a successful communicative self and world relations. This
will emphatically be the case if AAC design and research predominantly
focuses on linguistic performance and propositional content-
transmission, working with a limited conception of what it means to be
a communicative self. We suggest that AAC tech, and communication
technology more generally, should recognize (and be inspired by)
the vast range of communicative resources that human bodies can be
capable of and recognize the existential stakes of having access to these
resources. This is not to say that this is altogether unacknowledged
in the AAC space. In fact, there appears to be a growing interest in
embodied enrichment, stemming in part from emerging technologies
and developments in affective computing, which are opening up new
affordances for communication (Feijt et al., 2023; Metzger, 2023). As we
sketch in section 5, the analysis offered in this chapter can stand in the
service of these emerging developments.

## 4. Embodied Communicative Diversity

It is imperative to be mindful of a danger when taking limit cases such
as the ones described in the previous two sections as a methodological
device for uncovering 'normal' experiential structures. The danger,
perhaps lingering in our argument thus far, is that we end up
underwriting the normativity of 'the normal'—that we see a limit case
as merely a derivate form of 'full-fledged' communicative being-in-the-
world. A phenomenological analysis of limit cases *can* but does not need
to lead to such a reductive stance towards embodied communication—a

---

15    Translation from Flemish to English by Caroline Bollen.

stance that harbours problematic ableist biases.[16] One way to build upon phenomenological insights in order to circumvent such a narrow ableist stance on communication is by underscoring phenomenology's flexible expansive view of embodiment, according to which the embodied self's expressive resources are never fixed by what appears to be the 'natural' norm, but always capable of being extended and diversified through the habituated incorporation of tools external to the physical body. In the words of one of Bollen's interviewees, articulating the intimate connection forged between them and their AAC device, 'it's part of me. As time has gone by, I've seen it as my voice more and more' (interviewee 1).

We need not restrict ourselves to the modalities of (typically developed) unaided expression in order to identify and facilitate meaningful forms of communication and new ways of being as communicative selves. Recognizing this can help question normative biases that favour unaided expressivity, especially in their 'typical' form. If we don't attend to the diverse ways in which people can use their bodies to express themselves, we may be prone to thinking, for instance, that eye-contact or verbal expressions are necessary for communicative enrichment, or that rocking and flapping (examples of autistic embodied expressivity) are subpar or even pathological modes of expressivity. Such assumptions can, in turn, find their way into how AAC tech is designed (see Mankoff et al., 2010). Acknowledging and valuing the different ways in which people can be and thrive as expressive embodied beings is essential if AAC tech is to facilitate genuine communication, rather than enforce communicative norms that lead to 'neurotypical gatekeeping' (Bollen, 2023) or that are culturally hegemonic.[17]

In many ways, the field of AAC tech has already played an important role in accommodating and underscoring the validity of different communications styles and needs (Mirenda, 2009; Van Grunsven &

---

16  See Van Grunsven (2020) for a discussion of how different phenomenologically inspired approaches to autism can either harbour ableist tenets (as is the case in some of Shaun Gallagher's work) or embrace a neurodivergent perspective (exemplified in Hanne de Jaegher, 2013).

17  For an example of such a culturally hegemonic stance on what counts as meaningful language and expression, see Kim E. Nielsen's discussion of the significant role of sign-language in native American tribes and the Eurocentric dismissal and eventual eradication of this language (2012).

Roeser, 2022). In the context of non-speaking autism, for instance, it has signified a much more respectful alternative to the damaging practices of Applied Behavioral Therapy (ABA). ABA uses extensive 'positive reinforcement' strategies (sometimes subjecting young children to as much as forty hours of therapeutic intervention a week) in an effort to 'replace inappropriate behaviour', such as the rocking or flapping mentioned above, with 'socially accepted' forms of expression and communication.[18] In their blog post on the harm inflicted on autistic people through ABA therapy, Maxfield Sparrow writes:

> You want to always remember a few cardinal rules: behavior is communication [...] Communication is more important than speech. Human connection is more important than forced eye-contact. Trust is easy to shatter and painfully difficult to rebuild. It is more important for a child to be comfortable and functional than to 'look normal'.[19]

