

Chapter 7

Digital Touch Ethics and Values



Abstract This chapter examines key ethical considerations and challenges of designing and researching touch technologies, with a focus on incorporating ethical touch sensitivities and values into digital touch communication. We discuss the difficulty of researching and designing ethically in the context of an emerging technological landscape, as reflected in wider HCI ethics debate. The chapter then explores the central role of the human body as site for digital touch communication, before focusing on key challenges around trust, control, consent, and tactile data. In line with preceding chapters, we argue that digital touch practices are part of, and impact on, wider social relations and communications. The kinds of touch practices and relations designed *into* touch technologies bring with them implications for power relations and social cohesion, and it is these wider processes that digital touch design is able to – at least in parts – anticipate and shape. We close with a summary of key points and their implications for research and design.

Keywords Ethics · Values · Body · Machine · Consent · Control · Robotic touch · Remote touch · Privacy · Trust

7.1 Introduction

This chapter examines key ethical considerations and challenges of designing and researching touch technologies, with a focus on incorporating ethical touch sensitivities and values into digital touch communication. We propose what ‘ethical touch’ and ‘ethical touch technologies’ can mean, and why they matter. Some of the ethical challenges we discuss are more widely true for HCI research and design around emerging, interactive and connected technologies, including questions of consent, agency, harm, ownership, privacy and trust (Waycott et al. 2016). Here, we draw out how touch is ‘special’, firstly, because it is so directly related to our bodies – as part of our (human) identities and selfhood, as a place where experience and

the social are felt and articulated. And, secondly, as the preceding chapters have demonstrated, touch practices are part of, and impact on, wider social relations and communications. The kinds of touch practices and relations designed *into* touch technologies bring with them implications for power relations and social cohesion, and it is these wider processes that digital touch design is able to – at least in parts – anticipate and shape.

The themes we address in this chapter derive from the literature, InTouch case studies, and our CHI 2018 workshop, ‘Reshaping Touch Communication: An Interdisciplinary Research Agenda’ (Price et al. 2018). We refer to ethics and values in both touch technology research and design, acknowledging how these are often intertwined in practice. We begin by situating touch in relation to HCI scholars’ ongoing introspection of ethical conduct in light of changing technological and methodological landscapes.

7.2 What Is Ethical Touch?

Questions of ethics are intrinsically bound up with notions of what it means to be human, considerations of good and bad, right and wrong. Ethics is chiefly about preventing harm, with some ethical frameworks weighing up the rights of the individual versus achieving a greater good (Bonde et al. 2016): the power of touch places it at the heart of such questions. Yet, just as social norms change (Chap. 4), what touch is considered harmful within a given community might shift in light of scientific and technological advances, changing methodologies, and social and cultural sensitivities to touch (e.g. gender); in other words, in response to the trajectories of harm as they are experienced, anticipated and made relevant through history.

Much of the literature on unmediated touch makes distinctions between good, bad and absent touch (e.g. Green 2016). On close inspection, these categories are neither self-explanatory nor stable. Absent touch tends to be seen as problematic, partly because a certain ‘touch literacy’ is required to be able to distinguish between good and bad touch, and these vary across culture. It might result in instances of ‘bad’ touch, for instance when individuals’ ‘touch hunger’ leads them to search for touch in ‘inappropriate or dangerous situations’ (Green 2016: 775; Field 2001), when they touch where they should not, or when they misinterpret sexual for platonic touch, a boundary which is often deliberately blurred by child sex abusers and other sexual harassers (Conte et al. 1989, in Green 2016: 774). On the other hand, absent touch might be a welcome relief to people who are either overly sensitive to touch (e.g. through medical conditions) or who feel otherwise protective of their body boundaries, perhaps but not exclusively because of previous instances of unwanted touch.

Examples of ‘bad’ touch include sexual, and other forms of physical, violence (Green 2016), whereas ‘good’ touch is generally considered to be the kind of touch that brings physiological, psychological and social benefits. At the same time, violence arguably needs to *violate* to be considered bad, that is, for instance happen

against a person's will. Thus, while it might not make sense to base one's touch ethics on categories of 'good' or 'bad' touch, a slightly more helpful (though still imperfect) definition is the distinction between 'welcome' and 'unwelcome' touch. Even so, consent is only part of touch ethics. What might be experienced as unwelcome touch – being restrained by one's parent – can also prevent harm. Conversely, what seems to be welcome touch – affection shown by an adult – may have more sinister undertones or change in light of additional information, such as intent. As such, it matters who touches whom, in what context, with what intention, and to what (felt) consequence. Children are not the only 'vulnerable' members of society here; arguably, anyone can feel manipulated, exploited or violated through touch, depending on what they know and comprehend about the circumstances of touch – and their own power and agency – at any given moment.

