LUND UNIVERSITY

Aging enacted in practice

How unloved objects thrive in the shadows of care

Fischer, Bjoern; Östlund, Britt; Peine, Alexander

Published in:
Journal of Aging Studies

DOI:
10.1016/j.jaging.2024.101266

2024

Document Version:
Publisher's PDF, also known as Version of record

Link to publication

Citation for published version (APA):
Fischer, B., Östlund, B., & Peine, A. (2024). Aging enacted in practice: How unloved objects thrive in the shadows of care. *Journal of Aging Studies*, *71*, Article 101266. https://doi.org/10.1016/j.jaging.2024.101266

Total number of authors:
3

Creative Commons License:
CC BY

General rights
Unless other specific re-use rights are stated the following general rights apply:
Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.
• Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
• You may not further distribute the material or use it for any profit-making activity or commercial gain
• You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: https://creativecommons.org/licenses/

Take down policy
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

Download date: 16. Nov. 2026

Journal of Aging Studies 71 (2024) 101266

Contents lists available at ScienceDirect

Journal of Aging Studies

journal homepage: www.elsevier.com/locate/jaging

Aging enacted in practice: How unloved objects thrive in the shadows of care

Björn Fischer [a,*], Britt Östlund [b], Alexander Peine [c]

[a] Department of Design Sciences, Lund University, Sölvegatan 26, 223 26 Lund, Sweden
[b] Division of Technology and Health, Royal Institute of Technology KTH, Hälsovägen 11C, 141 57 Huddinge, Sweden
[c] Faculty of Humanities, Open University of the Netherlands, Valkenburgerweg 177, P.O. Box 2960, 6401 DL Heerlen, the Netherlands

ARTICLE INFO

Keywords:
Aging as object
Shadows of care
STS
Enactment
Maintenance
Temporality
Ethnography

ABSTRACT

In this paper, we explore the seeming stability of aging. More precisely, we offer an empirical account of how aging – images of aging, embodiments of aging, feelings about aging – is enacted in company practice, both in place and across time. Drawing on ethnographic fieldwork conducted at SMCare, a small-to-medium sized company active in the care technology sector, we show how aging achieves its stability not through practices that are characterized by affection, or purposefully targeted at maintaining or caring for aging, but due to ongoing re-enactments in the shadows of other care practices. In so doing, we mobilize STS care literature that foregrounds the often-invisible relationships among objects that are otherwise neglected, marginalized and excluded. In particular, we interrogate the interlinkages between aging and caring practices as emerging *in the shadows of care*. In these blind spots, we find, certain unloved and disliked objects such as aging may aggregate and grow, becoming stable and durable as they are incidentally brought into existence, drawing energy from, and feeding off, *other* care practices.

Troubling Aging

> Marie: "Now… we can maybe send devices… but for that, we need to explain it,.... and they [older people] have to be sharp in the mind" … The others nod… "...and another question is how do we define the users… I mean, we ourselves know quite a lot, we are of course not representatives but we have some features…" – Jeremiel, software analyst at SMCare,[1] agrees: "Yeah, we can do a lot in-house, we also have some previous care stuff for elderly[2] people in the hall…" – Nicholas: "Or children! We can test with children. Basically, when you're young, you are a child, and you are a child when you're really old again (the others laugh, including me)… I mean, seeing all of this that I work on now, I don't really want to get old […]" *(Personal Fieldnote, Office Meeting)*.

In this scene, older people are suspected of a lack of sharpness in the mind, a cognitive and physiological deterioration to the extent of re-becoming children. We can sense sarcasm and fear in the statement given by Nicholas, a lead product developer at SMCare, – not affection or attachment. Nicholas does not really want to get old. To the people involved in the scene above, aging does not appear as an object of love or compassion, but as something fragmentary, involving fear and deterioration.

Paradoxically, though, the scene took place in the office of SMCare, a small-to-medium-sized technology firm specialized in the development of care technologies. A place that explicitly heeds positive affect and *care* towards aging and older people as a core company value.[3] At the beginning of his ethnographic endeavour, the episode above left our observer somewhat perplexed with a range of seemingly unconnected,

* Corresponding author.
E-mail address: bjorn.fischer@design.lth.se (B. Fischer).

[1] The names in our account are fictional for the sake of ensuring anonymity of the staff working for SMCare. As well, SMCare is a fictional term to ensure the enterprise's anonymity.

[2] At SMCare, 'elderly' was occasionally used as a term to refer to the intended technology users of the company. As it emerged in-vivo, we opted to keep the term in its stereotypical form throughout our empirical analysis; but otherwise engage critically with it using quotation marks.

[3] Within the company's premises, as well as throughout its online presence, scattered across office walls, desk spaces, advertisement campaigns and corridors, one can find posters, slides and mission statements that serve as vibrant reminders of the organization's unwavering commitment to build technologies that *empower*, increase *integrity* of, and *care for* aging individuals, to ultimately contribute to an enhanced quality of later life.

https://doi.org/10.1016/j.jaging.2024.101266
Received 2 April 2024; Received in revised form 28 August 2024; Accepted 3 September 2024
Available online 9 September 2024
0890-4065/© 2024 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

fragmentary articulations about aging. Why is it regarded important and noteworthy that older people "have to be sharp in the mind"? How does the "previous care stuff for elderly people in the hall" help in obtaining feedback? And where does the linkage between childhood and old age have its origins? Clearly, a more thorough exploration was needed to understand how such versions of aging made sense within the context of SMCare.

Sites of technology production have received increasing attention because they are places in which not only technology is produced - but also aging itself (Gallistl & Wanka, 2023; Manchester & Jarke, 2022; Neven, 2010; Peine & Moors, 2015). This attention in the recent field of socio-gerontechnology (Peine et al., 2021) has questioned more traditional approaches in aging studies that have either neglected the relevance of technology to aging altogether (cf. Höppner & Urban, 2018; Wanka & Gallistl, 2018), or mainly explored the interventionist potential of technologies specifically designed for older people (cf. Peine and Neven (2019)). Instead, critical studies of aging and technology highlight the *co-constitution* of aging and technology (Dalmer et al., 2022; Gomez-Hernandez, 2024; Peine & Neven, 2021), thereby opening up possibilities to scrutinize the situated entanglements in which aging is constituted within relational networks of both humans and non-humans (Schwanen & Ziegler, 2011). In this view, the worlds of technology designers are not only relevant as spaces that matter because of the materialities that they produce, but they are relevant arenas in which certain versions, images and objects of aging and older people come to matter more than others (Buse et al., 2017; Lassen et al., 2015).

In this article, we present an ethnographic exploration of such co-constitutive making of aging in the design practices at SMCare. In particular, we zoom in on the somewhat puzzling neglect of "aging" at a company that, at the surface and in the glossy marketing materials, purports to do the opposite (i.e., care about aging as a central element in their design processes). Following the ethnographic encounters of our observer, who conducted fieldwork as part of a 2-year collaboration with SMCare, we focus on this neglect – and the localized performances through which it is held in place – to show how aging and older people are constituted in the shadows of design practices that *care for other things than aging*.

Our notion of 'care' is inspired by work in Science and Technology Studies (STS), which has produced a prolific amount of literature on *care in practice* over the past two decades (see Lindén and Lydahl (2021) for an overview). This line of work lends itself well to our study, as it allows us to deploy 'care' as a concept for critique that puts center stage the materials, attachments and 'neglected' things implicit in different care practices (Latimer & López Gómez, 2019; Mol et al., 2010; Puig de la Bellacasa, 2011, 2017). In particular, our work engages with the ambivalence of care: Care not only resembles the professional domain in which SMCare operates – and with it a potential moral obligation 'to care' for aging individuals; it also encapsulates a concept referring to a range of socio-material practices that are complicit in creating certain realities, while potentially side-lining others (Martin et al., 2015).

It is this plural meaning of care that allows us to focus our empirical analysis on the various objects that design practices bring about; both at their center, and *in their shadows*. In our account, aging appears as one such object – neither characterized by love or affection nor obtaining its shape from practices that are explicitly aimed at caring for it. Rather, as we shall argue, aging seems to emerge through *other* care practices, and it is enacted as an object of fear and dislike in their shadows.

Aging co-constituted in design: materiality, care and neglect

The concept of *co-constitution* for aging as it has become prominent in the socio-gerontechnology literature (Dalmer et al., 2022; Peine & Neven, 2021) is closely linked to the traditions of aging studies and gerontological research that have examined how institutions, policies, discourses or places not merely address, or accommodate for, the situation of older people but also play a crucial role in constituting aging itself (Dannefer, 2008). Notably, Estes' (1979) seminal work has demonstrated how the focus on US old age policies on planning and pooling was not just a means of allocating available resources more efficiently, but constituted influential yet contradictory myths about older people[4]: one that "defines the aged as responsible for their own plight and characterizes them (by inference) as immoral", and one that sees older people as "victims […] of circumstances beyond their control" (Estes, 1979, p. 28). Curious in the multiple dimensions of geographical gerontology, Cutchin and other scholars have further illustrated how places or environments not simply affect older people in measurable and assessable ways; instead, they have argued that places and humans, rather than exist as independent entities, constitute each other in their specific relationality (Andrews et al., 2013; Cutchin, 2003; Oswald et al., 2024). Similarly, theories of embodiment have reintroduced the body as an important site for aging studies – not as a biological, senescent reality, but as emerging from its *relation* with different temporalities, practices and knowledges (Gilleard & Higgs, 2018; Marshall & Katz, 2012; Martin, 2012; Twigg, 2007).