AAC tech, with its explicit emphasis on *alternative* communication strategies, has represented an important counter perspective on non-typical forms of communication that aligns with Sparrow's insistence on 'communication' as 'more important than speech'. That said, a significant amount of AAC interventions still prioritize speech acts. In a critical examination of this tendency, Donaldson, Corbin, and McCoy (2021) highlight the experiences of autistic adults who use AAC technology to complement speech in daily life. One of the trends they identify in their stories was an experienced pressure to use speech for communication rather than other modalities of communication, with one interviewee recounting:

> I learned to outwardly appear to speak well because there was a lot of social pressure to do so, but I was frequently being forced to speak when it was difficult. (Donaldson, Corbin, and McCoy, 2021)

Passages such as this one highlight that it is a common but mistaken view to assume that speech, when made available through technology,

---

18   The language of replacing inappropriate behaviour with socially accepted forms of communication is taken directly from the website of Autism Speaks, a deeply controversial and influential organization, largely responsible for the widespread availability, pursuit, and insurance coverage of ABA therapy in the US (See chapter 5 of Ashley Shew's *Technolableism*, 2023).

19   M. Sparrow (2016, October 20). ABA. *Unstrange Mind*.

is experienced as the preferred or even superior mode of communication for its users:[20]

> What makes communication successful for me is when I can use the method that works best for me in the moment, and when the other person just accepts that method. (Donaldson, Corbin, and McCoy, 2021)
>     I love multimodal communication. My brain loves it. It is so much easier to communicate with multimodal communication. It is hard to try to force myself to one communication method when I can use multiple. Life is easier with multiple. Different methods have different advantage[s]. (Donaldson, Corbin, and McCoy, 2021)

Recognizing how wildly people's relationship to speech and their communicative styles and preferences can differ calls for a shift away from understanding AAC as an intervention aimed solely at restoring lacking abilities, towards an appreciation of AAC as a valuable extension of one's lived expressive body. Building upon that insight, the notion of *embodied enrichment*, as laid out in the previous section, should now itself be enriched, where we should refer to enrichment not in a twofold but in a fourfold sense:

1. Embodied interaction enriches our individual experiential take on the world.

2. This experiential enrichment typically depends upon a mutual responsiveness to the mind-bogglingly rich array of expressive modalities that the human body, unaided by technology, is capable of.

3. This rich array of unaided expressive modalities can take on many shapes, influenced by, among other things, factors of neurodiversity.

4. This expressive diversity should be acknowledged in technologies aimed at enriching people's expressive resources—technologies that the body, understood as lived, is able of to incorporate into its bodyschema, integrating it into a user's experiential self and world relation.

We propose that an appreciation of the diverse ways in which human

---

20   See Mel Baggs' video (Baggs, 2007), for their powerful message underscoring this point.

bodies can be expressive and communicative, paired with an appreciation of the (lived) body as a site of tool-incorporation, can highlight the powerful potential for AAC tech to introduce new creative modalities of communication without sustaining an ableist romanticized view of unaided, typically developed speech-oriented communication.

## 5. Some Practical Implications for AAC Tech

How can the AAC tech field (and its users) benefit from our theoretical-phenomenological account, which has highlighted three dimensions of embodied communication? We argue that the first dimension, the dimension of address, is crucial to highlight because it hammers home the profound existential significance of communication, which presupposes that one's body is seen by others as addressable. This dimension doesn't require much for its establishment. As we saw, a blink of an eye, when taken up by the other, can transform a locked-in person's experiential life, 'pulling them out' of a state of utter isolation and into a state in which they begin to feel like a 'whole person' again. This insight is not only phenomenologically illuminating, but it has consequences for how we engage with people who are compromised in their addressability and the importance we attribute to AAC-usage. Recognizing that the smallest of bodily exchanges, when constituting mutual embodied address, can have a profound bearing on a person's sense of self and openness to the world can affect the challenging process of deciding whether to pursue or forego a BCI intervention for a person with complete LIS, a decision that turns *in part* on the assessment of whether the form of communication that a BCI enables—which for now is still extremely cumbersome and minimal in terms of supporting embodied enrichment—is 'worth it'.[21] Beyond the case of LIS, AAC users with a variety of disabilities credit their AAC-usage with their becoming visible to others as addressable and within the space of contact. In the words of disability rights activist, AAC user, and AAC co-developer Michael B. Williams, his ability to use AAC to outwardly express his thoughts to others allowed him to 'demonstrate I am not the blob incarnate' (2012).

---

21    The existential significance of address could also help to explain the arguably surprising finding that people with LIS who are able to maintain minimal expressive resources still consider their quality of life to be fairly high (Lulé et al., 2009).