These issues are differently complex when it comes to mediated or digital touch. What does informed consent look like in a digital context? We need to clarify how to ensure individuals' agency and control, and how to bring measures of authenticity and transparency to a digital touch moment. Given the above nuances of touch, the ability of a machine to decide between welcome and unwelcome touch and the contexts where that would be appropriate are brought into question. What might it mean for human touch to be 'replaced' by machine touch? The introduction of digital interfaces and algorithms, along with the notion of the machine that touches or mediates touch, bring with it wider questions of the touch sensations, experiences and relations we design for. If it is important to prevent oppressive or abusive forms of digital touch, how do we recognise the latter? What might be the benefits of enabling boundary setting and testing? One of the questions we ask is whether touch should be put to the forefront of design, so as to enable people to reflect and talk about it (Green 2016), or whether design might allow for incidental, hidden or covert touches, as long as they serve a fair purpose (for whom?).

The difficulty of defining ethical touch and devising set guidelines for designing and researching touch technologies is reflected in recent debates on design ethics and values in HCI more generally. We particularly note two trends. First, HCI scholars have outlined the challenges of negotiating universal values and human rights, as they make their way into relatively static and anticipatory ethics guidelines, with the *ad-hoc* ethical issues that arise during a research or design process that increasingly involves more ethnographically inspired, participatory and exploratory approaches (cf. Munteanu et al.'s 'situational' (2015) and Frauenberger et al.'s 'in-action' ethics (2017)). Second, whose values and ethics matter has been a useful but contested focus in a range of design approaches that seek to go beyond questions of functionality to put social implications and ethics at the centre of the design process; namely, participatory design (with its focus on democracy and empowerment), feminist HCI (providing multiple perspectives and a voice to the 'underrepresented', e.g. Bardzell and Bardzell 2011; Muller 2011) and value-sensitive design (VSD, which seeks a systematic approach to reflecting on and accounting for the values and 'desires' of different stakeholders, including designers themselves, Friedman et al. 2008; Winkler and Spiekermann 2018).

These movements, though not free from criticism (Jacobs and Huldgtren 2018), provide useful reading for considering touch ethics and sensitivities, with their focus on reflexivity, responsiveness, diversity and inclusion. In this chapter, we also move beyond immediate interaction contexts to bring into focus some of the wider social (and sensory) meanings and consequences of digital touch. We begin with a key component, its relationship to the human body or, rather, human bodies.

7.3 Touch, Body and ‘Machine’

Touch is personal because it involves our bodies – how we know them, how we feel and experience them, and how they encounter other bodies, objects and environments. In mapping the landscape of digital touch, the InTouch project has located touch and, with it, the body in relation to a range of technologies and interfaces. In Chap. 3, we categorised touch technologies according to whether they entailed human-human, human-robot or human-object touch communication. We can also think of touch technologies as implicating or relating to the body in at least one of three ways: as the body interacting with technologies through touch; as technologies becoming part of or augmenting the body; or as technology playing the role of a mediator between our body and the world, including other bodies. These categories are not discrete. When technology plays the role of the mediator, for instance, the very materiality of the interface might bring object interaction into focus (Chap. 5). Likewise, a device that might ‘augment’ the body, such as an exoskeleton or prosthesis, still mediates between body and environment. As loose categories, however, they allow us to *follow* and explore what forms of touch and bodies (or body parts) are at stake across instances of touch interaction, and beyond. This involves following touch as it is transformed and transforming, as it changes in its meaning and materiality, at the same time as acknowledging bodies as dynamic, multifaceted, physiological and social, and as differently shaped and situated through touch.