Aging, in a sense, can be construed both as an object and an image, co-constituted by and with its surroundings. There is a very physical, biomedical process of aging (Gubrium & Lynott, 1987), and there are also particular images (Buse et al., 2017; Featherstone & Wernick, 1995) and discourses (Katz, 1996; Katz & Marshall, 2003) about aging which constitute our experiences of it. And, as we have alluded to above (and has been argued previously, cf. Nelson, 2005; Woodward, 1991), aging also entangles emotional responses such as fear in its subjects – features that are more frequently captured under a term like 'image' rather than 'objects' or 'discourses', which appear to carry predominantly physical and cognitive connotations (McNeil et al., 2017). To help us make sense of the complexity of aging as encountered in the practices at SMCare, hence, we engage with a particular stream of STS literature that allows us to address aging in its heterogeneous – and sometimes elusive – appearance, encompassing its affective, material and relational qualities.

STS presents a relational and performative perspective on both humans and nonhumans, suggesting that neither of those entities exists independent of the socio-material practices in which they are connected (Barad, 2007; Woolgar & Lezaun, 2013). Entities, by this logic, are seen as constituted in or *enacted* by the very socio-material practices that bring them in relation to one another (Law, 2004; Mol, 1999, 2002). Likewise, STS scholars have brought forward a notion of images and imagination that is situated and embedded in practice (Fischer et al., 2020; Hyysalo, 2006; Ingold, 2002). In this understanding, the appearance or very existence of any object – whether this includes physical objects such as bush pumps (de Laet & Mol, 2000), or more metaphysical ones such as the disease atherosclerosis (Mol, 2002) – is understood as constituted in their relational performances in practice. Such situated performances hence provide a lucrative entry point for scholars particularly concerned with care (Mol et al., 2010; Pols & Moser, 2009).

Specifically, uncovering the situational enactments of care practices invites us to open up 'care' as a critical concept to think with (Coopmans & McNamara, 2020). In her influential work on the implications of care for knowledge creation, Maria Puig de la Bellacasa (2011, 2017) problematized the ethico-political dimensions of care, calling for critical scholars to "add layers of concern […] and promote additional attachments" (Puig de la Bellacasa, 2011, p.91). Zooming in on such concerns, critical care studies particularly emphasize the exclusionary nature of caring practices; the things that become neglected as people care for some things, and not others (Lindén & Singleton, 2021; Martin et al., 2015; Murphy, 2015; Wallenburg et al., 2013). 'Care', in this view, has a 'dark side', for it entangles a 'selective mode of attention' (A. Martin

[4] Estes (1979) does not use the term constitution, but her work was embedded in a social constructionist perspective, which was more common at the time.

et al., 2015) that, by way of valorizing some things necessarily also bears the risk of de-valorizing and excluding others (Giraud, 2019).

The concept of care has thus become qualified as 'non-innocent' and 'ambivalent' (Lindén & Lydahl, 2021; Lydahl & Hansen Löfstrand, 2020; Martin et al., 2015), and therefore as sometimes complicit in causing damages and injustices (Murphy, 2015; Singleton & Mee, 2017). Hence, as Martin et al. (2015) remind us, in light of the asymmetries that care can cause, "care's partialities, limits, and effects must be located, situated, and questioned" (p.635). Such a critical stance towards care involves, most notably, a distinct sensitivity to privilege and power relations implicit in care (Gill et al., 2017; Martin et al., 2015; Viseu, 2015), and in particular, attention to what is included, and what is excluded and happening on the sidelines of care practices (Giraud, 2019; Lindén & Lydahl, 2021). Empirical research has begun to take such 'matters of care' (Puig de la Bellacasa, 2011, 2017) seriously as an important ethos to put at its center of investigation the mundane, sometimes taken-for granted 'invisible work' implicit in care practices (Buse et al., 2018; Latimer & López Gómez, 2019; Oudshoorn, 2008).

It is this understanding of care that our account explores further: Care as a material practice that is sutured to the inevitability of partialities, discomfort and exclusions. More specifically, our paper is concerned with the *forgotten zones* of care; the neglected by-effects and the consequences particular care practices can have. We take from the care literature a focus on the dusky and shaded arenas of caring practices and illuminate their interlinkages with the constitution of *aging* - a connectivity that has remained relatively underexplored in aging studies. In our account, we localize and critically question these situated interlinkages, and empirically illustrate how aging becomes real only through the relational practices inside SMCare. These, we argue, are practices that do not necessarily care *for* aging. Instead, we illustrate how these practices care for *other* things, and conceptualize aging as an object that emerges and re-emerges in the shadows of these practices as an object and image of worry and dread. We thus contribute to the critical literature on aging and technology with an empirically induced conception of the co-constitution of aging and care technologies that includes the unintended, collateral, and murky upshots of other practices: Aging can be enacted circumstantially, as it is continually brought into existence, inconspicuously lingering in dimmed corners and uninterruptedly drawing energy from, and feeding off, *other* care practices.

Research methods and the company

But what other care practices are relevant, if not practices that are explicitly directed at caring for aging? A natural starting point for our exploration appeared to be the everyday practices of company staff. After all, as Nicholas in the introductory snippet articulated, his everyday work - "seeing […] what I work on now" – seemed to matter in his own conception of aging. What is happening in this everyday work? How is aging enacted in everyday company practices? Where does aging emerge in practice, and what does it amount to? And how does it manage to appear stable over time - in the face of an apparent lack of positive feelings? To allow for such an exploration, our article particularly examines the *practices* in the company, and their role in enacting aging. Our empirical material draws on ethnographic fieldwork conducted by the first author in SMCare, a small-to-medium sized company offering digital care technology solutions.

At the time of the fieldwork, the company employed about 20 employees, though there was considerable turnover with new employees being hired, as well as old ones leaving for new projects over time. A number of external consultants as well as project collaborators also formed part of the extended work environment of the company. The type of digital products developed included various smart care solutions, such as software for video meetings, alarm systems for care facilities, and sensor technology. Besides such digital solutions, the company's portfolio also comprised assistive devices such as eating support, and different types of robots such as robotic pets and wheeled service robots. These digital solutions were mostly targeted at the regional and national market, albeit they were also available to a broader international audience. The intended end users for these technologies were older people in a range of care facilities, while the paying customers were mostly individual municipalities.

Through academy-industry ties, our research team became aware of SMCare's work, and, due to the company's centrality at the intersection between care, aging, and technology, we deemed it as a suitable locale to explore the practices that happen inside such a care company. Mingling in a company-organized event, our observer (first author) started to enter the field and engage with company staff. He worked openly without hiding his research interests, and built from there a partnership where the company staff were agreeing to welcome him into the company for 2 years. Part of the negotiation was a mutual transaction in the sense that, for our observer to be allowed to take note of the practices, our observer was there to support the company's efforts at user involvement (see Fischer et al., 2022). To ensure that particular information about patents and individual technological specifications was staying secret, our observer also negotiated a Non-Disclosure Agreement that would allow him free research while ensuring the company staff's wishes for intellectual property protection.

The fieldwork was carried out from October 2019 to June 2021 and involved a multi-sited ethnography for strategic purposes of following the company's practices wherever they led (Pollock & Williams, 2010). Hence, due to the outset of the Covid-19 pandemic during the fieldwork, parts of the ethnography moved with the field into digital space, while other meetings, after work events and demonstrations could be joined physically. At the site of SMCare, most work was conducted in English but occasionally in Swedish, meaning that field observations also had to follow the blend in languages spoken. To allow for a consistent analysis, the emergent fieldnotes were kept purely in English. The fieldwork also included multiple informal interviews, as well as two semi-structured interviews with selected staff to further explore the practices in the company over time. Next to interviews, the material gathered also involved internal company communication channels (such as the internal intranet), external presences such as press releases and videos, as well as local policy documents that mattered inside the company. The main source of data, however, were the field observations made throughout the ethnography, as well as concurrent analytical notes about the various encounters. Following the style of grounded theory (Strauss & Corbin, 1990), the understanding of how aging was enacted in practice gradually took shape as a process of ongoing reflection and concurrent analysis of literature and empirical material. The interviews mentioned above, for instance, were a consequence of this ongoing analysis in the search for more meaningful data.

Findings

In the empirical account of SMCare that follows, we zoom in on the activities that our observer encountered in company practice, outline how they related to aging, so as to eventually examine the seeming durability and recalcitrance of this object over time. To do so, we begin with a very first, seemingly unrelated activity: gearing towards client requirements, and interrogate how in its shadows, aging began to take shape.