As we argued, while it is important to recognize the powerful existential meaning of establishing minimal communicative contact and being visible to others as an addressable embodied being, it is equally important to recognize how our communicative self and world relations depend upon embodied enrichment, facilitating reciprocal meaning-making. This has implications for the ways in which AAC tech is designed, including the kinds of expressive modalities that are prioritized. There continues to be a dominant emphasis on representational content-transmissive speech acts in the AAC tech space, where it is sometimes suggested that the availability of such speech acts suffices to fully 'restore' a person's lost access to communication (Van Balen et al., 2023). This is also reflected in how AAC tech is typically appraised. A recent meta-analysis showed that the way the 'success' of AAC technologies is measured predominantly focuses on the ability to make requests (Aydin & Diken, 2020). What is considered effectiveness in an 'intervention' is limited to this specific skill. This extremely narrow view of communication lacks much of what it means to be a communicative being. Relatedly, it threatens to dismiss potentially effective AAC technologies with significant communicative power if and when those technologies don't meet the requirement for the optimal making of requests. Crucially, the way the success of an AAC is measured and written about by researchers affects governmental and health insurance policy by informing technology assessment and appraisal, which, in turn, has been known to result in people being denied AAC devices (Romski & Sevcik, 2018). With its emphatic commitment to alternative communication, AAC technology should stand not stand in the way but should rather stand in the service of facilitating multimodal human communication in all of its rich facets. This can mean the difference between a person merely *surviving with* (*technology-mediated*) *speech* or a robustly *thriving with communication*.

The importance of pursuing multimodal forms of embodied communication is already acknowledged in some recent developments in alternative forms of technology-mediated communication, with, for instance, physiological biosignals such as heartbeat and respiration being used as sources of social information capable of opening new paths of interpersonal communication (Feijt et al., 2023). In a similar spirit, it is the expressed ambition of BCI-researchers Metzger et al. (2023) to build

communication BCIs that acknowledge that 'speaking has rich prosody, expressiveness and identity that can enhance embodied communication beyond what can be conveyed in text alone' (p. 1037). With the notion of embodied diversity, we urge that efforts to enrich the design of AAC tech in multimodal ways means questioning ableist assumptions that can become operationalized in tech. This may require that technologists working in this space replace an emphasis on 'interventions', which often stem from an ableist mission of bringing disabled communicators into the space of 'the normal', towards an emphasis on what human-computer interaction researcher Rua Williams calls disability-led 'counterventions', which start emphatically from the lived experiences of disabled users rather than the normative assumptions from researchers (cf. Williams et al., 2023).

The phenomenologically inspired concepts introduced in this chapter can help to conceptualize such lived experiences and their implications for the design of AAC tech. In the course of everyday life, when things go as they should, mutual embodied address, embodied enrichment, and embodied diversity blend together in genuine communicative exchanges (see Fig. 10.1). But what the testimonials of different AAC tech users help to bring out is that these embodied dimensions of communication can come apart and fail to get off the ground in different ways. For instance, as we saw with Tavalaro, the experience of embodied mutual address can be established (and immensely important) without robust embodied enrichment being within reach. Likewise, a failure to recognize embodied diversity can set up asymmetrical communicative spaces in which some people are unable to express themselves in accordance with their expressive styles and needs, while this does not necessarily undermine embodied mutual address (that is, two interlocutors can continue to see each other as targets of mutual address while failing to find ways to engage in sustained embodied communication). At the same time, there are cases in which failures at the level of embodied diversity catalyze a full breakdown of embodied mutual address. This has occurred, for instance, in the context of autism. Autistic self-stimulatory behaviours such as rocking and humming (stimming) are now increasingly recognized as richly communicative (Kapp et al., 2019). Historically, though, it has been categorized as non-communicative and pathological, which, in turn, has contributed to the

labelling of autistic people as non-communicative and non-addressable full stop (Van Grunsven, 2022). To the extent that AAC tech can embrace and mediate between divergent embodied communication styles, it thus has the potential to not only honour embodied diversity but also to help repair breakdowns in the very conditions necessary for someone to live a communicative life at all: embodied mutual address.