7.3.1 *Touching Bodies*

A key question is what happens to the body, or bodies, at the introduction of digital touch technologies. With a view to supporting bodies and enhancing users’ quality of life, some touch technologies actively train, ‘realign’, shape or stimulate bodies for medical or rehabilitative purposes. Spinal electrical stimulation allows people with Parkinson’s Disease to walk (Barzallo et al. 2019); sensory-equipped prosthetics can enable a new sense of touch or feeling (Sun et al. 2018); exoskeletons can aid rehabilitation. In terms of interacting with digital touch interfaces, it is possible to speak of a subtler disciplining of the body into new ways of moving and touching, which might have wider physiological, sensorial and social consequences (e.g. Elo 2012; Parisi 2008). Elo (2012: n.p.) speaks of the ‘digital finger’ being handed ‘the

status of a switch’ (and, increasingly, ‘dragging the body along’), by putting things in reach and changing our bodily and imaginary perception of touch agency and immediacy (Chap. 5). His discussion of technological feedback, as means to demarcate boundaries and regulate touch, highlights the subtle training of sensory skills and expectations. This was evident during InTouch’s *The Art of Remote Contact* case study when exhibition visitors tried to make sense of visual and auditory representations of touch as directly linked to their own touches and movements; however, the artistic provocations were more ambiguous and often challenged a direct 1-2-1 relationship of touch and reaction. Bodily feedback along particular digital-material parameters was key in students’ imagination of digital touch concepts during the *Designing Digital Touch* case study; here, bodies were nudged into specific positions and kinds of movements, and bodily feelings, states and symptoms were reinterpreted through numbers, vibrations, and emotion displays. Although Elo (2012) critiques some feedback’s haptocentrism, certain touch technologies arguably require the accurate representation of unmediated touch, for instance in the context of remote surgical interventions where medical professionals’ bodies are most actively trained to *feel* and manipulate interfaces in specific ways (see also O’Neill 2017, on the historical disciplining of doctor-patient touch interaction through the sphygmograph (a mechanical device used to measure blood pressure in the mid-nineteenth century). At an extreme, haptic technologies such as the Teslasuit have the potential to manipulate bodies by activating muscle groups to result in involuntary movements (Savvides 2018). Differently so, and going beyond the felt intricacies or affordances of touch interfaces, the Owlet Smart Sock disciplined babies and parents’ bodies by positioning them as static (a moving baby interfered with sensor readings) and geographically separated. In our case study, parents moreover used the mobile app as a sensory extension of touch, giving meaning to sensory readings in a way that allowed them to reinterpret their babies’ bodies, partly in relation to their own (Leder Mackley et al. [under review](#)). Determining the ethics of touch requires us to ask, then, what kinds of touches, movements, mobilities and socialities are inscribed in touch interfaces and wider user experiences.

At an extreme end, touch technologies have the potential for a sensory or haptic remapping of the body, akin to the kinds of ‘body hacking’ that are already possible through surgical intervention (e.g. Overgoor Max et al. 2006). Drawing on Rheingold’s early 90s visions of telesex, Parisi quotes it might ‘eventually be possible “to map your genital effectors to your manual sensors and have direct genital contact by shaking hands,” [Rheingold 1991: 352] resulting in the transformation of social touch”’ (Parisi 2018). Rheingold saw in cybersex a phenomenon of disembodiment between ‘the ultimate sexual revolution’, the possibility of experiencing deep multisensorial communion without the risk of pregnancy or sexually transmitted disease, and a first step towards ‘abandoning our bodies’ (Rheingold 1991: 352). It is significant to note that his vision of technologically mediated safe sex at the apparent expense of fleshly communion (beyond one’s own body) emerged during the HIV and AIDS pandemic, a time at which social fears of bodies and bodily fluids, sex and risk were particularly heightened. Teledildonics, technology for remote sex that can communicate tactile sensations over a data link between the participants, has

