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EMPIRICAL STUDY/ANALYSIS

The Mediated Breast: Technology, Agency, and Breast Cancer

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Abstract Women intimately interact with various medical technologies and prosthetic artifacts in the context of breast cancer. While extensive work has been done on the agency of technological artifacts and how they affect users' perceptions and experiences, the agency of users is largely taken for granted hitherto. In this article, we explore the agency of four women who engage with breast cancer technologies and artifacts by analyzing their narrative accounts of such engagements. This empirical discussion is framed within the tradition of science and technology studies, philosophy of technological mediation and phenomenology of embodied agency as 'I can/not'. This approach leads to the conclusions that women's technologically mediated agencies range from being restricted to extended, take place on different bodily levels, within complex temporal structures, and are determined by certain socio-cultural contexts. Furthermore, it reveals that such agency shaping does not imply a one-way conditioning relationship between technologies and users, but rather involves a reciprocal relationship in which both subject and object are co-constituted. We therefore suggest that the 'material turn' in philosophy of technology also needs to take into account technologically mediated, material human beings in order to gain a better understanding of human existence.

Keywords Breast cancer · Technological mediation · Embodied agency · Phenomenology · Women · Material turn

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Introduction

> Passing through the hands of the medical orthodoxy can be terrifying when you have breast cancer. I determined to document for myself what was happening to me. Not to be merely the object of their medical discourse but to be the active subject of my own investigation. Here whilst a mammogram is being done I have persuaded the radiographer to take a picture for me. She was rather unhappy about it, but felt it was preferable to my holding the camera out at arm's length and doing a self-portrait. (Caption 'Mammogram', Spence 1988: 153)

The photo entitled 'Mammogram' by British photographer Jo Spence captures a telling experience of engaging with technology in the context of breast cancer. In the frame, we see Spence standing in profile, naked from the waist up, while her right breast is compressed between the two plastic plates of the mammography (X-ray) machine. At first sight, 'Mammogram' documents the restrictive positioning of a woman-patient invoked by the medical routine of subjecting her body to diagnostic machinery. In correspondence with a long feminist tradition, Spence holds that this kind of inquiry is objectifying, suppressive and always in imminent danger of usurping selfhood: in being—quite literally—pinned down by the machine, she feels she hands over the control over her body, leaving her vulnerably exposed and terrified (Poovey 1987; Dykstra 1995; Sharp 2000). The accompanying caption, however, discloses how Spence by deploying a technology of her own—her photo camera—adds her own perspective, thereby constituting another kind of experience. The photograph allows her "to go over the experience again [later on] and use [it] as a kind of touchstone" (Spence and Coward 1986: 25). As such, she becomes more than only "the object of […] medical discourse": she also becomes "the active subject of [her] own investigation" (Spence 1988: 153). For Spence, the act of photography is a way of posing the question of what kind of self is represented and created amidst medical routines and through technology. "The potential of photography," she remarks, lies both in revealing her "lack of agency" with her breast in the machine and in "healing [her] agency" through taking a photograph (Spence 1995: 104f.) (Fig. 1).

Although Spence's agentic experiences are particular and personal by definition, as well as historically framed within feminist activism of the 1980s, they still raise general questions about the agency of women in the context of breast cancer. For what does agency—or the lack thereof—exactly mean in the face of breast cancer diagnosis, during the disease's treatment, and in its aftermath? And how does engaging with technologies and artifacts[1] in breast cancer co-shape the agency of the women involved? By considering these questions, the argument of this paper focuses on the meaning and construction of women's agency in their various engagements with breast cancer technologies and artifacts.

[1] In this article, we will use the terminology 'technologies', 'technological artifacts', and 'technologies and artifacts' interchangeably. Technologies, after all, are by definition materialized. While commonly understood as the application of knowledge for practical purposes, technology is always in some way or another embodied in artifacts through which we come to engage with and access that technology.

Fig. 1 'Mammogram' (Picture of health?, 1982) by Jo Spence, copyright © the Estate of Jo Spence. Courtesy Richard Saltoun Gallery

All women who deal with (the diagnostic possibility of) having breast cancer relate to, interact with, and, to some extent, incorporate a range of medical technologies and prosthetic artifacts. Their breasts are squeezed into a mammography machine, they get tubes inserted for chemotherapy, they are exposed to daunting radiotherapy equipment, and they wear external breast prostheses or incorporate implants in a breast reconstruction. Following recent research in Science and Technology Studies (STS), philosophy of technology and postphenomenology, we argue that such engagements shape the ways these women approach and experience themselves and their lives. Technologies and artifacts mediate people's existence (Ihde 1990, 2002; Verbeek 2006). While authors within these fields of study rightly argue that only a combined account of researching technologies, artifacts and human experiences can confront the nuances of human experiential relationships with technology, they predominantly attend to the agency of *technologies*: that is, to the ways in which technologies inhibit, invite, or provoke users' routines, intentions, and values (Ihde 1990, 2002; Akrich 1992; Latour 1994; Verbeek 2006; Rosenberger 2014). They call for a so-called 'material turn,' believing that through the exploration of things, rather than human beings, we will gain a deeper understanding of how people are present in the world and the world is present for people (Verbeek 2010). In response, various scholars argue that in order to understand how technology mediates people's existence, the agency of *users* in human-technology relations must be fully reckoned with as well (van Dijck 2009; Dalibert 2015; Oudshoorn 2015).