Gearing towards client requirements

How to understand the images our observer encountered in the beginning, as outlined in the introduction? Let us start our exploration with a glimpse into a first activity:

> Four videos appear, carrying the faces of the testers, with one video switched off. But the videos are not steady, but rather flashing, going on and off in the blink of milliseconds, as if some string of Christmas lights. "We are flashing…" - "Are you in the waiting room?" - "No I

am part" - "I can't see you joined." - "I think it's because I have not approved video access for the test user." - "Now the blinking stopped, did anybody do anything?" - "No, I haven't done anything" - "Strange. I don't know why it stopped… Let's have one more meeting" […] *(fieldnotes, office demonstration)*.

In the snippet above, we first see some chaos. The episode describes how a particular feature of a software platform is tested, which would allow for video meetings between older users and care professionals at a municipality. Different company staff sit at individual videos connected to the test. Blinking videos, and blocked video access, were but a few of the many bugs encountered in this activity. The requirement for video meetings mattered for many technical development activities within the company. And it was a requirement particularly requested by municipalities – the paying clients of the company:

We did that because, actually, a tender was coming out last year or end of uh— 2019. There was a tender coming out that was saying that we need to have a delivery in 2020 where we have an option of having a video meeting with the care recipient that has a care alarm. Okay, so we had thought about that and say, okay, what could we do? *(Andrew, R&D developer at SMCare)*.

After the municipality publicized its wishes in the scope of a tender, the staff in the company began a lengthy practice to implement video meetings as one of their technical features. In other words, everything to do with video meetings in the company occurred after it was specified as one of the requirements by the municipality. Interestingly, this was the case even though the municipality was by far not a secured client, but only a *potential* client: As Bianca, chief executive officer at SMCare, noted "I learned from Colette… After winning a tender, we will be reviewed… They will send a consultant to us to see if we fulfilled the requirement." The tender would first have to be 'won', and the internal practices 'reviewed' for compliance. Still, the articulated requirements in the tender were featured in many practices within the company. It was thus of central importance to fulfil the requirements articulated by the potential clients through their tenders:

"From my understanding, we should not allow two care professionals to be in a separate meeting without a care consumer.[5]" Lily, a sales manager at SMCare, determines. Confused, Jeremiel asks: "So… you can add a second care professional during an ongoing meeting…?" Lily responds: "Yeah but it is good to be able to add people… just not only care professionals". Jeremiel seems to agree and type the comment that not only care professionals should be in one meeting: "Ok I took the notes there." The discussion continues about how to deal with adding care professionals, as it should be possible to add additional ones if required, but not without there being care consumers. In this context, I hear Lily mention: "The first question we get from the municipality is: 'How do we compensate the care professional for the time spent in the meeting' Because they are getting paid per minute…" *(fieldnotes, office meeting)*.

The overarching consideration here, again, was the needs of potential clients (the municipalities), who would be interested in reducing time spent in the meeting through their employees (care professionals).

We have witnessed a multitude of such instances where company practices were tailored specifically towards procurement requirements set out by municipalities. Taken together, we may summarize such actions as belonging to a broader activity: *gearing towards clients*. As Andrew highlighted, "[…] the priorities are based on what the customers are primarily asking for." For our analytical purpose, what is interesting here is not so much the observation that potential client demands would spur company development. Rather, we were interested in what it means for the constitution of aging, if company activities are organized around gearing technical equipment towards tenders and expectations set by clients. Our first case is the feature of video meetings:

When it comes to elderly people specifically, there's a large group of people with cognitive issues and they need to have a bit more of a direct communication. It's not enough just to make a phone call, but there's a lot of travel back and forth to have face time. So a lot of the customers in the market right now are looking for new modern ways of doing the communication. To make sure you have more face time with people, but less travel time. So using video communication for that makes sense. *(Andrew, R&D developer)*.

As can be seen, older people were considered in relation to the feature of having video meetings. Specifically, as Andrew suggests, online meetings were tied in with images of older people as being 'elderly', cognitively impaired, hence appreciating 'more face time' – a feature that video meetings would allow together with its ability to reduce time. For Andrew, this enhanced efficiency through video meetings might well outweigh the reduction of physical visits. In company practice, hence, gearing towards clients' wishes of video meetings enacted aging in terms of lower mental abilities and in need for a rebalancing of the time-space continuum: longer meetings in virtual spaces, rather than shorter meetings in physical spaces.

But 'gearing towards clients' did not only involve activities of building video meetings between older people and care professionals. Two further demands were expressed by the municipality in the tenders: to allow for volume adjustments for the older people across distance, and to forcefully enter video calls from a distance.

I ask: "Did they [Municipality 1] say something about what they want?" Colette responds: "Not really, only the government… the municipalities gave us requirements from January this year… They only said three things…. that they wanted video meetings between care staff and older people… that they wanted the staff to be able to adjust the volume at the old person's place… and that they wanted forced entry…" I look confused and Colette seemingly senses this: "Forced entry is that … when nobody responds… then the care workers can force a video call …. and see what is happening." Colette looks at me and continues: "But, of course, the elderly have [sic] to sign a compliance… that it is ok with them" *(fieldnotes, office discussion)*.

In particular, Colette appears to consider some ethical troubles with the feature for forced entry, yet she seems to suggest these troubles may be dealt with by a required compliance signature by the older person. And hence, these two requirements, too, were embedded in the development practices at the company, as the following example from an introduction by the software development team to functionality testers illustrates:

"Care meetings is the meeting part of [the care platform]…" Marie, quality engineer at SMCare, explains. "Care professionals can meet from the portal or from the phone… with the older person." […] "What is a bit of interest here is these three dots…" Her mouse circles around three dots at the lower right corner of the screen. "Here you can mute and unmute the consumer… and also increase their volume", she explains. […]

"Then there is also the possibility to… when you request a meeting as a care professional…" […] As we are waiting, suddenly a medium-sized, purple button appears to the right of the sentence for waiting, saying: 'Force join'. Marie explains: "If one does not reply… then you can click here and you are in the meeting with force join … now I actually accepted so it should work…" *(fieldnotes, work session)*.

[5] 'Care consumer' was commonly used by the staff at SMCare as a term to denote their end users in a unified fashion, seeking to define the user's identity with respect to the technological products developed by the company. Nevertheless, during the engagement of our ethnographer, it was one of many terms utilized to refer to older end users, which also included more stereotypical forms such as 'elderly' people.

As these excerpts show, the client's requirements, of being able to mute older people, and to access their video from a distance, were embedded as aspirational technical features of the developed meeting platform. If older people would not take the call, the idea was that care professionals should get a camera view in the older people's homes, regardless of their wish to connect. Further, care professionals should be allowed to raise and lower the sound for older people, implying a negative image about the hearing abilities of older adults, and the autonomy of older adults to make such adjustments themselves.

Borrowing from Akrich (1992), we may say that these enactments of older people became part of or "inscribed in" (p.209) the developed platform. And as the platform formed a core element in the practices in the company, older people thus continued to exist along these lines in the company. They became taken-for-granted by testers, who worked to identify, organize and report bugs; by developers, who continued to improve software efficiency and functionality in line with the perceived clients' requirements; and by sales and management staff, who worked to ensure the alignment of practices with the needs originally articulated in the tender.

Forced entry and adjusting volume across distance offer a second case of how gearing towards clients enacted aging. What did aging become in this practice? How did gearing towards clients' perceived requirements of forced entry and volume tapering from a distance enact aging? A response from one of the sales representatives:

> That has been important for the clients. That the elderly should not um— If they are really not able to do anything with the technology, they are maybe very disabled. So they—they can't or they are very— what you call this — or they are very afraid of the technology. Then, they should only have […] a touch screen in the home, and the personal should be able to make forced entry. And that was very important for the clients. And when we told them that that was possible, then they understand, OK, that we can't do with zoom meeting or teams meeting or anything else. But we are able to go in without their consent, in their consent at the moment, they have that consent. *(Ingrid, Customer relations manager at SMCare)*.

As can be seen from this passage, the requirement of forced entry also required certain types of older people – older people that would not be able to operate an interface properly and whose care needs where more important than their right to consent. The platform *with* the forced entry button thus became a platform that can legitimately relate only to older people that are significantly disabled. A specific image of aging emerged from the practices of fulfilling the requirements of the municipality, under suspicion of wrongdoing, of fear, of decline and of disability.

In short, aging was not the direct target of gearing towards clients – *client wishes* were. But in the shadows of this activity, aging was enacted and maintained as a disturbing object encompassing suspicion and disregard. In our empirical account, it is precisely as company staff worked to build products in line with the needs articulated by potential clients that particular versions of aging became real.