fostered online communities and a number of commercial markets (including webcam sex work). However, some of Rheingold's ideas remain in the realm of the imagined, the forms of sensory remapping that are perhaps most closely aligned with his visions are body hacking practices that involve surgical implants to experience sensations (usually vibration), based on magnetic or digitally mediated inputs (see Chap. 3). Notions of cyborgs are actively entertained through the very reconstitution of the human body as part machine. Moreover, it is possible for technology to play a mediating and, thus, remapping role in augmented/virtual reality or other forms of remote touch communication. This might include changing the location of where on the body touch is received, translating strokes into tickles or punches, or amalgamating touch messages, as in the *Tactile Emoticon* case study (see Sect. 7.4 for issues around trust and control). Of course, the latter still worked within the technical constraints of representing touch through heat, pressure and vibration. This was, on the one hand, a communicatively frustrating restriction. On the other hand, participants seemed to develop new embodied ways of making sense of touch, for instance by working out communication patterns or distinguishing between seemingly identical machines based on their 'feel'. Whether the abstraction of 'human' into 'machine' touch serves a safeguarding purpose is questionable in light of participants' comments on the power of imagined, affective and intended dimensions of mediated touch, an issue that is reflected differently in Kozel's (2007) writing on the virtual-interactive performance piece, 'Telematic Dreaming'. 'The mechanization or computerization of human experience', she writes, 'is generally thought to diminish the physical and emotional sides of life, yet in the virtual world of Telematic Dreaming questions of privacy, intimacy and identity were central' (Kozel 2007: 94; see also Sect. 7.4). The above raises related questions of what is lost or added by the machine's representation of touch. We need to consider what elements of human touch we choose (or need) to digitize. Is touch diminished by being stripped of its uniqueness and individuality, or is there virtue in 'flattening' personal touch into a thing, for instance when it comes to the recording and sharing of machine-mediated touch? The question is not only what happens to bodies but also to human touch at the introduction of digital touch technologies.

7.3.2 *Human Touch*

Human touch is at once positively infused as essential to being human (not to be replaced by a machine), and yet a complicated category in itself which is steeped in social norms and partly requires regulation. Some of the discourses the *In Touch with Baby* case study responded to were, the perceived loss of human touch (and related bonding and affection) and the sensory de-skilling implicated in bio-sensing technology replacing the parent's hand on the child's chest or forehead. While, in the context of our study, unmediated touch continued to play a key role and the device's relatively short lifespan of 18 months puts doubt over the transformation of parents' sensory skillsets, the OSS-enabled new insights into babies' bodies beg the

question of whether the device paves the way for similar bio-sensing technologies to eventually saturate a market for all age groups (e.g. toddler and primary school children Fitbits), thus normalising the ‘hands-off’ hands-on approach. Implications go beyond individual interaction contexts to include how babies’ bodies fit into medical and other ideological notions of norms (as regards healthy heart rates or sleeping patterns, cf. Lupton and Williamson 2017), plus related issues of privacy and surveillance (see Sects. 7.3.3 and 7.4).

For some, digital technologies provide a solution to the kinds of problems that arise from unmediated touch. Not only might they enhance human touch in extending its reach, perfecting it as a skill, or enabling new forms of knowing. It might also be possible to teach ‘good touch’ (although see the limited success of historical attempts to use tactile approaches to induce ‘corporeal discipline’ Classen 2005, 262), or enable kinds of touch that are at odds with societal touch regimes, in a safe environment, thus preventing ‘actual’ harm. Two controversial examples are the use of child robots for the ‘therapeutic’ treatment of pedophilia (Behrendt 2018), and sexbots more generally to reduce human sexual exploitation (prostitution) and harassment. Arnold and Scheutz (2017) articulate a key concern, that ‘[t]he touch between a person and a robot [...] carries with it the implicit connection to human-human or other forms of touch – how that person will want to touch and be touched in the rest of his or her daily life, and how his or her touching and being touched features for better or worse within a community at large’ (2017: 84). Moreover, there are concerns about the mistreatment of robots themselves which, as Whitby reminds us, ‘can be aggravated by the provision of anthropomorphic interfaces (De Angeli et al., 2006) or by placing the robot into an intimate setting (Fogg and Tseng 1999)’ (Whitby 2008: 327). Besides a general sense of human deprivation linked to any form of abuse (of sentient, non-sentient or semi-sentient beings), a central fear is that if someone abuses human-like artefacts, they are more likely to abuse humans, too. Whitby’s solutions include providing guidance on a list of unacceptable activities, such as ‘the use of robots in paraphilic sexual activities and purely as the victims of violence’ (ibid: 330). Arnold and Scheutz (2017), writing of ‘tactile ethics’ for soft robotics in social companion or care contexts, suggest that ‘[f]eeling the touch of others [should be] a robotic conduit for the larger purposes of the system’s designers and implementers (therapeutic, companionship, education, etc.). There should be no suggestion, however implicit, that the robot suffers or enjoys the tactile feedback’ (2017: 84). In other words, robot touch should be entirely functional as appropriate to the social context (ibid: 85). However, questions of functionality are relative in the context of sex robots, where advances in smart skin technologies mean that robots can feel where on the body they are touched, at what intensity, and by whom (Sheila Media 2018).