In taking up this critique and exploring women's agency, we deliberately focus on the mediation of *established* technologies and artifacts. In doing so, we run counter to the current trend in STS research, which centers around the mediation of *new* and *emerging* technologies (Latour 1994; Swierstra and Waelbers 2012; Dalibert 2015). A focus on already implemented and widely used technologies shifts the attention away from the groundwork involved in creating technologies and (the prediction of) their initial impact on the social and moral order. It will instead enable us to concentrate on the meaning of embodied experiences of users who engage with technologies in the here and now. Only after technologies have been used for a sustained amount of time, after all, it may become clear in what ways and to what extent they impact people's actions and experiences (Oudshoorn 2015). In

this sense, 'old(er)' breast cancer technologies and artifacts allow space for thinking through the issue of the technologically mediated agency of women.

In this paper, we describe and investigate the agency of women in their engagements with breast cancer technologies and artifacts by presenting and analyzing four narrative accounts of women in different stages of breast cancer diagnosis and treatment. We explicitly frame our discussion of these empirical cases within the tradition of philosophy of technological mediation (Ihde 1990, 2002; Verbeek 2006) and within a phenomenology of embodied agency (Merleau-Ponty 1945; Young 2005). As discussed in the next sections, this dual theoretical approach will contribute to unraveling the empirical complexities involved in women's technologically mediated agency and, as such, it offers us a deeper understanding of the role of this agency. Before turning to the empirical investigation, however, we first elaborate on the concepts of technological mediation and embodied agency.

Technological Mediation and Embodied Agency

In his well-known work, Ihde (1990, 2002) shows that technologies and artifacts co-shape or mediate people's experiences and perceptions. He discerns several fundamental ways in which such technological mediations take place: in embodiment, hermeneutics, alterity, and in background relations between humans and technologies. First of all, technologies may be *integrated* into the bodily sensorium of their users. In such an embodiment relation, technologies become extensions of the user's body and of how she or he perceives and approaches the world. Here, the artifact typically withdraws from people's attention and, ideally, becomes perceptually 'transparent'—something which is, for example, quite literally the case when we look through (rather than at) eye glasses and see the world more clearly. In the second, hermeneutic relation, technologies claim explicit attention for themselves. Such technologies may provide a representation of reality that needs to be *interpreted* by the user in order to constitute a perception of that reality. Note that this hermeneutic relation still evokes some kind of technological, or as Ihde puts it, "referential" transparency (1990: 82). While the technology is being read, it refers beyond itself to what is not immediately seen, to a certain account of the world the user lives in—like a thermometer, which delivers a value that needs to be interpreted in order to tell something about the hotness or coldness of the world. Third, technologies, instead of merely being vehicles through which people experience or perceive the world, may also be the terminus of their experience. In this so-called alterity relation, people explicitly *interact* with technologies, and in doing so, technologies become the center of their attention—as is the case when we lovingly anthropomorphize our cars by naming them and 'taking care' of them. Finally, some technologies may not be either embodied or experienced directly, but rather *situate* what is explicitly present, like constant traffic noise which creates a context through which we experience city life.

Since Ihde, many scholars within the field of philosophy of technology have expanded the scope of the concept of technological mediation by exploring how artifacts mediate not only experience and perception, but also action and praxis

(Akrich 1992; Latour 1994; Fogg 2003; Verbeek 2006; Tromp et al. 2011; Rietveld 2012; Rosenberger 2014; Waelbers 2009). By reconciling Ihde's work with that of Akrich (1992) and Latour (1994), Verbeek, in particular, formulates an integrated theory of how technologies mediate people's perceptions and how these approach their world and are present in it. Similar to experiences, he argues, people's actions "are not only the result of individual intentions and the social structures in which human beings find themselves […], but also of [their] material environment" (Verbeek 2006: 366). In other words, 'how the world appears to humans' and 'how humans act in the world' is always to a smaller or larger degree constituted and transformed by artifacts and technologies.

As various authors have shown, there is a repertoire of figures of such technological mediations. For instance, artifacts may direct people's actions by harder or softer forms of (physical) coercion (Akrich 1992; Latour 1994; Tromp et al. 2011), and convince or persuade users to adopt certain behaviors (Fogg 2003). Drawing on an alternative vocabulary, such as Gibson's eco-psychological account (1979), artifacts (and the environment) are claimed to entail a certain amount of "affordance," in the sense that they variously "afford" possibilities for use and action (Rietveld 2012).

At this point, it is important to note that artifacts and technologies are not neutral intermediaries, but co-determine people's involvement in the world by way of their normative dimension. Technologies mediate actions by attempting to bring about suitable, acceptable, or desirable practices and experiences (Verbeek 2006). For example, a speedometer on the side of the road tries to convince drivers to comply with the speed limit (Tromp et al. 2011), a speed bump enforces drivers to slow down (Fogg 2003), and door handles in cars, often making use of a recess in the door that fits the hand, suggest and solicit an appropriate grip (Rietveld 2012).