Establishing realms of expertise

Why were the needs articulated by the municipality so powerful? Looking at the practices in the company, we realize that gearing towards client requirements was intricately entwined with another activity. This refers to an activity by which company staff actively work to create distinctive realms of responsibility, accountability, and authority. One ramification of the activity was that municipalities appeared as trustworthy sources of images about aging, due to their perceived closeness to older people, as Ingrid articulates: "[…] when you talk to municipalities, they *know* [she emphasizes] their elderly." The governing rationale that served to justify relying on the potential clients' articulations, hence, was one of trust and proximity. The clients' wishes were considered reliable and knowledgeable. Old age images were, hence, considered within the realm of expertise for municipalities. Establishing realms of expertise mattered to the way aging was enacted in practice, as an entangled, yet separate activity.

But while this may work as a justifying rationale, it does not appear as something that could count as an overarching 'activity'. How did demarcating these realms of responsibility look like inside SMCare? Below, let us look at an example:

> "When will be the next time you have a meeting with the municipality?" I inquire. - "On Tuesday… but that is a new client...we first ask them open questions… and inform them about the services and so on…" says Lily. Marie takes this as an opportunity to express her interest in looking at the answers they receive, for which Lily replies this will be no problem, she can share them. I offer that I could join, as Marie will be on leave that time. Lily: "No, we are already four people from [SMCare]… this will not be so interesting…." *(fieldnotes, work session)*.

In this episode, our observer was engaged in a discussion with sales staff about being able to join their meetings with their potential clients: the municipalities. Lily, who belonged to the sales team, actively delineated her realm of responsibility, to meet and discuss new products of SMCare with municipalities as possible clients, keeping development staff out. Marie, herself belonging to the development team, appeared to feed into this rationale in a private discussion with our observer after the event above:

> Marie explains to me that when she has sales people coming first to sell a vacuum cleaner, she will want to say if she is interested or not at first: "I could be offended if there were other people asking me questions already. It's just a sales thing in the beginning..." *(fieldnotes, work session)*.

Certain things (or images), apparently, were 'just a sales thing'. Through establishing realms of responsibilities, in talk and action (Schatzki, 1996), both sales and development staff actively enacted boundaries between their respective spaces of authority. In practice, this activity positioned sales staff (and the corresponding images they provided) as closer to the customer than others. As Jeremiel articulated: "[...] our user representatives are internal employees". The sales employees, in turn, offered up the privilege they thus acquired through the disclosure of their very own ideas aging:

> Lily: "... if you have a consent about forced entry…. sometimes it can be the relatives who did that… and they may not want that they (the care consumers, i.e. the older people) change it… so it's best to go through an administrative process". Marie: "I believe users should have as much freedom as possible… that they can decide it with a button here. But as you say if the … then it is best to...." Lily adds: "If they meddle with it...they might bungle things up… which they wouldn't do if they were healthy… and we want to avoid that they … ((indistinct)) with what their relatives agreed on." Marie gives in: "Maybe then the check boxes can be removed as we don't need them anymore" *(fieldnotes, work session)*.

In this example, what was at stake was the feature of forced entry mentioned earlier. In the prototype that Lily and Marie were debating, the care platform did allow the care consumers (i.e. older people), to revoke their consent. Marie, however, argued that from *her* experiences, often relatives may give consent on behalf of the older people. Hence, she pushed for the feature to be removed and replaced by an 'administrative process', which would involve the older people contacting the municipality through a variety of intermediate steps. With the articulations by sales representatives taken at face value by the development staff, aging was enacted: images of fear about old people that may 'bungle things up', and need to be spoken about by others were embodied and inscribed into the platform (Akrich, 1992), with the checkboxes for revocation removed.

Our fieldnotes reveal how, in a variety of practices, *establishing realms of expertise* collaterally enacted aging in its shadows, as sales employees

were *not* concerned with aging, but with sales and marketing. In the following example, Marie and Lily jointly worked on the appearance of the app version of the platform:

> "It is very good to get the customer perspective. That is why we take the time from Lily!" […] Marie then moves on to now "start with the tablet", as she says. Marie displays a new screenshot, this time from the tablet, which should be used by older users. The first page Marie shows is the landing page on the user's agreement to different types of rights they give up, including terms of services, and integrity policy. Lily quickly comments: "So...two things… Number One: Everything is too small… Even for me! This needs to be much bigger!" Marie writes concurrently to Lily speaking, taking note of her comments. […] *(fieldnotes, office discussion)*.

Enacting different realms of proficiency, Lily's experiences of usage and interest in sales again nurtured in its corners aging as a worrisome object. With signs being too small for *even* herself, Lily implicitly positioned aging as an episode with *even more* physical difficulties in handling technologies. As larger letter size and boxes became part of the subsequent design, a certain manifestation of aging took shape. Again, these images entangled negative connotations and were uncritically taken over by development, embodying it into the evolving platform designs. In the dimmed corners of such allocated responsibilities, aging rested and retained its form, obtaining its vitality from being circumstantially enacted and re-enacted:

> Marie and Lily now discuss the different sections of the […] app. […] Jasmine then makes a comment: "Why is the main bar blue in the tablet and purple in the mobile app? It looks so nice in the mobile app but the blue..." - "Yeah... I think it is a misunderstanding that old people only like the clear colors blue, green and red…" - "I understand that...if you have difficulties with seeing with your eyes… it is good to have a blue background and yellow text. But it really looks not as nice! It looks as if it has been developed a long time ago. Not like something that is new... developed recently… But it looks so nice in the app of the smartphone!" Marie agrees and a comment is added for the consideration of the colors. *(fieldnotes, work session)*.

This example shows how a negative image of aging that has already been implemented is re-enacted (Law, 2004): that, as Marie explicates, aging comes with vision loss. This image is affirmed by Lily, but, with marketing as her concern (and not aging), she advocates for a reform of colors, to something presentable and 'new'. In this vein, aging as an object is crudely severed from different color impressions: aging is re-enacted as vision loss, which yet does not need to be expressed through specific colors. Once severed, it continues to quietly sit in the dark corners of the practices of care, leeching off quietly its occasional enactments and re-enactments.

Hence, aging was enacted while the target was either client wishes, or marketing and sales. But if sales and development staff enforced different fields of expertise, then, another, third field of expertise also required delineation: Technical development.

> Marie: "But I don't think we should give this input right now on this but maybe to find some time. Because we are quite a good team to give some input" – Andrew: "The mock-ups are there. Everybody feel free to give input […] But there is 100s of mock-ups… Everybody who has the time to go through ..." - Marie responds that she is wondering about some type of roadmap, "...to know which ones are first in line, on what you need feedback"" - Andrew: "We don't need feedback because it is already designed… We got no time to wait for external people to give some feedback." […].
>
> Marie comments again there would be "too much info". Andrew responds: "There is a reason why we are doing things, Marie.... I agree that there is too much information… But better to have more than less for the clients… They cannot give us a bad remark if there is too much information" – Marie retorts: "Yes… if it is confusing" [….] "If a change is requested, I think it needs to be more that is needed than just "oh I think it is too much"", says Andrew in the end. (*fieldnotes, work strategy meeting*).

The episode above represents another illustration of a re-enactment of responsibility allocation. When it came to technical features, the software specialists as represented by their head Andrew enacted a separate field of authority, as multiple attempts by a member of the development team to breach this boundary were rejected by Andrew. The boundaries between technical and non-technical responsibilities were thus produced and re-produced.

In sum, aging was *not* achieved through dedicated care practices characterized by love or affection for aging. Rather, establishing realms of responsibility, caring for delineating realms of expertise, specifically *sales* and *marketing*, enacted and re-enacted aging at the side-lines as an unimposing by-product. As our account shows, in the shades of internal user representatives and sales experts working to refine products to make them marketable, aging obtained and gained its shape as an object of impairment and loss. In a similar vein, aging subsisted on a *third* activity: expanding technological possibilities.

Expanding technological possibilities

A new sensor project started during our observer's fieldwork in the company. This episode shows how the company's work on beacon indoor positioning began through a research collaboration:

> Marie: "At 11, I have a meeting on beacon indoor positioning" […] - "Interesting…What was that... beacon?" - "Marie: I don't know the exact technical aspects but it's like a sensor chip. […].
>
> I ask how they began this collaboration. Marie: "It was through or connection with the research unit we are part of… They have been developing this beacon indoor positioning technology." *(fieldnotes, office conversation)*.

New research into sensor chips opened up new commercial opportunities for the company. Most notably, technical interest drove this development:

> Now I join Marie and Nicholas in the meeting room. Four others, Andrew, Hannah, Freya and Gabriel, join the meeting virtually. […] "I think it is a good beginning to explain how it works" - "I agree" - "We need to know technically... the state of the art....which gateway to use" - "It also has to be practically applicable...that it works in the settings" […] Hannah remarks that it would be very good to test different algorithms. Gabriel and Andrew continue by discussing different aspects that need to be considered first. I can hear them talk about guidelines, signal strengths, algorithms, compliance rules that have to be met, available frequencies, and which possibilities they could potentially look at. (*fieldnotes, office meeting*).

This was a quite comprehensive activity, as we observed a preoccupation with resolving technological difficulties as a predominant concern in many company practices. Much interest was in improving technical aspects of the sensor technology; in suitable 'algorithms', 'gateways', 'frequency bands', 'signals', 'encryption', 'transmission range' and 'reflections'.