Many complexities of human-robot touch and human-machine bodies go beyond the scope of this chapter (see Devlin, 2018; Dix, 2008 for a fuller account). Van Erp and Toet (2013), who foresee that ‘over the coming years social agents will increasingly use touch as affective communication channels’ (2013: 780), have set out initial guidelines for social agents and robots that can touch, including not hurting users themselves (see also ISO 2009). Crucially, more research is needed to fully

understand social and psychological implications of human-robot touch interaction. ‘Imagining’ vulnerable user groups (in Whitby’s case, ‘children, or those with known psychiatric disorders’ (Whitby 2008: 330)) gives rise to the sorts of moral panics that have historically been attached to a range of new media and technologies, some of which are now considered benign (Drotner 1999). For some of the participants in the *Imagining Remote Personal Touch* case study, the use of the Kissenger brought with it connotations of human-machine interaction, which ranged from the feeling of kissing a massage chair to associations with sex robots. In order to ensure ethical digital touch, future research and design needs to engage with these associations and connotations, in terms of their sensory and social meanings and implications.

7.3.3 *Whose Bodies?*

The social and moral objections towards human-like robots in certain contexts of human-machine touch interaction bring to the fore an area often neglected in HCI design, that is, the power of representation. Not only does it matter whether robots are human-like *per se*. As Devlin (2018) argues, the kinds of robotic bodies currently designed for sexual interaction are often ‘crude’ and ‘hypersexualized’ representations of women, which arguably hold them to ‘unrealistic expectations of beauty and shape’ (Devlin 2018: 219) and portray visions of touch behaviour and obedience that objectify and disempower the humans they model. Importantly, the question is not only one of behavioural or attitudinal effects, although these require systematic and evidence-based scrutiny. It is also one of wider social meanings; we need to consider what the existence of such robotic representations might mean to women and children’s sense of safety and self-worth, and to their understanding of proper and improper touch. While some have called for a ban on sex robots (Richardson 2016; the country-specific legality of child robots illustrates the need for global considerations of digital touch), Devlin has argued for a rethinking of sexbots as ‘things’, machines or toys, which can take on any number of non-human-like features, sensations and touches (Devlin 2018). Representation is a key ethical dimension to this debate, which speaks to design decisions as to whether to mimic or reconfigure human touch, skin and bodies, as well as the social norms and practices these are embedded within.

Linked to and transcending issues of representation, there are ethical considerations around the kinds of users we imagine when designing touch technologies. As we discussed in Chap. 4, the ways in which touch becomes gendered requires us to attend to the gendered ways in which technologies empower or constrain different members of society. This includes ascribing values to technology that ‘encourage progressive attitudes towards gender roles, especially towards feminine values’ (cf. ‘gender-sensitive design’, Rode 2011: 299) Rode’s writing on gender as continually socially produced and non-binary is important in light of static and essentialist approaches to gender, moving towards incorporating more inclusivity, diversity and

reflexivity in design. Aside from gender, there are other socially constructed or infused categories, such as race (Benjamin 2019), age and disability, that require reflection on the kinds of implicit bias we might bring to touch design.

Importantly, and bearing in mind the complex relationship between physical attributes and social categories, this also extends to the kinds of ‘bodies’ we design for, and to what end. Noting the dearth of social and ethical research on the meanings and implications of extraskeletons, Sadowski (2014) considers the ambition of enhancing and fixing ‘the “impaired” or “disabled” body, so that it fits into societal conceptions of what it means to be “able-bodied”’ as working within and enforcing ‘structures of ableism and privilege’ (Sadowski 2014: 217). In shaping touch technologies and, through them, our bodies, it is thus important to consider what concepts of ‘normal’ we work with. Likewise, our research has highlighted differences in how people experienced their bodies and, thus, perceived and responded to touch, in terms of medical conditions or sensory preferences (e.g. Chaps. 5 and 6). Other questions are more straightforwardly about devices’ sizes, weight and usability, for instance the types of bodies that fit into haptic suits or VR headsets. As per VWVR vision statement notes, ‘VR headsets and Sub-packs fit poorly onto female bodies, smaller bodies and cannot accommodate afro hair – a clear indication of who, at the moment, the VR industry’s “standard” user is’ (VWVR 2018: 9).