This capacity to mediate (moral) practices and experiences, however, is not an essential or static property of the artifacts themselves, but emerges from the context in which these artifacts are used. By referring to Ihde's concept of 'multistability,' Verbeek explains that in a particular socio-cultural context an artifact may be used differently (2009). Expanding on Heidegger's well-known hammer example, this means that a hammer may be used to drive nails into a wall, but in intense fury, this same tool may be used as a murder weapon. Rosenberger (2014) adds to this argument that there is often a dominant stability: across different contexts, a technology is typically used in a certain way or for a particular purpose. Returning to the hammer example, this device is dominantly used, for its designed purpose—to hammer. Rosenberger suggests that whether a certain way of using a technology becomes dominant is dependent on the normative context in which the usage takes place. Slowing down before driving over a speed bump, for example, is set as 'normal' and expected within the power of the culture, driving norms, and within the jurisdiction of the country or state (Rosenberger 2014). As such, an artifact may develop a range of various dominant and alternative identities in particular contexts of use, thereby allowing for multiple possible perceptions and practices. In this sense, Verbeek (2009: 253) argues that technologies may be seen "as conditioned entities [that] condition human life."

In this paper, we are interested in what technological mediation in the context of breast cancer does to the agency of women who engage with the technologies involved. To actually understand changes in agency, we have to outline how to understand the very concept of agency. It is striking that in many studies on technological mediation and agency, the idea of human agency remains rather vague, and often implicitly understood as similar to technological agency (Waelbers 2009), or as only defined in terms of physical activity (Fogg 2003; Tromp et al. 2011). In drawing on Verbeek's philosophy, Waelbers (2009) points out that if we want to understand the human-technology relationship, we have to distinguish between technological agency and human agency without falling into the trap of a modernist and radical subject-object dichotomy. Technological artifacts and humans can both be seen as agents, the way they are intentional—i.e., the way they can do something—, however, is different. Technologies are intentional in the sense that they *direct* our actions. When talking about the agency of human beings the term 'intentionality' refers to the *capacity* to intend something (Waelbers 2009). So in following the argument that the co-constitution of technologies and people's actions and perceptions presupposes that people are *able* to act and perceive, we will draw on a phenomenological concept of human agency.

According to phenomenology, the condition of possibility for world-disclosure is given with the embodied subject's situation and her possibilities. People's possibilities to be in the world open up because of the mode and limits of their embodied capacities. Phenomenologists have emphasized that it is this kind of embodied skillfulness that is the locus of agency—or the lack thereof—and this is expressed through the utterance 'I can' (Merleau-Ponty 1945) or 'I cannot' (Young 2005). In this sense, it is not *active* movement ('I do') or action *toward* the world, but rather the *possibility or capacity* to perceive of or act towards something that is the primary example of human agency (See Waelbers 2009). Fundamentally, the notion of 'I can' is inscribed in the tradition of existentialist philosophy, and as such it refers to the idea that human existence is ambiguous in that it is characterized by having possibilities while 'being thrown' into a particular, given situation. Although the notion of 'I can' is primarily associated with pre-reflective 'motor-intentionality' in the work of Merleau-Ponty, and it is thus directly related to a person's lived body (*corps vécu*), it is not possible to reduce the degree of 'I can' or 'I cannot' to actual physical strengths or impairments. A person's embodied 'I can' is fundamentally framed within a person's situation—one that is never neutral but always already determined by certain power relations and socio-cultural norms. For this reason, women living in a sexist society may have a strong experience of 'I cannot' when engaging in competitive, typically masculine physical activities (Young 2005). A similar dynamic pertains to colored people living in a white society (Fanon 1967; Ahmed 2006) or women who feel that they cannot live up to expectations of female appearance (Boer and Slatman 2014). Based on the notion of agency in terms of 'I can' and the idea of agency and (technological) objects conditioning each other reciprocally, this paper explores how women's bodily capacities to create possibilities in the world are shaped in relation to using breast cancer technologies and artifacts.

Shaping Agencies in Engaging with Breast Cancer Technologies

In our empirical analysis of women's technologically mediated agency in the context of breast cancer, we present and analyze four cases: the experiences of Mary, Karin, Grace, and Barbara. The first author interviewed these women as part of a larger empirical-philosophical study on how women who have (had) breast cancer experience and make sense of themselves and their bodies (see Boer and Slatman 2014; Boer et al. 2015). In addition to these interviews, the first author included Karin's personal weblog about her breast cancer experiences and the observations of Mary at her breast screening in the analysis. As outlined below, these case studies were chosen as each of these women's experiences covers different aspects of a technologically mediated agency in breast cancer. We obtained ethical clearance for this study from the ethical review board of the Dutch hospital through which the respondents were recruited (file number 13-4-086). Informed consent was obtained from all individual participants included in the study. Mary, Grace, and Barbara are pseudonyms. Karin, a well-known disability activist in the Netherlands, specifically requested that we use her real name.