What is interesting here is again not so much the observation alone that technical interests feature in company development activities, but rather how these activities, in turn, occasioned *aging* as an object. Here, a relevant starting point is the observation how such new technological opportunities were often mapped onto different possible scenarios of use. Continuous tracking was one of the main use scenarios of the newly developing indoor sensor technology. But what would continuous tracking in a care home entail?

> Andrew: "In the scenario, we focus on the elderly. We want to be able to continue to be able to track their location… any time they are moving around the environment… Continuous tracking is tracking even if you are sitting still... to see the detailed movement on the chair. […] For that, a device has to be worn by the residents… something around the neck...or in the pocket, in the shoes...or set fast on the wrist." At this point, I first think Andrew seems to digress a bit here, talking about Dubai in the current corona situation. But his example turns out to become relevant soon: "There, if you are arriving, you have to stay in quarantine for two weeks… and you get a device tracking you on the wrist, and you can't take it off, else there will be an alarm… because you actually break the law. This is something we also see as a good way of doing in other situations." *(fieldnotes, office meeting)*.

Older people, the care home inhabitants, were the envisioned subjects of this tracking exercise. Akin to travelers suspected of breaching their quarantine rules during Covid-19, the emerging image of aging was one that associated them with potential criminals 'breaking the law', in need for constant surveillance. With this, a particular object of aging began to take shape: Aging was seen as something that made monitoring necessary, and something that spurred suspicion. Notably, while monitoring practices can be seen as part and parcel of institutional long-term care, as Grigorovich and Kontos (2020) point out, it is precisely due to this widespread implementation that critical reflection is crucial regarding its ethical and social effects. In this context, our empirical findings reveal a rather *deviant* manifestation of monitoring, where monitoring emerges not necessarily as a means to prevent existing errors and harms of monitoring, but rather as a disciplinary measure to control and patronize older adults.

This, we contend, emerged out of the broader activity of *expanding technological possibilities*. With company staff working on technical improvements rather than finding solutions for old age, in the murky shadows of this practice, aging was enacted as an uncomfortable object involving a need for being monitored. Previous work has highlighted the profound tensions that emerge as monitoring solutions enter the daily lives of older adults, causing threats to their senses of agency, power imbalances and acts of resistance and subversion among older end users (Berridge, 2016, 2017). Our empirical inquiry into design worlds shows how the identified scenarios for aging silently emerged in the corners of a broader activity concerned *not* with aging but with enhancing the capabilities of the evolving technology. Aging, then, took distinct form following from a need for monitoring - and measurement:

> Andrew explains yet another [scenario for using the technology], this time themed 'proximity alert': "For example, when you have too many people in a room...then you can raise the awareness level. You can get feedback from the device: 'Now you are too close to the person, take a step back'… Or, you can notify the staff that they should be apart…. to make sure that people are kept safe. There are for example people that are in certain medication groups that should not be too close to others. […] The next use scenario Andrew introduces is about inactivity. Andrew explains: "Inactivity is about... tracking something that is not moving as it should. For example, if an elderly person is in bed too long... then it is usually not good… or … inactivity in the bathroom for 45 minutes. It's not good…" *(fieldnotes, office meeting)*.

In the scenarios outlined by Andrew, older people were abstract beings that the technology could appropriately measure, be it their 'proximity', or their potential 'inactivity'. Crucially, these were possibilities that the sensor technology could offer. Hence, the concern here was *technological improvement – not* aging as an object. Yet, on the sidelines of a move towards enhanced surveillance, aging was nevertheless enacted: as something that had to be measured and quantified.[6] This shows how practices of technology development that care for technology are not innocent. In their shadows, they may enact aging in abstract, distant and numerical terms, thereby positioning aging as a worrisome object in need of measurement.

Notably, these practices also reinforced and maintained prior images of aging as decline and deterioration. To acknowledge the need for largely unfettered surveillance of bodily features is to enact aging as a process of degradation and a very existential threat, closely tying aging to measurement and control. Next to the reduction of 'being old' to numbers, another example was the lively existence of older people, which was supposed to be measured as their 'heartbeat':

> Andrew: What we need to have is some type of heartbeat…no more than two minutes apart…during heartbeat, you can send the battery status.
> Marie: Yeah, maybe we find out other things we want to send… to always use them for positioning…
> Hannah: There are some devices that are continuously streaming.
> Andrew: Yeah, that's a good point, this is only needed for devices that are not continuously streaming location data… So, we just make it a requirement that we need to be able to somehow measure the heartbeat… but we can use continuous streaming…
> Hannah: What are you gonna do with this heartbeat data? …if this should be reliable… I mean what are you using the data for …?
> Andrew: …The heart rate and activity can give an indication if the person is having a hard time… It does not necessarily mean that high heart rate means you are in danger…Like if you are running on a bicycle… But certain people are… like a pre-stage of a stroke… Then you can send a warning.
>
> *(fieldnotes, office meeting)*

Again, the predominant concern was *not* with caring for aging, but for technical matters: of what the technology could 'do' with heartbeat data; monitoring real-human heartbeats, and detecting the pre-stage of a stroke. The heartbeat of older people was considered a technical opportunity; a means to transmit information about the battery status of their streaming device. Nevertheless, aging was re-enacted. It sat still, and consolidated its contours, in the backyard of another practice advancing what was technically feasible. Thereby, the advancement to deploy and monitor heartbeat data re-enacted aging in numerical terms, in need of surveillance, and as a constant threat to liveliness in later life.

In sum, *not* dedicated love or affection for aging, but a concern for *technological matters* enacted aging in terms of measurements, numbers, passivity, fragility and risk. It is in the shadows of such practices, directed at caring for entirely different things such as newly built sensor technologies, that aging gains and maintains its shape. Importantly, this is not to say that aging was a mere bystander here. Rather, aging took its very appearance and *gestalt*, embodied in the various technologies, from this very practice of expanding technological possibilities. Enacted inside the practice of expanding technological possibilities, aging took the shape of older people in numerical terms, as abstract objects, in need of monitoring and surveillance. Without this practice - the sensors, beacons, frequencies, the anonymous partners, and heartbeats all participating in expanding technological possibilities – aging in its witnessed form would not have materialized.

[6] The increasing quantification of older people has recently become a topic in gerontological research. See, for example, (Katz & Marshall, 2018) for an example of how fitness trackers and digital games position the aging body at the centre of competing arithmetic interests in measurement and surveillance.

Temporalities of aging and design

Notably, our empirical account allows us to trace how such assemblages of aging were maintained *over time*:

> Interviewer: And that was always the idea? So that hasn't changed since one and a half years?
> Ingrid: No, I don't think so.

Following a discussion about the platform and the intended users, our observer then asked if any changes occurred at all in these core ideas. None of the original ideas seemed to have changed in 1.5 years. In fact, some ideas date back much further:

> Well, I've been working a lot with infrastructure and technology for many years. Because, when I was working a lot with ISPs and data communication, telecommunication companies… They are the ones that are selling these kind of solutions directly to the customers. […] So the care alarms was [sic] the— the only entry service available at that time, because if you didn't sell care alarms, you wouldn't get in through the door of the care sectors – period. (Andrew).

Having worked on the corresponding technologies for many years, building a type of platform for alarms remained the main interest for Andrew since the beginning. These original technical interests carried similar notions of aging as the ones enacted by the care practices that we presented earlier. We can thus say that, while our findings have shown how aging was dynamically enacted through the contingencies of various company practices, it also and somewhat paradoxically appeared rather *stable*. This was because the care practices we observed appeared to persistently involve similar people and objects, and enact equally analogical targets, over long periods of time. In Law's (2004) terms, the care practices we observed could be described as "practices that continue" (p.56).

The socio-material conditions of the practices we observed, thus, were comparatively resilient. For example, the need for care alarms existed for a long time. Technological development continued to build on previously established technical normativities and knowledge. And the staff themselves and their perspectives had been shaped for many years.

> I've been working twenty-five years in [municipality] with people with cognitive disabilities. And Lily has been working with elderly. So, we have quite a long experience, both of us working with sales, working hands on with these people. (Ingrid).

The staff had similar backgrounds in related care disciplines, municipalities continued to issue similar tenders, and technology relied on prior devices. At the same time, older people, the potential end-users, continued to stay outside of these socio-material arrangements inside the company:

> Interviewer: Is there something you or the sales team also do to get ideas about older end users?
> Ingrid: I would love to do that. Yeah. I would love to do that. But I — We haven't, I'm sorry to say.

None of the practices we observed directly involved older people, and neither did the staff actively seek out ways to refine their ideas about old age. In other words, aging was jointly constituted by dynamic activities, emerged, and re-emerged, as the *upshot of persistent, long-lasting practices*. These practices, re-enacted over time, continued to produce and re-produce a rather consistent imagery of aging. Yet, this does not mean that images of aging were entirely static either. Rather, it *was* changing, albeit slowly:

> If you look like— on a 10-year scale, the elderly people are much, much more susceptible to technology at the moment and they want more technology. Before they were more technophobic because they really want to have a person to see and talk to. But it has to do both with their understanding of technology as well as the sense of integrity for the people. (Andrew).