Consider, also, the way in which embodied enrichment and diversity, while ideally coinciding in real-life communication, can come apart. Embodied enrichment, phenomenologists have emphasized, often unfolds pre-reflectively, with communicative partners responding to each other's bodily cues and expressions with near automaticity and in a manner that contributes quietly to a shared mutually enacted relational domain. However, when two communicative partners exhibit communication styles, needs, habits, and preferences that are emphatically divergent from one another, one may feel oneself confronted with the challenge to resist habituated pre-reflective norms of embodied enrichment (e.g., expecting eye-contact, specific patterns of rhythmic turn-taking and distance-taking, certain intonation and cadence-styles to express emotion) in order to make room for embodied diversity. Recognizing this matters for the design of AAC tech. For instance, rapid advancements in machine learning seem to support functionalities that enable people with severe paralysis to use communication BCIs that augment expressed utterances with 'facial-avatar animation', enabling a person to express not merely that X but also their affective attitudes with respect to X (Metzger et al., 2023). Predictions made by a BCI about which affective states and expressive styles ought to accompany utterance X seem capable of contributing to BCI-mediated embodied enrichment. However, as BCI-made predictions about which affective states and styles ought to accompany a given speech act will, to an important degree, be built upon data sets that likely reflect neurotypical styles and preferences for affective expressivity, this creates a potential trade-off between the BCI facilitating experiences of embodied enrichment for some while also denying embodied diversity to others. Awareness of such trade-offs, which presupposes the conceptual distinction between embodied enrichment and embodied diversity, can open up choices at the levels of technological functionality and design that one otherwise might overlook.

In sum, insights pertaining to the failures and successes of embodied communication and the ways in which such failures and successes can come apart (or mutually reinforce one another) in the areas of embodied mutual address, embodied enrichment, and embodied diversity can fruitfully inform AAC tech design. In this chapter, we hope to have provided analytical tools that can stand in service of this work. At the same time, we call for further phenomenological research on the embodied dimensions of communication and the ways in which they are at play in the lives of AAC users. There are already many initiatives and methods aimed at better including AAC users in research and design processes as primary contributors (Beneteau, 2020). However, AAC tech users are still systematically excluded from research that is not directly related to AAC but that does inform how we theorize the nature and scope of human communication and our views about what it means to thrive as a communicator (Dee-Prince, 2021). We hope that the three dimensions of embodied communication that we have highlighted, and that we have arrived at in part through insights gleaned from the lived experiences of AAC users, can inform not only how AAC tech is designed and assessed, but also how we design and assess more mainstream communication technologies. Finally, we hope that the testimonials of AAC users, seen through the lens of phenomenological concepts and ideas, loops back into those concepts and ideas, thereby refining and diversifying our phenomenological understanding of the nature and meaning of human communication in all of its unaided and technology-aided complexities.

# References

Aydin, O., & Diken, I. H. (2020). Studies comparing Augmentative and Alternative Communication systems (AAC) applications for individuals with autism spectrum disorder: A systematic review and meta-analysis. *Education and Training in Autism and Developmental Disabilities, 55*(2), 119–141.

Baggs, A. M. (2007). *In my language* [Video], https://www.youtube.com/watch?v=JnylM1hI2jc

Bauer, G., Gerstenbrand, F., & Rumpl, E. (1979). Varieties of the locked-in syndrome. *Journal of Neurology, 221*(2), 77–91, https://doi.org/10.1007/BF00313105

Becchio, C., Manera, V., Sartori, L., Cavallo, A., & Castiello, U. (2012). Grasping intentions: From thought experiments to empirical evidence. *Frontiers in Neuroscience, 6*(117), https://doi.org/10.3389/fnhum.2012.00117

Blackstone, S. W., Williams, M. B., & Wilkins, D. P. (2007). Key principles underlying research and practice in AAC. *Augmentative and alternative communication, 23*(3), 191–203.

Beukelman, D., & Mirenda, P. (2013). *Augmentative and alternative communication: Supporting children and adults with complex communication needs*. Paul H Brooks.

Bollen, C. (2023). Towards a clear and fair conceptualization of empathy. *Social Epistemology, 37*(5), *637*–655, https://doi.org/10.1080/02691728.2023.2227963

Burwell, S., Sample, M., & Racine, E. (2017). Ethical aspects of brain computer interfaces: a scoping review. *BMC Medical Ethics, 18*(1), 1–11, https://doi.org/10.1186.s12910-017-0220-y

Cabrera, L. Y., & Weber, D. J. (2023). Rethinking the ethical priorities for brain–computer interfaces. *Nature Electronics, 6*, 99–101, https://doi.org/10.1038/s41928-023-00928-w

Carel, H. (2016). *Phenomenology of illness*. Oxford University Press.