While these four women all have had encounters with technologies that may speak to cancer patient experiences in general, this study concentrates on engagements that target their *feminine* body and are particular for their *breast* cancer. The case studies show that various medical technologies and prosthetic artifacts involved in the process of diagnosis of breast cancer—the mammography machine (Mary)—, its treatment and aftermath—external breast prostheses (Grace), breast implants (Barbara), wigs (Grace), bra's (Karin), etc.—specifically affect feminine facets of life and body parts. Accordingly, such breast cancer technologies co-constitute these women's actions and experiences, and shape aspects of their agency that relate to their femininity and their being (non-/one-) breasted.

Moreover, this study explicitly focuses on a wide range of different temporal and spatial configurations of using these breast cancer technologies. In existing studies, the concept of technological mediation seems to be bounded by a certain temporality and configuration of use. Here, mediation predominantly takes place between humans and manageable, detachable, and momentarily used technologies (Ihde 1990; Verbeek 2006). In this respect, Dalibert (2015) rightly argues, however, that technological mediation may shape user's agency differently in different durations of use and different positions on/in the body. As such, the cases discussed below highlight various aspects of shaping women's female, breasted agencies within various temporal and spatial configurations of using breast cancer technologies: Mary's brief but invasive close encounter with the mammography machine ('choreographing the mammography'), Karin's and Grace's adjustments to their intensively worn prosthetic artifacts ('personalizing prosthetics'), and Barbara's subcutaneous incorporation of her breast implants ('filling/failing the breast reconstruction').

Mary: Choreographing the Mammography

Engaging with technology in the context of breast cancer is not only reserved for women who are actually diagnosed with breast cancer. In many Western countries, most women between ages 50 and 75 regularly participate in a national mammography screening program. At a radiological center, these women get their breasts X-rayed in order to detect malignancies.[2]

Upon an invitation by Mary, the first author accompanied her to her breast screening. In the radiology room, Mary undressed her upper body behind a folding screen. The analyst put her breasts on the plastic plates of the mammography machine, during which she instructed Mary to embrace the machine and to stand still during the procedure. By standing right behind her, the analyst adjusted Mary's stance: her arms higher up, her chest closer to the machine, and her legs wider. During the X-ray, the plates squeezed Mary's breasts and while she held on to the machine forcibly, she grimaced from the pain. With a squeaky voice she said: "stop," and then louder: "OUCH!". "Hold on just a bit," the analyst responded. After a few seconds, the plates opened up and Mary looked visibly relieved.

What is indeed an intimate and painful interaction between the mammography machine, Mary, and the radiological analyst may also be understood as the collaborative enactment of the mammography machine's scripts. Technologies have 'scripts,' Akrich (1992) and Latour (1994) argue, inasmuch as they prescribe certain actions while they discourage others, just like a theatre play script does. The radiological analyst explained that the mammography machine indeed requires a specific positioning of the screened woman: the breast has to be flattened and separated from the body as much as possible while the woman has to stand still. Such a scripted 'fit' between the device and Mary depends on—what Garland-Thomson (2011) calls—"the relational choreography" that plays out between the material and the social environment: in this case, the choreography of the radiologist who put Mary's breast in the machine, adjusted her stance, and encouraged her to endure the pain, and of Mary who held on to the machine forcibly, thereby preventing herself from retracting while the plates painfully squeezed her breasts.

Even though Mary cooperatively performed scripted behavior, she evaluated this encounter with the mammography machine as "painful," "suppressive," and "stressful". Similar to Spence, Mary was able to actively mold this kind of mediation of her actions and experiences to more acceptable ones. As she commented:

> They made a note in my file about this [the painfulness of the screening], but they seem to be doing nothing with it. It [the pain] is just necessary, they say. So I developed my own way of dealing with it: breathing deeply and massaging my armpit and breasts to soften the tissue so that the squeezing will not hurt that much.

[2] Most women's diagnosis of breast cancer starts with having a mammogram. Although there are other types of imaging technologies – thermography or elastography –, mammography is standard for breast screening as it offers the most validated and comprehensive information.

These kinds of strategies seem to help Mary to make the encounter with the mammography machine as comfortable as possible within the range of what the machine allows in order to produce a successful X-ray. As a kind of prologue to the mammography choreography, such bodily experimentation enabled Mary to cope with and even reduce the painful experience enforced by the mammography machine. Note that in doing so, she was not only cooperative, but she also adjusted and appropriated the mammography's mediation: in her interaction with the diagnostic device, she actively pursued—and achieved—a better (i.e., less bothersome) experience.

Moreover, whereas current debates on technological mediation predominantly deal with actual use-contexts (Ihde 1990; Verbeek 2006; Dalibert 2015), Mary shows that her experiences and actions outside of the actual usage of the X-ray device were already affected by—in Kiran's (2012) terminology—the "technological presence" of the machine. As Mary explained:

> Merely the thought of having to go in again [to her periodic breast screening] makes me feel a bit shaky. It's scary because by doing it [having the x-ray], you may find out that something is wrong. But [if so] I want to know, […] because it allows you to do something [about it].

This quote underscores that in a society in which the breast is depicted as 'at risk' and the possible carrier of a lethal disease, the mere potentiality of using the mammography machine functions as a reminder to Mary that her body is vulnerable and may harbor danger. Accordingly, she felt anxious, insecure and "a bit shaky," something that, at times, preoccupied her and prevented her from being fully engaged in her daily activities.

