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Love and Fear? Affect, Public Engagement and the Use of Facebook in HPV Vaccination Communication

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Abstract

Social media are increasingly envisioned by public health authorities as a new promising arena for public engagement. Against this backdrop, this article attends to how citizens confirm, debate and resist governmental framings of health information online. By drawing upon STS and affect theory, it centers on the digital mediation of feelings on a Facebook engagement site for HPV vaccination. While the public authorities framed HPV vaccination as a matter of love and fear, a wide register of positive and negative feelings were mediated on the site. The article proposes the notion of 'digitalised literary devices' to analyse how mundane literary habits, such as the use of punctuation, online have been transformed to digital devices that, for instance, mediate public feelings. By conceptualizing public engagement as 'civic intensities', it shows how digital devices, such as digitalised literary devices, mediate and intensify public feelings of engagement.

Keywords: HPV vaccination, social media, affect, public engagement, health communication, science communication

Introduction

Social media are increasingly envisioned by public health authorities as a new promising arena for public engagement (Lupton, 2014). Within this context, it is argued that citizens' vaccination fear can be productively counteracted through citizen-expert dialogue on social media (Betsch et al., 2012). Against this backdrop, this article centers on a public health Facebook campaign – entitled "I love me" – for human papilloma virus (HPV) vaccination. It discusses how HPV vaccination communication was framed by public authorities (a Swedish county council) as a question of love and fear, and how lay citizens used the Facebook platform to affectively support, debate and resist this framing of the public concerns involved.

In Sweden, the HPV vaccine *Gardasil* is since 2010 part of the national vaccination program to prevent girls from cervical cancer and genital warts.[1] It is offered free of charge to girls in grade 5 or 6 (girls age 11 to 12). This is similar to many other European countries, who also implemented HPV vaccination for girls as part of national vaccination programs around the same time (for example, in the UK it was introduced to girls in 2008, see Hanbury, 2017). Until 2016, girls and young women up to 20 years old were in Sweden offered the vaccine free of charge via a so-called catch-up vaccination scheme (and up to 26 years old in the county council studied in this article). This article only concerns the catch-up vaccination.

HPV vaccination communication needs to be understood against a backdrop of other vaccine debates. Currently, vaccine policies and media discourses articulate a concern that citizens increasingly distrust the safety of vaccinations (Leach and Fairhead, 2007), and that this may affect the HPV vaccine uptake (Wailoo et al., 2010). This discussion is especially made with reference to recent vaccine controversies around the measles, mumps and rubella (MMR) vaccine and the H1N1 (Swine flu) vaccine *Pandemrix*. In 1998, Dr Andrew Wakefield wrote an article claiming a link between the MMR vaccine and autism. While this link later became discredited and the article was retracted, the article's impact on vaccine debates is still persistent. It is often mentioned as a starting point for a current trust crisis in vaccinations (Hobson-West, 2003; Bragesjö and Hallberg, 2009). As Gottlieb (2018: 126) writes, the article can be understood as "the origin story immunisation advocates tell about vaccine resistance". Also, in current vaccine policy and media discussions, the 2009 controversy around *Pandemrix* and narcolepsy is described as a case that further increased a breakdown of trust in vaccines (Dupras and Williams-Jones, 2012). Public health authorities are responding to such perceived trust crisis, for example through a range of public health communication initiatives – the Facebook site analysed here being one of them. The county council who launched the campaign hoped that a dialogue between the county council, girls and parents on Facebook would decrease girls' and parents' fear over the HPV vaccination, and that it would allow for public engagement with HPV vaccination information.

In practice, however, the site got populated by other public actors, and especially vaccine critical ones. Vaccine critics argued that the vaccination and the campaign were generating harmful effects, and that they therefore were upsetting issues in need of public attention and critique. For example, they accused the county council to cover the truth about HPV vaccination by representing the vaccination through an imagery of happy, positive and pink girls.[2] Importantly, while the county council envisioned the campaign site to center on sharing feelings of love, the communication on the site included a vide register of positive and negative feelings.

This article combines STS insights on the public engagement with science with affect theory to analyse the importance of affect and feelings – such as love and fear – to understand public engagement on the "I love me" Facebook site. It aims to provide knowledge about the affective politics of digitally mediated online HPV vaccination communication, and how it matters for our understanding of public engagement in vaccination (public health) science. More broadly, I argue that the "I love me" Facebook campaign is a good case for understanding affective engagements with science and science communication online.