Donaldson, A. L., corbin, e*, & McCoy, J. (2021). 'Everyone deserves AAC': Preliminary study of the experiences of speaking autistic adults who use augmentative and alternative communication. *Perspectives of the ASHA Special Interest Groups, 6* (2), 315–326, https://doi.org/10.1044/2021_PERSP-20-00220

Eilan, N. (2020). Other I's, communication, and the second person. *Inquiry,* https://doi.org/10.1080/0020174X.2020.1788987

Feijt, M. A., Westerink, J. H., De Kort, Y. A., & IJsselsteijn, W. A. (2023). Sharing biosignals: An analysis of the experiential and communication properties of interpersonal psychophysiology. *Human–Computer Interaction, 38*(1), 49–78.

Fuchs, T. (2017). Intercorporeality and interaffectivity, In C. Meyers, J. Streeck, & J. Scott Joradan (Eds), *Intercorporeality: Emerging socialities in interaction* (pp. 3–24). Oxford University Press.

Fuchs, T., & Jaegher, H. D. (2009). Enactive intersubjectivity: Participatory sense-making and mutual incorporation. *Phenomenology and the Cognitive Sciences, 8*(4), 465–486, https://doi.org/10.1007/s11097-009-9136-4

Gilbert, F., Ienca, M., & Cook, M. (2023). How I became myself after merging with a computer: Does human-machine symbiosis raise human rights issues? *Brain Stimulation, 16*(3), 783–789, https://doi.org/10.1016/j.brs.2023.04.016

Guenther, L. (2013). *Solitary confinement: Social death and its afterlives*. University of Minnesota Press.

Guenther, L. (2021). Six senses of critique for critical phenomenology. *Puncta: Journal of Critical Phenomenology*, *4*(2), 5–23, https://doi.org/10.5399/PJCP. v4i2.2

Haselager, P., Vlek, R., Hill, J., & Nijboer, F. (2009). A note on the ethical aspects of BCI. *Neural Networks, 22*(9), 1352–1357, https://doi.org/10.1016/j. neunet.2009.06.046

Husserl, E. (1960). *Cartesian meditations*. Martinus Nijhoff.

Husserl, E. (1973). *Zur Phänomenologie der Intersubjektivität: Texte aus dem Nachlass, vol. ii, 1921–1928*. Springer.

Jaegher, H. D., & Paolo, E. D. (2007). Participatory sense-making: An enactive approach to social cognition. *Phenomenology and the Cognitive Sciences, 6*(4), 485–507, https://doi.org/10.1007/s11097-007-9076-9

Johar, S. (2016). *Emotion, affect and personality in speech*. Springer.

Kapp, K. S., Steward, R., & Crane, L. (2019). 'People should be allowed to do what they like': Autistic adults' views and experiences of stimming. *Autism, 23*(7), 1782–1792. https://doi.org/10.1177/13623613

Lulé, D., Zickler, C., Hä Cker, S., Bruno, M. A., Demertzi, A., Pellas, F., Laureys, S., & Kü Bler, A. (2009). Life can be worth living in locked-in syndrome. *Progress in Brain Research, 177*, https://doi.org/10.1016/S0079-6123(09)17723-3

Mankoff, J., Hayes, G., & Kasnitz, D. (2010, October 25–27). Disability studies as a source of critical inquiry for the field of assistive technology. Proceedings of the 12th International ACM SIGACCESS Conference on Computers and Accessibility, ASSETS 2010, Orlando, Florida, USA.

Maslen, H., & Rainey, S. (2021). Control and ownership of neuroprosthetic speech. *Philosophy and Technology, 34*(3), 425–445, https://doi.org/10.1007/ s13347-019-00389-0

Meindl, P., & Zahavi, D. (2023). From communication to communalization: a Husserlian account. *Continental Philosophy Review*, https://doi.org/10.1007/ s11007-023-09601-7

Merleau-Ponty, M. (1963). *The Structure of Behaviour*. Beacon Press.

Merleau-Ponty, M. (2012). *Phenomenology of perception*. Routledge.

Metzger, S. L., Littlejohn, K. T., Silva, A. B., Moses, et al. (2023). A high-performance neuroprosthesis for speech decoding and avatar control. *Nature, 620*(7976), 1037–1046.