At the same time, the presence of the machine did not only affect Mary's daily doings and sense of control over her life and body negatively. Her words suggest that the availability and dreaded functionality of the machine—offering her the possibility to "find out that something is wrong"—also empowered her. By being able to seek the knowledge the machine offers—together with an appeal to the promise of exerting control over the body through biomedicine ("it allows you to do something")—, she actively tried to avert imagined disastrous illness scenarios. In line with what Kiran holds about technologies that are not taken up or used directly, then, Mary's mixed experiences show that such technologies, rather than merely functioning in the background and contextualizing experiences, actually "profoundly shape the way we live or perceive our lifeworld. [As such,] technologies [as a receding phenomenon] have a much more active role than Ihde assigns to [them]" (Kiran 2012: 83).

Mary's interaction with the mammography machine seems to affect her agency in ambiguous ways. The machine threatened her 'I can' for it reminds her of the risk of having a lethal, disfiguring disease. In its presence, it appears that the assumption 'I can do X later' can no longer be taken for granted by Mary because her possibilities may diminish. This uncertainty—and the fear that comes with it—can be debilitating in the present. In actually being pinned down by the mammography machine, moreover, her bodily 'I can' was impaired because of the temporary inhibition of actually being able to move around, but also because of the involved

decline of comfort and the imposition of pain. This technologically mediated 'I cannot (move around/be comfortable/stop the pain)' draws attention to the interdependency of her (lack of) agency and this specific social setting: after all, the analyst positioned her and could have put an end to her pain (Garland-Thomson 2011; Boer and Slatman 2014).

Nevertheless, her agency was not only affected negatively in the mammography machine's mediation. Counter to Spence's experiences and the idea that the objectifying medical gaze strips off women's agency (Poovey 1987; Sharp 2000), Mary shows that scientific objectification is not antithetical to agency. By resolutely turning herself over to the restrictive clinical protocols, she actively invested in the positivist promise of medical expertise that all can be known and controlled. Her will to consent to such an objectifying positioning refers to her agentic properties, signifying both the affirmation and the empowerment of her 'I can'. That is, by *exerting the possibility* to participate in a breast screening program, she assured herself that her impending possibilities were less indeterminate, and in doing so, she seemed to regain her *ability to presently act* and *approach her future* with (more) confidence. Furthermore, in complying with the painful mammography routines, she remained self-asserting while experimenting with her body. In doing so, she actively renegotiated and reconstituted her 'I can (be comfortable),' albeit only within the bounds of the protocol.

Grace and Karin: Personalizing Prosthetics

While Mary got an assuring letter stating that she does not have any malignancies, Karin, Grace, and Barbara did get diagnosed with breast cancer after their breast screening. During chemotherapy and in the aftermath of their mastectomy or lumpectomy, these women related to technologies and artifacts that adhered to their affected—scarred, one/un-breasted and balding—bodies against the status quo of female—symmetrically and double breasted, (long-)haired—bodies. For most women, as for Grace and Barbara, this meant wearing external breast prostheses or incorporating internal ones in a breast reconstruction. Karin, however, decided to go around asymmetrically breasted after her unilateral mastectomy. For her, wearing clothes becomes a significant issue. With one missing breast, bras literally do not fit her anymore. On her weblog, Karin writes:

> Although I do not want a prosthesis […], a bra for the remaining breast might be nice: mainly for support. But regarding that [one-breasted bras], there is simply not much available. That is why I did some home crafting. I made a photo report of [how to] make a 'pirate bra'.

While a bra may be seen as a way to discipline female bodies into an ideal female form (Yalom 1997), Karin's writings underscore that bras may also provide breast support and comfort. The standard design of a bra, however, assumes a double breasted body and as such, it fails to fulfill its purpose for Karin. Similarly, this bodily norm is also incorporated in the material of shirts: this kind of apparel has the tendency to wrap around Karin's one-breasted body, thereby restricting her movements and requiring her to constantly pull down her shirts (Fig. 2).

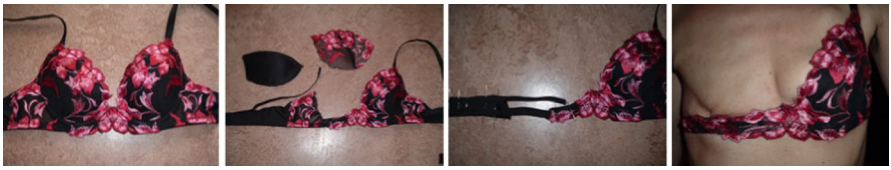

Fig. 2 Photo report of making a pirate bra by Karin, copyright © Karin Spaink 2007

In contrast to Ihde's claim that clothes are somewhat embodied—"[it] is part of a fringe awareness […], without restricting movement" (1990: 110)—Karin shows that with her atypical body clothes may neither be enabling nor transparent in her tactile experience but rather explicitly opaque and uncomfortable. Being ready-to-wear mass produced devices that incorporate presuppositions concerning the female body, bras and shirts do not 'fit' Karin's 'abnormal' body. Consequently, Karin's agency—her possibilities to act in the world—are constrained. In wearing such normative designs, her clothes remain in the foreground of her experiences, thereby restricting her in going around comfortably and hindering her in being engaged in other activities. This 'I cannot' challenges her to tinker with the design of the artifacts themselves. In personalizing her clothes, we argue, she attempts to reconstitute her ability to go around unobstructed and she affirms her agency in the altering activity itself. In fact, Karin's aspired rehabilitation of her 'I can' seems to depend on the *ideal* of her clothes not being explicitly noticed by her (Boer and Slatman 2014). Note that this enterprise is paradoxical insofar as it entails Karin's explicit awareness of, and invasive engagement with her clothes: aiming for a transparent clothing experience apparently requires her clothes to become an intensely directive focal point, if not a restrictive one.