The above demonstrate that design needs to reflect on how and whose bodies are implicated in digital touch. In the following we elaborate on what else is at play in the mediation, replication, fragmentation and broadcasting of human (and machine) touch.

7.4 Consent, Trust and Control

Friedman et al. (2008: 69f) list privacy, ownership, physical welfare, freedom from bias, universal usability, autonomy, informed consent and trust as some of the enduring human values guiding value-sensitive design. Here, we reflect in more detail on the ethical specificities and opportunities of digital touch in relation to three interrelated concepts: consent, trust and control. Whilst issues of consent are complex in unmediated touch, these are amplified in contexts in which, firstly, touch does not have to be synchronous, reciprocal or bidirectional and, secondly, touch locations can be moved and sensations transformed, either through mediating technologies or through the actions of touch ‘senders’ and ‘receivers’ themselves. In our research, these issues became most apparent in two technological domains, remote personal touch communication and virtual touch (in some cases a sub-section of remote communication). Parisi’s (2018) aforementioned handshake becoming something else in digitally mediated contexts resonated with participants’ concerns over the possible ‘improper’ uses of, for instance, the Touch Cape in the *Imagining Remote Personal Touch* case study (a digital cape for remote touch designed to be worn over the shoulders). The relative agency of touch ‘receivers’ to re-direct the location of touch is not new; an innocent kiss on the cheek can inadvertently or

purposefully result in a more intimate kiss on the mouth. Although it is not always possible to mutually shape unmediated touch moments, there is perhaps less opportunity to do so in digital context, and more room for manipulating and concealing the ultimate location, direction or sensation of touch. Likewise, remote and virtual communication may obscure the identity of who is touching or being touched. In the case of our prototyping workshops, participants envisaged systems of visual or auditory authentication; advances in smart skin technology may further utilise the properties of touch for purposes of identification (whilst also raising questions of privacy, see Sect. 7.5).

In the context of virtual touch, some of the considerations of authenticity and trust include whether touch makes avatars believable, and also the extent to which virtual touch needs to be ‘physical’ (rather than auditory or visual) to be effective in this way (cf. Botvinick and Cohen, 1998). As Parisi, quoted by Caddy (2019: n.p.), argues, “even if the reproduction of touch falls short of fully synthesizing the full range of tactile sensations, [...] low-definition can be emotionally meaningful.” Believable virtual touch may provide new senses of closeness in social VR (Chap. 5) or, alternatively, enable moments of transgression to feel ‘more real’ – whether this is experienced as positive or not. Kozel’s (2007) writing on ‘Telematic Dreaming’ suggests that trust is not a static concept that can be easily designed *into* virtual environments, but one that is actively negotiated within specific virtual encounters. She speaks of the sense of ‘openness and trust’ that lay the foundation for a kind of immersion and connection (our words) that rendered ‘the distinction between which bodies were real and which were virtual [...] irrelevant’ (2007: 94). ‘Little electronic shocks’ would pass through her body in response to caressing virtual touch (ibid). Where trust was betrayed, as in a number of violent encounters, the amount to which she felt ‘touched’ (that is, her body physically reacted despite the absence of physical contact) depended on the severity of the virtual violence, with extreme violence leading her to disassociate herself from her physical body ‘in an involuntary act of self-preservation’ (ibid: 97).

Digital touch does not only raise questions of trust in the relationship between people but also in the reliability, security and safety of the machines and systems that mediate touch (cf. Friedman et al. 2008). The mediation, recording and broadcasting (sharing) of touch bring issues of agency, control and ownership into focus, both at the initial moment of touch interaction and across time. Just as we proposed following touch (and bodies) through different moments of touch interaction and beyond, we might also consider how agency and control travel across instances of digital touch. Within the context of the *Imagining Remote Personal Touch* case study, participants’ addition of buttons to their prototype remote touch devices to turn touch on or off (or record it) sought to place agency and control with users and, specifically, recipients of touch (Jewitt et al. 2020). Other participants designed prototypes that included more or less adjustable touch blockers, and yet others diffused touch through a sense of ambient presence, rather than direct physical contact, although the details of agency in negotiating ambient touch were unclear. The question of how much agency and control is given to the technological mediator is a matter for the ethical design of digital touch – be this the machine or, by extension,

its designers or owners – and how easily touch might be intercepted or hacked. Technological devices like Tjacket (formerly Huggy Pajama, Teh et al. 2009) function along normative conceptions of how a person might want/need to be held or touched. At a more extreme end of the spectrum, we might ask if and how mediators should regulate and ‘police’ touch, that is, prevent brutal or improper digital touch.