STS scholars have emphasised the important role of, for example, passion, enjoyment and frustration in public engagement initiatives (Harvey, 2009; Davies, 2014). Public engagement arenas are full of "public expressions of delight and interest" as well as of "frustration, rage, and humiliation" (Davies, 2014: 103). Relatedly, in social studies of vaccinations, the importance of fear, anxiety and trust to understand the interplay between medical and lay expertise is extensively analysed (Hobson-West, 2003, Leach and Fairhead, 2007; Gottlieb, 2016).

In relation to HPV vaccine campaigns, it has been discussed how the vaccine has been promoted to parents (and along gendered lines, especially to mothers) through a focus on parental affection, love and care (Connell and Hunt, 2010; Lindén, 2017). Girls, in turn, have been addressed through a framing of the vaccine as a positive message about girl empowerment and individual choice (Mamo et al., 2010). As Maldonado Castañeda (2017: 129) argues, these "narratives around girlhood, women's empowerment, motherhood and parental care have had a global reach". Accordingly, campaigns in, for example, Sweden (Lindén, 2016, 2017), the US (Mamo et al., 2010) and Colombia (Maldonado Castañeda, 2017) share striking similarities concerning affective and gendered representations of parental care and girl empowerment.

HPV vaccine campaigns can be defined as "emotion-risk assemblages" (Gottlieb, 2018: 23), this as they are designed to invoke bodily reactions, sensations and intensities. They want parents to *feel* "that could be my daughter", and they encourage girls to *feel* empowered ("I *can* do it!"). While this holds true, affect, emotions and/or feelings are not the central focus in previous studies of HPV vaccine campaigns (but see, Lindén, 2016). Instead, these matters are mentioned, often in passing, to analyse *other* issues, such as discourses of gender, individualised responsibility and neoliberal public health governance (Mishra and Graham, 2012; Gottlieb, 2018).

I combine an analysis of the communication on the "I love me" Facebook site with an analysis of interviews with county council professionals who worked with the campaign. I center on the digitally mediated communication between the major groups involved: the county council, girls, young women, parents, and a vaccine critical group. Drawing on this collection of materials, I further expand upon the focus on feelings in public engagement and in vaccination politics. With the focus on social media, I add to the current discussion insights on the digital mediation of feelings in health communication, and in vaccination politics. I propose the notion of 'digitalised literary devices' as a concept to analyse how mundane literary habits, such as the use of punctuation, online have been transformed to digital devices that, for instance, mediate public feelings. Moreover, I argue that while vaccine fear, anxiety and trust are at the core of discussions in social studies of vaccinations, how feelings matter in public engagements with vaccination politics can be further developed. By drawing upon theories that attend to affect as intensity, I stress the productivity of analysing public feelings about vaccination concerns as (digitally) mediated through 'civic intensities' (Papacharissi, 2014: 25).

Public engagement and vaccination politics

The use of social media in health communication practice is part of a larger trend within science communication where online media is becoming more and more popular (Wyatt et al., 2016; Davies and Hara, 2017). Social media are envisioned and promised "to open up science, enable dialogue, and create a digital public sphere of engagement and debate" (Davies and Hara, 2017: 564). In the context of vaccinations, Reynolds (2010) argues that using health authorities' Facebook sites as discussion forums can increase citizens' trust as it allows them to debate and evaluate vaccination evidence. Directly in the context of HPV vaccination, it is stressed that social media is a "key strategy to disseminate accurate information and dispel some of the mis-information that is spread by the anti-vaccine movement" (Zimet et al., 2013: 416). Thus, health communicators envision online public engagement to enable effective vaccination communication, and counter-act vaccine critical mobilisations.

Yet, several studies also warn against how social media, quite contrary, enable an increased dissemination of misinformation (Kata, 2012). It is feared that the anti-vaccination movement will, for example through so-called "trolling", "hijack" health communication online platforms (Wilson and Keelan, 2013). While vaccine critics have existed as long as there have been vaccines (Colgrove, 2006), these authors emphasise that the internet in general, and social media in particular, have provided the anti-vaccination movement with expanded opportunities to spread their message and agenda (Dubé et al., 2015; Getman et al., 2017).

Vaccination practice is often assumed to consist of vaccine proponents, vaccine accepters and the anti-vaccination movement. Since there are degrees of acceptance (Streefland et al., 1999), and different forms of vaccine critique (Gottlieb, 2016), this is a problematic simplification. Usefully, Hobson-West (2007: 204) argues for the notion of 'vaccine critical groups' as preferable to 'the anti-vaccination movement'. Based on an empirical study of vaccine critique in the UK, she distinguishes between *reformist* vaccine critical groups, "who often have personal experiences of children believed to have been seriously injured following a recommended vaccine", and *radical* vaccine critical groups who "do not necessarily have personal experience of vaccine damage" (Hobson-West, 2007: 204). She makes a separation between how reformists not necessarily are against vaccines in general, and radicals who tend to pursue more of an anti-vaccination agenda.