As Karin's experience demonstrates, breast surgery greatly affects women's bodies and their agency. While Karin's 'I can' seems to be co-dependent on the *tactile comfort* of wearing normative clothes on her mastectomized body, for other women who have lost one or both breasts, or parts thereof, their 'I can' seems to be co-determined by their non-normative bodily *appearance*. Grace is one of them. After her unilateral lumpectomy, which reduced one of her breasts significantly, she feels she appears as an oddity in the eyes of others, thereby attracting other people's stares and glares. In attempting to uphold her 'I can,' that is, her ability to go about unobstructed by unwanted gazes, she aims to pass as an anonymous, normally breasted woman by wearing a partial external prosthesis that filled up the removed part of her breast (Goffman 1963; Garland-Thomson 2011). At first sight, the prosthesis effectively masked Grace's marked body: "I do not stand out that much when I walk on the street," she says, "that's nice: I look normal, […] more feminine". Upon a closer look, however, keeping her 'I can' is not just a matter of wearing the prosthesis and appearing as breasted. In order for the prosthesis to fulfill its normalizing function in the eyes of by-passers, Grace had to actively engage with it.

During the prosthesis fitting, Grace was offered a pale pink prosthesis. With her dark skin she looked, as she put it, "like a muddy pig with a pink snout". Since there

were no dark skin colored prostheses available at the prosthesis shop, she settled for the pink one. She elaborated on wearing such a contrasting prosthesis:

> I like to wear deep cleavages: I have nice breasts, you know. But the prosthesis is quite high up my breast, making it [the pink prosthesis] visible. So I did not do that [wear cleavages] anymore. Altogether, it felt just strange to wear it [the prosthesis]. [Eventually,] I colored the prosthesis with a brown permanent marker and then it did not stand out that much anymore. […] It was better.

Grace's experiences show that her skin color, which has nothing to do with her biological physical capacities, certainly influenced the way she orientates herself in the world. She inhabits a world in which 'whiteness' is the taken-for-granted background. Her being colored therefore resulted in the fact that often her body, rather than being a zero point for her action and perception, became the object of perception, something which disrupts her full potential of 'I can' (Ahmed 2006). In incorporating the assumption that its user is white by definition, Grace's prosthesis—which, ironically, was designed to allow its wearer to appear as 'normal' and breasted—categorized and segregated her dark skinned body as non-normative and deviant. Consequently, her ways of going about without being bothered by any negative conscious experience of her body was hampered—"it felt just strange"—and actually prevented her from wearing cleavages.

Grace, however, adopted a strategy through which her basic embodied attitude of 'I cannot' could be converted into an 'I can'. Concretely, by coloring the prosthesis she allowed herself to go around with a décolleté again. It may be argued that Grace's dark skin color in the dominant white world not only engendered the disabling prosthetic experience but also provoked her ability to change this experience into a more productive one. Having had breast cancer herself, Lorde suggests that "one of the most basic black survival skills is the ability to change, to metabolize experience, good or ill, into something useful, lasting, effective. For hundreds of years of survival as an endangered species has taught most of us that if we intend to live, we had better become fast learners" (2007: 182). Grace's case may be understood in the same vein: metabolizing her non-normative experience of being a dark skinned breast prosthesis wearer implies that the contrast between her body and the prosthesis is literally wiped out. In doing so, she did not adapt to the normative whiteness of the world, but rather allayed the trigger point that explicitly exposed her as being deviant. As her non-normativity becomes less evident, she relieved—as Ahmed puts it—"[the] pressure upon [her] bodily surface, where the body feels the pressure point as a restriction in what it can do" (2006: 139). In this case, Grace reconstituted her 'I can' by passing as *less contrasting with the status quo*, instead of by conforming to that status quo.

Sometimes, however, wearing a (personalized) prosthetic artifact does not involve a straightforward effort of passing as *normal* or *less deviant* in order to move around unhindered by the gazes of others and to uphold one's 'I can'. When Grace lost her hair during chemotherapy, she decided to wear a wig. "People kept staring," she said, "[and] I really wanted to be not only the sick one, I wanted to be normal too". Grace's choice to wear a wig refers to the fact that the loss of hair, especially for women, has powerful significations. It may indicate, as Grace

explicitly stated, a state of sickness, but also the resistance of discourses of normative femininity by symbolizing possible disgrace and madness (Freedman 1994). However, in bypassing unfettered gawking that accompany such tainting positions, Grace's practice of keeping—or rather restoring her 'I can' through wearing wigs seems to be far from normalizing. She elaborated:

> You immediately notice that it [a standard wig] is fake anyway, so you should better have fun with wigs. I did. […] I had a whole collection of them [party wigs]: in blue, pink, short, long, […] and one—my favorite—with metallic strings.