> I think, especially during this growing year, I think that elderly and their technical knowledge has risen and become better. And still—hmm, and I think there's a lot going on in Sweden where elderly should learn technology. (Ingrid).

Both Andrew and Ingrid appear to hint at a slow change in the way they conceived of elderly people, highlighting how older people would now be much more interested in technology than they were a decade ago. Interestingly, their rationale is located in the agency of older people themselves, rather than in an active transformation afforded by the staff. But where was this change coming from?

> Because, if you don't— if you're not able to use a smartphone today, you are not able to go by bus or— or get your medicine or— It's a lot of things you are pushed out from. (Ingrid).

As socio-material conditions changed globally towards a growing digitalization, so, too, did the socio-material conditions we encountered locally. Smartphones, tablets, online platforms became available to the care sector. They became obdurate, durable preconditions for the practices we observed in the company. With the socio-material conditions slowly transforming, the locally enacted care practices also changed – away from care practices that presumed no technological interest, towards practices that squarely built on a heightened perceived demand for technology in the lives of older people. It is precisely as a by-product of these slowly shifting care practices that aging has not been changing rapidly in the company but it was also not entirely stable.

Aging hence was dynamically enacted in everyday design practices, but these practices often stretched far across both time and space, specifically due to their socio-material contingencies. The capacity for change and transformation of images has previously been referred to as 'flows' (Appadurai, 1996), 'fluids' (Mol & Law, 1994), 'mobility' (Sheller & Urry, 2006), or evolving 'sociotechnical imaginaries' (Jasanoff & Kim, 2015). In different shades, these terminologies seem to carry connotations of sleek movements; of decent speed and even acceleration in times of globalization. But what we have witnessed have not been rapidly shifting terrains, but rather sluggish and onerous compounds. Instead of fluids or flows, we believe, we may speak of *viscous* change. The idea of viscous change alludes to a somewhat slowly occurring transition, to the hard work, bypasses and material shifts necessary to achieve change. It allows us to think about what is required, and what is at stake, for change to happen. At the same time, it allows us to understand the ongoing achievement of an apparently stable object such as aging not through directed maintenance but as a by-product lurking in the shadows of a situated, practical and historical process of continuous, yet slowly shifting enactments. It points to the importance of the care practices involved, and their socio-material conditions, in the making and shaping (and re-making and re-shaping) of aging over time. For if change was to occur, where else to begin if not with the practical circumstances that enact aging in the first place?

Discussion: Aging in the shadows of care

Our empirical material shows how practices of care for technology and marketing – conventionally seen as being outside the realm of aging studies – also imply relations to aging, albeit not necessarily in a positive sense. This is a general point that scholars in critical gerontology have made for a long time, where they showed how aging is often configured in specific, negative ways as part of social policies that care for efficiency, austerity or market growth more than for the situation of older people (Estes, 1979; Peine et al., 2024; Walker, 2009). These studies have explored policy making from a structural rather than practical perspective, and critiques following from such studies have largely demonstrated *that* policy often constitutes problematic ideas and stereotypes of aging in the shadows of other concerns. What our

exploration adds to such critiques is first an understanding of how design constitutes aging, and here in particular *how* it does so in the shadow of other practices. Aging, as we encountered it inside the practices of SMCare, became situationally enacted through three interconnected, yet differently targeted activities: gearing towards client requirements, delineating technical from marketing concerns, and expanding technological possibilities. Crucially, then, these activities did not signify care *for* aging. Rather, they entangled care and concern for other things, such as sensors, frequencies, bandwidths, prototypes, municipalities, realms of competence, or relatives. In other words, in our case, aging – and particularly troubling and uneasy versions of it – appeared within practices that are not predominantly concerned with caring for aging, yet without which the appearances of aging that we observed could not have been evoked.

While others in aging studies have highlighted before that sites of technology production co-constitute aging (Buse et al., 2017; Cozza et al., 2020; Gallistl et al., 2024; Peine et al., 2015) our study draws out the *invisible and circumstantial nature* by which such interlinkages emerge. Specifically, our study emphasizes how aging obtained its situational enactments *despite* a lack of concern – *in the shadows* of other caring activities. We use the term "*shadows of care*" precisely because these were practices *not* specifically targeted at maintaining aging, but dealing with a range of other things. Indeed, across various instantiations, our practice-based inquiry into care showed how aging was repeatedly enacted and re-enacted as a by-product of other practices that cared for technical aspects, client requirements and sales and marketing.

Beyond the hidden nature of such enactments, it is also notable how these practices occasioned rather *specific* relationships to aging. That is, these relationships entailed emotional connotations – not of care, but of distrust and dislike. Rather than characterized by love (de Laet & Mol, 2000; Latour, 1996) or affection (Latimer & López Gómez, 2019; Latour, 2011; Puig de la Bellacasa, 2011), the enactments of aging we observed in the shadows of care were interspersed with physical and cognitive decline, misbehavior, and fragility. This is concerning because even fragmentary and neglected notions of aging, once enacted in the practices of technology design, can become inscribed into concrete technical objects (Akrich, 1992; Neven, 2010), as our study also has shown. Once inscribed in technical objects, these versions of aging can become durable and mobile (Latour, 1987, 1990). As they carry with them particular encapsulated normativities into different realms, they may then further configure aging bodies relatively removed from their original enactments, such as the everyday lives of older people (Aceros et al., 2015; Peine & Neven, 2021).

There is an ongoing interest in the literature about how images, discourses and objects of aging remain stable (Buse et al., 2017; Dalmer, 2019; Featherstone & Wernick, 1995). In this article, we have put forward a performative exploration of these issues. In our empirical account, we see how enactments of aging are both collective and ongoing endeavors, implicitly or explicitly making particular futures of aging a reality (and foreclosing other ones). The objects and activities for aging we observed were chaotic, distributed across space and time, sometimes flowing quietly into one another, and held by different actors and actants - both human (employees, sales personnel, stakeholders) and nonhuman (digital platforms, software, robots). Aging, therefore, appears as sectoral and continuously produced in distributed assemblages (Deleuze & Guattari, 1987), not necessarily referring to old people, but co-constituting older people nonetheless. Rather than looking for directed caring practices, hence, our study emphasizes the value of exploring the forgotten zones of care practices; their dark sides and ugly feelings. If we do this, we can find the unintended, neglected images and objects that emerge in the 'dark' milieus of caring (Martin et al., 2015; Murphy, 2015). In these blind spots, certain unsettling and worrying objects such as aging may aggregate and grow, becoming stable and durable as they are enacted and re-enacted by other practices. In fact, we found that these places offered surprisingly fertile grounds for such objects to thrive.

We have also interrogated this apparent stability over time and suggested to think about *viscous* change to disentangle how aging moves through time and space as an apparently stable entity. This, we contend, allows us to shine light on the circumstantial appearance *and* historical re-appearance (and transformation) of aging. Specifically, it makes accessible the various practices and materials that participate in the ongoing making and re-making of aging, and that have not yet received attention in scholarship explicitly interested in aging. This, then, is the point we wish to make: aging is enacted and re-enacted in practices as a situated, collective, infrastructural outcome. Thereby, we hope to initiate a dialogue in critical aging and technology studies (Fischer et al., 2021; Peine & Neven, 2021) about how aging can invisibly but forcefully be co-constituted in technology practices and institutions that do not directly care about aging; about how aging can be a neglected by-product that we can now disentangle and open up for critique: If changes in images of aging are to occur, then an open discussion is needed about the practices that require change. And along with them the socio-material conditions that circumvent these very practices: How to introduce new practices? How to change the socio-material conditions of practices? And what images and objects of aging are missing in practice? These are questions for future research. Considering the practical realities in the company, our study indicates, would be a good starting point to set expectations. Expectations about practices. About stability. About change. About feelings. And about speed.

Conclusion

Let us now briefly return to the episode first introduced and witnessed early during the fieldwork of our observer. Employing this new perspective on the interrelation between care and aging, we can now see how the images encountered earlier nicely add to an overall picture of aging as enacted in company practice. Ideas of old age compared to childhood, or a scary life stage that staff would want to avoid – images that appeared at first fragmentary and unconnected – do no longer seem to contradict, but to reify the everyday enactments of aging in company practice. With aging enacted as something passive, as physical declines that require technical fixes, monitoring and alarms, images of aging as childhood, too, became a conceivable part of aging. As our examples show, considering aging as being constituted jointly *in the shadows of care* activities allows us to shed new light on how it may come into being in the first place, how it became entangled with everyday company practices, and how it was constantly produced and re-produced through these very practices. It allows us to explore aging as an object that relates to a range of different potentialities, entangling quantification, depletion and deterioration, privacy infringements, programs for action that reduce agency and scripts that embody physical and cognitive decline.