Who controls (and owns) touch recordings or memories is partly a question of agency and transparency in ‘tactile data’ management and also, again, partly of the extent to which touch might be abstracted or personally identifiable through digital reproduction and mediation. Will the touch of one’s child – e.g. a baby’s first kiss – become a tangible, sharable artefact and, if so, how might digital-mechanical reproduction disguise or attribute the uniqueness of the baby’s touch? If someone engages in and records inappropriate or illegal touch, what stops them from sharing these touches with others?

Two other areas of control are worth considering. First, in relation to extraskeltons, Sadowski (2014) raises the question of who controls access to touch technologies, giving the example of definitions – e.g. the difference between body enhancement and rehabilitative aid – as impacting on health insurance payments. Second, Cranny-Francis (2011: 472) highlights how users might find themselves to be mere nodes in digital-technological assemblages ‘over which control is distributed’ – between soldiers, medical and command staff, in the case of technologically-enhanced battle suits, or between employees and employers, in the case of bio-metric monitoring of employees’ stress levels and productivity. ‘In these examples’, Cranny-Francis writes, ‘the “being with” or engagement enabled by the touch (of the uniform) incorporates the wearer into a network that is outside her/his control’ Cranny-Francis 2011: 472). The latter leads us to questions over the forms of tactile data touch technologies enable, how these are used and represented, and to what purpose.

7.5 A Note on Study Ethics

In her reflections on the ‘anthropologist as toucher’, Blake (2011) describes how her attempts to keep a professional, unintrusive distance from the ontology children whose experiences she studied were superseded by the children’s requests for emotional support, including affective touch. Rather than resisting the children’s ‘tactile demands’ (2011: 10), Blake came to see these encounters as essential to her ethnographic understanding and position in the field, alerting her to the importance of skin and body in ontology experiences. She advocates employing one’s (touch) influence as a ‘tool for exploring and satisfying our ethical responsibilities in the field’ (ibid: 11).

In our own studies, we found touch equally inescapable and indeed a necessary part of researching touch technologies. Rather than avoiding or ignoring it, we sought to be attentive to participants and colleagues’ touch sensitivities, some of which emerged in unexpected ways. Key considerations have included the

safeguarding of participants and colleagues during touch-based research activities; introducing different levels of (and an ongoing dialogue about) consent; and understanding and negotiating tactile data protection with stakeholders.

Touch-based activities chiefly happened during research workshops, where we introduced ground rules of touching with consent, as well as during the Remote Contact exhibition. Although the latter touch experiences were not designed by us, we were still complicit in instigating them as part of research encounters. There was a sense that touch in the exhibition space was an unexpectedly ‘touching’ experience, precisely because it brought visitors into the context of experiencing dementia in new, and sometimes personal ways. One participant, for example, who suffered from anxiety, to us, invisible condition, excessive sweating, shared with us her anxiety over holding hands with a stranger in the Kinect exhibit. InTouch consistently prompts people (e.g. colleagues at conferences, research participants) to share personal histories and stories of touch, notably their family experiences and early childhood memories of touch, touch aversions, and their intercultural experiences and faux-pas. We have an evolving sense, which we need to investigate further, that people may be more skilled at self-censoring visual materials than they are in relation to touch. In response, to manage this we have at times used different levels of consent for different research stages or contexts. A pilot workshop for our *Imagining Remote Personal Touch* case study alerted us to the difference between being video-recorded during rapid prototyping and whilst testing an existing prototype, the Kissenger. The latter brought with it additional sensitivities and was, in some sense, enforcing a kind of intimacy that participants were more easily able to circumvent when producing their own prototypes. Likewise, we were conscious of needing to ensure each other’s consent within the InTouch team when testing touch technologies with each other.