While a standard wig is designed to resemble real hair, to Grace, this kind of prosthesis appears to be fake immediately. As such, it may covertly reveal her body's non-normative element. In a surprising response, Grace decided to wear unusual party wigs, which probably attract more, rather than less, staring. Yet attracting such attention may paradoxically be understood as an attempt to normalize the public dimension of having a non-normative body. Crawford explains that "being unambiguously defined as unlike others, as overtly distinct may function as a way to normalize [her] interactions because [s]he no longer has to contend with those who could not take their eyes of [her]. Just one glance solidifies [her] difference or distinction and allows gazers to 'move on'" (2015: 233). Instead of attempting to be normal or less deviant, Grace's wig wearing practice was explicitly geared towards appearing as evidently deviant. In doing so, she encouraged passers-by to qualify her and, subsequently, to move on, thereby maintaining her possibility to go about unhindered by the lingering stares of others.

Note that while Grace may indeed reinstates her 'I can' through wearing explicit non-normative wigs, she did not opt for the other alternative of appearing explicitly different: going around bald. This may indicate that only within the spectrum of the normative (i.e., having hair, whether actually real or really fake), a deviation from the status quo—crazy colored, weird hair—enabled her to pass by with a non-normative appearance and to maintain her possibilities to act in the world (Freedman 1994).

Barbara: Filling/Failing the Breast Reconstruction

Apart from wearing external prostheses, some women opted for a breast reconstruction after their breast surgery. Or rather, as suggested by Barbara, getting a breast reconstruction may itself be an alternative to wearing external prostheses. She recounted her reasons for opting for an artificial implant reconstruction:[3]

> Even when I wore a very tight bra […], even then, the right [breast prosthesis] was always a bit higher than the left [breast prosthesis] and then, when I wore a tight shirt, it looked awful. I always had to pull the right one down, constantly. […] And the cleaning [of the prosthesis], pff […]. I felt something like, no, I have to do something about that.

[3] Breast reconstructions fall into two general categories. Autologous reconstruction is based upon the usage of own tissue, while alloplastic reconstruction is based upon an artificial implant.

Like in the cases of Karin and Grace, Barbara's words allude to the fact that a certain degree of forgetfulness of one's (practical, sensorial, visual) body widens the scope of possible action. Barbara's external prostheses required cleaning and pulling down, and this could be a source of frustration. The prostheses hindered her in being engaged in other activities by not supporting her embodied capabilities, her 'I can'. For Barbara, getting a reconstruction seemed to be motivated by her aspiration to be less engaged with her body, and maybe even to forget about her prosthetic body altogether. However, it turns out that attaining such a carefree or effortless body—which would enable Barbara to be fully engaged with other activities again—not only required a lot of work and awareness, but—in contrast to Karin's and Grace's case—also seemed to be largely beyond her control.

As in most of the implant reconstructions, Barbara's implant was inserted by a balloon expander. This expander was placed beneath her skin by a plastic surgeon and—over the course of a couple of months—was periodically injected with a saltwater solution to gradually fill the expander in order to stretch the skin. When the skin was sufficiently stretched, the expander was surgically replaced by the actual implant (Serletti et al. 2011). This process was a time-consuming one, which required periodic and extensive care at the hospital. Moreover, as it was a physically intrusive, uncomfortable, and potentially restricting process, it also demanded Barbara to constantly attend to her own body. As she explained:

> Because I have a very thin skin, it [the insertion of the saltwater injection] was [a] very delicate [process]. Often they injected too much and then it was like a hard ball, very painful. […] On these days, I tried to stay put as much as possible. […] Well, and yes, you try to avoid those situations so I do not move around a lot anymore since, well, this [she points to her breast].

Although the reconstruction process was geared towards an extended 'I can,' this quote shows that Barbara's possibilities of being involved in the world within the process itself were inhibited. Her 'I can' is not only restricted because of the required periodic maintenance at the hospital or the actual pain in her breast, but also because of her anticipation and attunement to her potentially painful body. That is, her ability to move around and to attend to other activities is to a large extent limited by her avoidance of pain.

After the expander was replaced by the implant, Barbara indeed had a more carefree body in the sense that her prosthetic body did not require constant cleaning and pulling anymore. Unfortunately, the pain from her overstretched skin and especially the fear thereof still occurred from time to time, something which continues to leave her with a limited 'I can'. Moreover, her 'I can' seems to be further restricted in adopting the habit of 'coloring' her overstretched, transparent skin. She elaborated:

> So, yes, the skin is so thin now that it all looks a bit bluish. Of course, you see more veins now, and the scars, but also the implant itself is very visible. […] So I put on skin colored concealer [on the breasts] so that the bluishness does not stand out that much.