Funding statement

This research was funded by: Sweden: FORTE (ref. 2017-02301); The Netherlands: ZONMW (Project 9003037411).

Ethics approval

The study was conducted according to the guidelines of the Declaration of Helsinki. The broader research project 'BCONNECT' focusing on older people was approved by the Swedish Board for Ethical Vetting (2018/839–31/5). In correspondence with the institutional review board, it was decided that this specific ethnography research did not require additional ethical approval, because it did not handle any sensitive data.

Permission to reproduce material from other study

All materials included are original to this manuscript.

Author contributions

Conceptualization, B.F. 80%, A.P. 15% and B.Ö. 5%; formal analysis, B.F. 80%, A.P. 15% and B.Ö. 5%; investigation, B.F. 100%; methodology, B.F. 100%; writing—original draft preparation, B.F. 80%, A.P. 15% and B.Ö. 5%,; writing—review and editing, B.F 80%, A.P. 20%.; project administration, A.P. and B.Ö..; funding acquisition, B.Ö., and A.P.

CRediT authorship contribution statement

Björn Fischer: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Britt Östlund:** Supervision, Project administration, Funding acquisition, Conceptualization. **Alexander Peine:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Data availability

Data is contained within the article.

Acknowledgements

We warmly thank all staff at SMCare, who generously allowed Björn into their company and conduct this study, gave us insights into their lived realities and offered their time to share their experiences and stories. We also owe many thanks to all other personnel involved for their dedicated support, including university administrators settling legal documents, corporate conference contacts welcoming Björn into an unknown environment, and test users open to collaborate. Their open-mindedness and kindness made this work possible. Furthermore, Björn would like to thank his family and partner June Lio for their continued encouragement during a difficult time for doing an ethnography during a worldwide pandemic.

References

Aceros, J. C., Pols, J., & Domènech, M. (2015). Where is grandma? Home telecare, good aging and the domestication of later life. *Technological Forecasting and Social Change, 93*, 102–111. https://doi.org/10.1016/j.techfore.2014.01.016

Akrich, M. (1992). The De-scription of technical objects. In W. E. Bijker, & J. Law (Eds.), *Shaping technology/building society: Studies in sociotechnical change* (pp. 205–224). MIT Press.

Andrews, G. J., Evans, J., & Wiles, J. L. (2013). Re-spacing and re-placing gerontology: Relationality and affect. *Ageing and Society, 33*(8), 1339–1373. https://doi.org/10.1017/S0144686X12000621

Appadurai, A. (1996). *Modernity at large: Cultural dimensions of globalization*. University of Minnesota Press.

Barad, K. (2007). *Meeting the universe Halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.

Berridge, C. (2016). Breathing room in monitored space: The impact of passive monitoring technology on privacy in independent living. *The Gerontologist, 56*(5), 807–816. https://doi.org/10.1093/geront/gnv034

Berridge, C. (2017). Active subjects of passive monitoring: Responses to a passive monitoring system in low-income independent living. *Ageing and Society, 37*(3), 537–560. https://doi.org/10.1017/S0144686X15001269

Buse, C., Martin, D., & Nettleton, S. (2018). Conceptualising 'materialities of care': Making visible mundane material culture in health and social care contexts. *Sociology of Health & Illness, 40*(2), 243–255. https://doi.org/10.1111/1467-9566.12663

Buse, C., Nettleton, S., Martin, D., & Twigg, J. (2017). Imagined bodies: Architects and their constructions of later life. *Ageing and Society, 37*(7), 1435–1457. https://doi.org/10.1017/S0144686X16000362

Coopmans, C., & McNamara, K. M. (2020). Care in translation: Care-ful research in medical settings. *East Asian Science, Technology and Society: an International Journal, 14*(1), 1–14. https://doi.org/10.1215/18752160-8193729

Cozza, M., Östlund, B., & Peine, A. (2020). When theory meets practice in entanglements of ageing and technology. *Tecnoscienza, 11*(2), 5–11.

Cutchin, M. P. (2003). The process of mediated aging-in-place: A theoretically and empirically based model. *Social Science and Medicine, 57*(6), 1077–1090. https://doi.org/10.1016/S0277-9536(02)00486-0

Dalmer, N. K. (2019). A logic of choice : Problematizing the documentary reality of Canadian aging in place policies. *Journal of Aging Studies, 48*(January), 40–49. https://doi.org/10.1016/j.jaging.2019.01.002

Dalmer, N. K., Ellison, K., Katz, S., & Marshall, B. (2022). Ageing, embodiment and datafication: Dynamics of power in digital health and care technologies. *International Journal of Ageing and Later Life, 15*(2), 77–101. https://doi.org/10.3384/ijal.1652-8670.3499

Dannefer, D. (2008). The waters we swim: Everyday social processes, macrostructural realities, and human aging. In K. W. Schaie, & R. P. Abeles (Eds.), *Social structures and aging individuals - continuing challenges* (pp. 3–22). Springer Publishing Company.

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia (translated by Brian Massumi)*. The University of Minnesota Press.

Estes, C. L. (1979). *The aging Enterprise - a critical examination of social policies and Services for the Aged*. Jossey-Bass Publishers.

Featherstone, M., & Wernick, A. (Eds.). (1995). *Images of ageing: Cultural representations of later life*. Routledge.

Fischer, B., Östlund, B., & Peine, A. (2020). Of robots and humans: Creating user representations in practice. *Social Studies of Science, 50*(2), 221–244. https://doi.org/10.1177/0306312720905116

Fischer, B., Östlund, B., & Peine, A. (2021). Design multiple: How different configurations of participation matter in design practice. *Design Studies, 74*, Article 101016. https://doi.org/10.1016/j.destud.2021.101016

Fischer, B., Peine, A., & Östlund, B. (2022). Doing user involvement: Shifting interstices and coalescing tensions in care technology. *Science, Technology & Human Values, 49*(5), 1130–1157. https://doi.org/10.1177/01622439221143196

Gallistl, V., Hahmann, J., Höppner, G., & Wanka, A. (2024). Material gerontology – Central thematic intersections and blurring boundaries. *Journal of Aging Studies, 68* (December 2023), 822–823. https://doi.org/10.1016/j.jaging.2023.101203

Gallistl, V., & Wanka, A. (2023). Spacetimematter of aging – The material temporalities of later life. *Journal of Aging Studies, 67*(February), Article 101182. https://doi.org/10.1016/j.jaging.2023.101182

Gill, N., Singleton, V., & Waterton, C. (2017). The politics of policy practices. *The Sociological Review, 65*(2_suppl), 3–19. https://doi.org/10.1177/0081176917710429

Gilleard, C., & Higgs, P. (2018). Unacknowledged distinctions: Corporeality versus embodiment in later life. *Journal of Aging Studies, 45*(January), 5–10. https://doi.org/10.1016/j.jaging.2018.01.001

Giraud, E. H. (2019). *What comes after entanglement? Activism, anthropocentrism, and an ethics of exclusion*. Duke University Press.

Gomez-Hernandez, M. (2024). Industry visions of technology for older adults: A futures anthropology perspective. *Journal of Aging Studies, 70*(July), Article 101248. https://doi.org/10.1016/j.jaging.2024.101248

Grigorovich, A., & Kontos, P. (2020). Towards responsible implementation of monitoring Technologies in Institutional Care. *The Gerontologist, 60*(7), 1194–1201. https://doi.org/10.1093/geront/gnz190

Gubrium, J. F., & Lynott, R. J. (1987). Measurement and the interpretation of burden in the Alzheimer's disease experience. *Journal of Aging Studies, 1*(3), 265–285. https://doi.org/10.1016/0890-4065(87)90018-1

Höppner, G., & Urban, M. (2018). Where and how do aging processes take place in everyday life? Answers from a new materialist perspective. *Frontiers in Sociology, 3* (April). https://doi.org/10.3389/fsoc.2018.00007

Hyysalo, S. (2006). Representations of use and practice-bound imaginaries in automating the safety of the elderly. *Social Studies of Science, 36*(4), 599–626. https://doi.org/10.1177/0306312706058426

Ingold, T. (2002). *The Percpetion of the environment: Essays on livelihood, dwelling and skill*. Routledge.

Jasanoff, S., & Kim, S.-H. (Eds.). (2015). *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power*. The University of Chicago Press. https://doi.org/10.7208/chicago/9780226276663.001.0001.

Katz, S. (1996). *Disciplining old age: The formation of gerontological knowledge*. University Press of Virginia.