Mirenda, P. (2009). Introduction to AAC for individuals with autism spectrum disorders. In P. Mirenda & T. Iacono (Eds), *Autism spectrum disorders and AAC* (pp. 3–22). Paul H Brooks.

Nielsen, K. E. (2012). *A disability history of the United States* (Vol. II). Beacon Press.

Nizzi, M. C., Blandin, V., & Demertzi, A. (2020). Attitudes towards personhood in the Locked-in Syndrome: from third-to first-person perspective and to interpersonal significance. *Neuroethics, 13*(2), 193–201.

Osler, L. (2021). Taking empathy online. *Inquiry*, 1–28.

Oxley, T. J., Yoo, P. E., Rind, G. S., Ronayne, S. M., et al. (2021). Motor neuroprosthesis implanted with neurointerventional surgery improves capacity for activities of daily living tasks in severe paralysis: first in-human experience. *Journal of Neurointerventional Surgery, 13*(2), 102–108, https://doi.org/10.1136/NEURINTSURG-2020-016862

Portnuff, C. (2006). AAC: A user's perspective [Video]. *AAC-RERC* Webcast series. Oregon Health and Science University, https://www.youtube.com/watch?v=ldXC3FbShn0

Ratcliffe, M. (2014). *Experiences of depression: A study in phenomenology*. Oxford University Press.

Reddy, D. V. (2008). *How infants know minds* (1st edition). Harvard University Press.

Romski, M. A., & Sevcik, R. A. (2018). The complexities of AAC intervention research: emerging trends to consider. *Augmentative and Alternative Communication, 34*(4), 258–264.

Shew, A. (2023). *Technoableism*. Norton Shorts Series.

Tavalaro, J., & Taylon, R. (1997). *Look up for yes*. Kodansha America Inc.

Trevarthen, C. (1979). Communication and cooperation in early infancy. A description of primary intersubjectivity. In M. Bullowa (Ed.), *Before speech: The beginning of human communication* (pp. 321–347). Cambridge University Press.

Tronick, E. (2007). *The neurobehavioral and social-emotional development of infants and children.* W. W. Norton & Company.

Vidal, F. (2020). Phenomenology of the locked-in syndrome: An overview and some suggestions. *Neuroethics, 13*, 119–143, https://doi.org/10.1007/s12152-018-9388-1

Van Balen, B., van Grunsven, J., Vansteensel, M., & IJsselsteijn, W. (2023). Brain Computer Interfaces: Kunnen breincomputers een stem geven aan niet-sprekenden? *Wijsgerig Perspectief, 63*(1), 16–23.

Van Grunsven, J. (2020). Perceiving 'other' minds: Autism, 4E Cognition, and the idea of neurodiversity. *Journal of Consciousness Studies, 27*(7–8), 115–143.

Van Grunsven, J. (2021). Perceptual breakdown during a global pandemic: Introducing phenomenological insights for digital mental health purposes. *Ethics and Information Technology, 23*, 91–98.

Van Grunsven, J. & Roeser, S. (2022). AAC technology, autism, and the empathic turn. *Social Epistemology*, *36*(1), 95–110.

Van Grunsven, J. (2022). Enactivism and the paradox of moral perception. *Topoi*, *41*, 287–298, https://doi.org/10.1007/s11245-021-09767-w

Vansteensel, M. J., Pels, E. G. M., Bleichner, M. G., Branco, M. P., et al. (2016). Fully implanted brain–computer interface in a locked-in patient with ALS. *New England Journal of Medicine, 375*(21), 2060–2066.

Wickenden, M. (2011). Whose voice is that?: Issues of identity, voice and representation arising in an ethnographic study of the lives of disabled teenagers who use Augmentative and Alternative Communication (AAC). *Disability Studies Quarterly, 31*(4).

Williams, M. B. (2012). How far we've come, how far we've got to go: Tales from the trenches [Video]. https://www.youtube.com/watch?v=f14uio_2tNk0

Williams, R. M., Boyd, L., & Gilbert, J. E. (2023, April). Counterventions: A reparative reflection on interventionist HCI. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1–11). ACM.

Young, I. M. (1980). Throwing like a girl: A phenomenology of feminine body comportment motility and spatiality. *Human Studies*, 137–156.

Zaner, R. M. (2003). Sisyphus without knees: Exploring self-other relationships through illness and disability. *Literature and Medicine, 22*(2), 188–207.