In contrast to the nature of Barbara's pursuit for a more carefree body, her experiences seem to demonstrate that the actual *bodily incorporation* of an artifact cannot be equated with an *embodiment* relation (Ihde 1990). In line with what several authors have argued, the insertion of a prosthesis under the skin may neither amount to its disappearance nor to—quite ironically—its lived transparency (Oudshoorn 2015; Dalibert 2015). In comparison to her external prosthesis, Barbara's implant may even involve more (painful, fearful, color) awareness, which in turn required much care and caution. As such, Barbara failed to obtain a carefree prosthetic body—one that would enable her to forget about it and to extend her agency—through a subcutaneous implant. The strengthening of her agency through such a surgical intervention, however, seems to be largely beyond Barbara's control. We may even argue that, paradoxically, her efforts to control and extend her agency further confine her 'I can'. After all, by adopting the habit of coloring her breasts as a kind of 'damage control strategy,' Barbara seems to be more, rather than less, engaged with her body in comparison to the situation prior to her breast reconstruction.

Materializing Women's Agencies in Breast Cancer

By taking the existential, phenomenological concept of embodied agency (Merleau-Ponty 1945; Young 2005) as a theoretical framework in discussing technological mediation, this article showed that breast cancer technologies shape the agencies of women who engage with them in multiple and sometimes ambiguous ways. We have identified that the embodied possibilities women have in the context of breast cancer—their 'I can'—may be restricted, reconstituted, maintained, affirmed, and extended in their interactions with and incorporations of various technologies and artifacts.

These mediations of women's agency take place on different bodily levels, within complex temporal structures, and are determined by certain socio-cultural contexts. First of all, various aspects of embodiment are at stake in such mediated agencies: not only these women's bodily capability and sensory experience—'I can/cannot be comfortable and do stuff'—but also their public appearance and possibility to pass—'I can/cannot look normal and go around un/obstructed'. Second, whereas these women's 'I can/cannot' may simply refer to the present tense, it may as well denote past and future tenses, or entanglements thereof. As shown, actual mediations may constitute their current 'I can,' but the same is true of potential and previous ones that adhere to women's future and past possibilities to act. Finally, this temporal process of mediating embodied agencies in the context of breast cancer does not take place in a vacuum of subject and object, but involves a highly situated matter. The above-described experiences highlight that a technologically mediated agency involves dealing with contemporary, stigmatizing and sometimes harmful norms of sickness, femininity, and ethnicity, some of which are incorporated in the technology or artifact itself. Moreover, the concrete medical and social contexts in which women engage with technological artifacts also play a significant role in how their agency is shaped.

Important to note is that the above-described processes do not imply one-way conditioning relationships between technological artifacts and human agencies, but rather involve reciprocal relationships in which both subject and object are co-constituted. Indeed, technologies shape women's embodied agencies, but women engaged with technologies also massage, shape, and position themselves and their bodies, and even mold and alter the technological artifacts. By playing and negotiating with bodies and artifacts, these women try to *appropriate* the technological mediation: they actively try to influence the ways in which technologies shape their agency. In doing so, they affirm their agency—that is, their options for action—while attempting to maintain or reconstitute their scope of possible action within the technological mediation.

Based upon the idea that we need a 'material turn,' current research departs mainly from the constitutive power of the material world in human existence, and as such, decries a one-way conditioning of materialities influencing and co-determining human perceptions and actions (Verbeek 2010). In starting from a subjective perspective, while also acknowledging the constitutive power of the material context, we offer insight into a reciprocal dynamic of material/human agency-shaping. Women's embodied experiences and their possibilities to act in breast cancer are indeed constituted by objects, but they also appropriate their (positioning in their) material context, and thereby constitute their own embodied agency. In light of this conclusion, we suggest that there is a need for one more turn after the 'material turn': we should also take into account the dimension of appropriation in the human-technology relation. It is through acts of appropriation that people (try to) adjust, mold, and alter the technological mediation of their experiences and actions. Within this kind of relationship, both 'objectivities' and 'subjectivities' crystallize around such adjustments. Acknowledging this constitutional double-act turns the attention away from 'technologies'—but also from 'humans'—and toward 'humans with technologies' (or 'technologies with humans'). It reveals the fundamental embeddedness of humans and technologies, of how technologies transform and materialize selves and bodies and, in turn, the ways in which humans affect and appropriate these technological mediations. After all, as contended by Latour already, "action and intentionality may not be properties of objects, but they are not properties of humans either" (1999: 192). In trying to understand human existence and agency, then, one should neither stop at the technological artifact, nor at the physical borders of the skin. Here, as Latour aptly states, "the name of the game [is] to avoid using the subject-object distinction at all" (1999: 193f.). In this sense, we argue that mediation theory, which is guided by the material turn, should not just focus on technologies alone, but needs to move toward an exploration of the materialization of technologically mediated human agencies. By carefully considering the reciprocal dynamic of this materialization, we gain a deeper understanding of people's perceptions and experiences—their agencies—and, accordingly, learn more about who they are.

Then finally, approaching Jo Spence's 'Mammogram'—the photo with which this article started—from this perspective, this frame is not just a picture of a half-naked woman whose agency is shaped by various technologies. In demonstrating how her agency both affects and is affected by technological mediations, it appears

that the photo is the materialization of a technologically mediated Spence on different levels: the pictured objectification of Spence-in-the-mammography-machine, the implied and assertive Spence-with-her-photo-camera, and the subjectifying photo-of-Spence-in-the-machine-with-her-photo-camera.

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