As part of *In Touch with Baby*, we had to navigate the already private and sensitive context of the home, as well as what was effectively medical and, thus, sensitive ‘touch’ data, in the form of babies’ oxygen and heart rate readings. Not only was there a risk of revealing illicit touch in the home, it was important to ascertain and communicate to participants the details of what was happening to babies’ data, how it was stored and who had access to it. In aggregate form, it was clear from our conversations with Owlet makers that there was also an aim to use OSS data to contribute to medical norms and definitions. Partly for health and safety reasons, it was important to know how accurate the OSS was in detecting babies’ well-being and, further, how parents would make sense of touch data. The meanings parents came to attribute to the data – that is, of their child being healthy, a good sleeper – impacted on interaction and wider social relations (e.g. empathy, bonding). How touch becomes data is a question we continue to explore through our work, and an ethical question for both design and research on digital touch.

Throughout this chapter, we have outlined the ways in which touch might be digitally represented and reproduced, and we have hinted at what it might mean for these materialisations of touch to leave a digital trace. If wanting to infuse the design process with a sensitivity towards ‘tactile data’, it is useful to articulate how touch as data matters. There are, we argue, two hotspots of data use: first, as making sense

of people's bodies (physiologically and emotionally) and, second, as learning about people's touch practices or behavioural patterns. The latter can be exploited for commercial gains (e.g. touch marketing); more generally, the tracking and analysis of behavioural touch data raises privacy and other ethical concerns when we return to questions of who decides on appropriate qualities or quantities of touch. Both of these hotspots are moreover linked to questions of touch as identifier, and of the trust we can place in the accuracy, completeness and representations of data.

7.6 Conclusion

In this chapter, we raised key questions of touch ethics and values in digitally mediated contexts. We outlined the tensions between universalistic notions of ethics, touch definitions and boundaries, and how these might be situationally complex. Specifically, we brought the complexities of 'the body' in its physiological, socio-cultural and sensory manifestations to the forefront of digital touch, with a view to both exploring existing moments of digital touch interaction and designing new ones. Key sensitivities included the kinds of touches, movements, mobilities and socialities inscribed in touch interfaces and wider user experiences, and how we imagine and understand bodies, in terms of their agency, ability and diversity. Importantly, this chapter has moved some way beyond the intricacies of interaction design to also bring to the fore the wider social implications of digital touch, including questions of representation (of touch and bodies), touch norms and practices, and the nature and significance of tactile data. One way of embedding ethical values in the design of touch technologies is to attend to the sociotechnical imaginaries that guide our research and design, and the imaginations of those we design with and for (Chap. 6). More generally, we can think of the relationships and environments we create, that is, what kinds of relationships are enabled or restricted, whose rights are upheld, who is empowered, or not.

Just as we proposed following 'touch' in its different digital-material manifestations and its implications for bodies and social relationships, we also discussed key ethical concepts, such as consent, trust and control, as dynamic and multifaceted. The chapter highlights a tension between liberating and censoring digital touch, which we have not fully resolved. Instead, we suggest more research is needed to understand the social and psychological implications of emerging touch technologies, not just after the fact but also, crucially, at those opportune moments when early concepts, prototypes, user scenarios and wider discourses allow us to access social and sensory meanings and connotations of significance for future designs. This involves actively engaging with touch boundaries – not just as sets of rules but as talking points and sensitivities (Green 2016). Golmohammadi has written of her experiences of (unmediated) touch in a professional cuddle workshop (Golmohammadi 2019), which involved some ground rules – in this case, avoiding sexual contact but also asking for permission before touching. Thomas writes of generating a 'grammar' of touch and touch 'invitations' as part of establishing an

‘ethics of care’ in *Figuring*, a participatory virtual touch performance (Thomas 2018): ‘it was essential to create ways in which participants would feel supported and cared for, but not bounded or contained in any way’. She took inspiration from contact improvisation, specifically work by Little (2014) which advocates the notion of ‘response-ability’ as a relational practice that responds and supports partners, rather than keep and restrain them.

Our research suggests that digital mediation has the potential to change sensations, communication practices and social and relations but that existing social boundaries still exist; they are felt and negotiated, both in the immediate interaction context and in wider meanings and connotation of mediated touch. Bringing the sensitivities and complexities of touch to the forefront of design – and making them a talking point in and through design – is one step towards safeguarding ‘ethical touch’.

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