Katz, S., & Marshall, B. (2003). New sex for old: Lifestyle, consumerism, and the ethics of aging well. *Journal of Aging Studies, 17*(1), 3–16. https://doi.org/10.1016/S0890-4065(02)00086-5

Katz, S., & Marshall, B. L. (2018). Tracked and fit: FitBits, brain games, and the quantified aging body. *Journal of Aging Studies, 45*, 63–68. https://doi.org/10.1016/j.jaging.2018.01.009

de Laet, M., & Mol, A. (2000). The Zimbabwe bush pump: Mechanics of a fluid technology. *Social Studies of Science, 30*(2), 225–263. https://doi.org/10.22394/0869-5377-2017-1-171-228

Lassen, A. J., Bønnelycke, J., & Otto, L. (2015). Innovating for 'active ageing' in a public–private innovation partnership: Creating doable problems and alignment. *Technological Forecasting and Social Change, 93*, 10–18. https://doi.org/10.1016/j.techfore.2014.01.006

Latimer, J., & López Gómez, D. (2019). Intimate entanglements: Affects, more-than-human intimacies and the politics of relations in science and technology. *The Sociological Review, 67*(2), 247–263. https://doi.org/10.1177/0038026119831623

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Harvard University Press.
Latour, B. (1990). Technology is society made durable. *The Sociological Review, 38*(1_suppl), 103–131. https://doi.org/10.1111/j.1467-954X.1990.tb03350.x
Latour, B. (1996). *Aramis, or the love of technology (translated by Catherine Porter)*. Harvard University Press.
Latour, B. (2011). Love your monster: Why we must care for our technologies as we do our children. *Breakthrough Journal*, 19–26.
Law, J. (2004). *After method: Mess in social science research*. Routledge.
Lindén, L., & Lydahl, D. (2021). Care in STS. *Nordic Journal of Science and Technology Studies, 9*(1), 3–12.
Lindén, L., & Singleton, V. (2021). Unsettling descriptions: Attending to the potential of things that threaten to undermine care. *Qualitative Research, 21*(3), 426–441. https://doi.org/10.1177/1468794120976919
Lydahl, D., & Hansen Löfstrand, C. (2020). Doing good: Autonomy in the margins of welfare. *Sociology of Health & Illness, 42*(4), 892–906. https://doi.org/10.1111/1467-9566.13069
Manchester, H., & Jarke, J. (2022). Considering the role of material gerontology in reimagining technology design for ageing populations. *International Journal of Ageing and Later Life, 54*(2), 181–213. https://doi.org/10.3384/ijal.1652-8670.3531
Marshall, B. L., & Katz, S. (2012). The embodied life course: Post-ageism or the renaturalization of gender? *Societies, 2*(4), 222–234. https://doi.org/10.3390/soc2040222
Martin, A., Myers, N., & Viseu, A. (2015). The politics of care in technoscience. *Social Studies of Science, 45*(5), 625–641. https://doi.org/10.1177/0306312715602073
Martin, W. (2012). Visualizing risk: Health, gender and the ageing body. *Critical Social Policy, 32*(1), 51–68. https://doi.org/10.1177/0261018311425980
McNeil, M., Arribas-Ayllon, M., Haran, J., Mackenzie, A., & Tutton, R. (2017). Conceptualizing imaginaries of science, technology, and society. In U. Felt, R. Fouché, C. A. Mille, & L. Smith-Doerr (Eds.), *The handbook of science and technology studies* (4th ed., pp. 435–463). The MIT Press.
Mol, A. (1999). Ontological politics. A word and some questions. *The Sociological Review, 47*(1_suppl), 74–89. https://doi.org/10.1111/j.1467-954X.1999.tb03483.x
Mol, A. (2002). *The body multiple: Ontology in medical practice*. Duke University Press.
Mol, A., & Law, J. (1994). Regions, networks and fluids: Anaemia and social topology. *Social Studies of Science, 24*(4), 641–671. https://doi.org/10.1177/030631279402400402
Mol, A., Moser, I., & Pols, J. (2010). Care: Putting practice into theory. In A. Mol, I. Moser, & J. Pols (Eds.), *Care in Practice on Tinkering in clinics, homes and farms* (pp. 7–25). Transcript Verlag.
Murphy, M. (2015). Unsettling care: Troubling transnational itineraries of care in feminist health practices. *Social Studies of Science, 45*(5), 717–737. https://doi.org/10.1177/0306312715589136
Nelson, T. D. (2005). Ageism: Prejudice against our feared future self. *Journal of Social Issues, 61*(2), 207–221.
Neven, L. (2010). 'But obviously not for me': Robots, laboratories and the defiant identity of elder test users. *Sociology of Health & Illness, 32*(2), 335–347. https://doi.org/10.1111/j.1467-9566.2009.01218.x
Oswald, F., Wahl, H.-W., Wanka, A., & Chaudhury, H. (2024). Theorizing place and aging: Enduring and novel issues in environmental gerontology. In *Handbook on aging and place* (pp. 37–60). Edward Elgar Publishing. https://doi.org/10.4337/9781802209983.00013.
Oudshoorn, N. (2008). Diagnosis at a distance: The invisible work of patients and healthcare professionals in cardiac telemonitoring technology. *Sociology of Health & Illness, 30*(2), 272–288. https://doi.org/10.1111/j.1467-9566.2007.01032.x
Peine, A., Faulkner, A., Jæger, B., & Moors, E. (2015). Science, technology and the 'grand challenge' of ageing—Understanding the socio-material constitution of later life. *Technological Forecasting and Social Change, 93*, 1–9. https://doi.org/10.1016/j.techfore.2014.11.010
Peine, A., Marshall, B. L., Martin, W., & Neven, L. (Eds.). (2021). *Socio-gerontechnology: Interdisciplinary critical studies of ageing and technology*. Routledge.
Peine, A., Meissner, A., & Wanka, A. (2024). Digitalisation and population ageing: Social policy dimensions of the digital divide and innovation. In *A research agenda for ageing and social policy* (pp. 131–149). Edward Elgar Publishing. https://doi.org/10.4337/9781802208139.00017.
Peine, A., & Moors, E. H. M. (2015). Valuing health technology - habilitating and prosthetic strategies in personal health systems. *Technological Forecasting and Social Change, 93*, 68–81. https://doi.org/10.1016/j.techfore.2014.08.019
Peine, A., & Neven, L. (2019). From intervention to co-constitution: New directions in theorizing about aging and technology. *The Gerontologist, 59*(1), 15–21. https://doi.org/10.1093/geront/gny050
Peine, A., & Neven, L. (2021). The co-constitution of ageing and technology – A model and agenda. *Ageing and Society, 41*(12), 2845–2866. https://doi.org/10.1017/S0144686X20000641
Pollock, N., & Williams, R. (2010). E-infrastructures: How do we know and understand them? Strategic ethnography and the biography of artefacts. *Computer Supported Cooperative Work (CSCW), 19*(6), 521–556. https://doi.org/10.1007/s10606-010-9129-4
Pols, J., & Moser, I. (2009). Cold technologies versus warm care? On affective and social relations with and through care technologies. *Alter, 3*(2), 159–178. https://doi.org/10.1016/j.alter.2009.01.003
Puig de la Bellacasa, M. (2011). Matters of care in technoscience: Assembling neglected things. *Social Studies of Science, 41*(1), 85–106. https://doi.org/10.1177/0306312710380301
Puig de la Bellacasa, M. (2017). *Matters of care: Speculative ethics in more than human worlds*. University of Minnesota Press.
Schatzki, T. R. (1996). *Social practices: A Wittgensteinian approach to human activity and the social*. Cambridge University Press.
Schwanen, T., & Ziegler, F. (2011). Wellbeing, independence and mobility: An introduction. *Ageing and Society, 31*(5), 719–733. https://doi.org/10.1017/S0144686X10001467
Sheller, M., & Urry, J. (2006). The new mobilities paradigm. *Environment and Planning A, 38*(2), 207–226. https://doi.org/10.1068/a37268
Singleton, V., & Mee, S. (2017). Critical compassion: Affect, discretion and policy-care relations. *The Sociological Review, 65*(2_suppl), 130–149. https://doi.org/10.1177/0081176917710587
Strauss, A. L., & Corbin, J. M. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Sage Publications.
Twigg, J. (2007). Clothing, age and the body: A critical review. *Ageing and Society, 27*(2), 285–305. https://doi.org/10.1017/S0144686X06005794
Viseu, A. (2015). Caring for nanotechnology? Being an integrated social scientist. *Social Studies of Science, 45*(5), 642–664. https://doi.org/10.1177/0306312715598666
Walker, A. (2009). Commentary : The emergence and application of active aging in Europe. *Journal of Aging & Social Policy, 9420*(21), 75–93. https://doi.org/10.1080/08959420802529986
Wallenburg, I., Bont, A., Heineman, M.-J., Scheele, F., & Meurs, P. (2013). Learning to doctor: Tinkering with visibility in residency training. *Sociology of Health & Illness, 35*(4), 544–559. https://doi.org/10.1111/j.1467-9566.2012.01512.x
Wanka, A., & Gallistl, V. (2018). Doing age in a digitized world—A material praxeology of aging with technology. *Frontiers in Sociology, 3*(Article 6). https://doi.org/10.3389/fsoc.2018.00006
Woodward, K. (1991). *Aging and its discontents: Freud and other fictions*. Indiana University Press.
Woolgar, S., & Lezaun, J. (2013). The wrong bin bag: A turn to ontology in science and technology studies? *Social Studies of Science, 43*(3), 321–340. https://doi.org/10.1177/0306312713488820