Expanding upon Hobson-West's (2007) notion of a vaccine critical group, I will discuss a vaccine critical *public*. I prefer the wording *public* rather than *group* as the former emphasises the specificities of a lay group's status as a crowd of lay citizens (compared to groups that can include public authorities etc.). The vaccine critical public that was present on the "I love me" site can roughly be understood in line with Hobson-West's (2007) description of a radical vaccine critical group, this as it often pursued a critique against vaccines in general, and did not primary draw upon personal experiences of vaccine injury. Similarly, I define girls, young women and parents writing comments that were supportive towards the campaign and the HPV vaccination, or who liked or shared vaccine promoting messages, as another public. In defining critics and supporters as different publics, I follow Marres's (2007) conceptualisation of publics as constituted through their engagement with a specific issue (here, HPV vaccination). I am, thus, interested in how civic actors' very engagement constituted publics on the Facebook site. What I refer to as critics and supporters are, thus, understood as positions constituted *in relation*; in relation to each other and in relation to the Facebook platform.

The fear present in vaccine and health communication literature that the anti-vaccination movement will "hijack" communication platforms reflects a larger tension within public engagement with science concerning *which* citizen it is imagined will engage with public issues. Public engagement events tend to be limited through public authorities' and/or scientists' specific framings of how the concerned public *should* engage with science (Lezaun and Soneryd, 2007). That is, there are specific parameters for how engagement should take place (Michael, 2012). Public engagement events often constitute "a highly formalized and carefully choreographed form of engagement" (Lezaun and Soneryd, 2007: 282), and they easily exclude or marginalise dissent and opposition (Elam and Bertilsson, 2003).

Public engagement events easily reproduce – and quite paradoxically so considering how they aim to *engage* citizens in science – a deficit model of public involvement in science (the idea that citizens misunderstand scientific findings, and that more information will solve the problem) (Elam and Bertilsson, 2003). In the context of online science communication, research shows that there often is a tension between a promise of a participatory two-way citizen-expert dialogue, and how a one-way deficit model in practice often is reproduced (Davies and Hara, 2017). Notably, the very idea that health communication can be used to *disseminate* accurate vaccination information and *dispel* misinformation, builds upon a deficit model (Hobson-West, 2003; Gottlieb, 2016).

There is a tension between idealised forms of engagement (the "good" participant) and "unruly" citizens who disrupt, induce mess and "misbehave". For example, Gottlieb (2016) shows that vaccine critics often are silenced or marginalised since they are seen as not doing public engagement the right way. Following others (Michael, 2012; Davies, 2014; Mendel and Riesch, 2017), I believe it is important to attend to how citizens do not engage with science in 'the right way', this since it may challenge predominant forms of science communication. As Michael (2012: 529) writes, "[e]ngagement events can entail a range of happenings which, in one way or another, 'overspill' the empirical, analytical, or political framing of the engagement event". That is, "[l]ay participants 'misbehave' in various ways – they 'overspill' the parameters of the engagement event" (Michael, 2012: 529). 'Overspillings' can be understood as "those activities or actions that do not make sense within […] the framing of the engagement event" (Michael, 2012: 529).

Michael (2012) and Mendel and Riesch (2017) show that attending to citizens' misbehaviours – how they 'overspill' the parameters of the event – can shed light on hierarchies and tensions within public engagement initiatives. They interestingly mention affective matters such as irony, jokes and mockery as examples of citizens' misbehaviours (Michael, 2012: 532-533; Mendel and Riesch, 2017: 675).

I build upon STS insights about framings and overspillings to analyse how publics can confirm and overspill public engagement framings of how HPV vaccination should be discussed. By focusing on *affective* framings and overspillings *online*, the article contributes to the discussion on feelings in public engagement with science (Davies, 2014), and on fear, anxiety and trust in vaccination politics (Leach and Fairhead, 2007; Gottlieb, 2016).

Digital mediation and public feelings

Within the social sciences, during the latter years there have been an increased attention towards affect, emotions and feelings. Many theorists separate these notions from each other. Notably, for cultural studies scholar Massumi (1995: 88) they are conceptually distinct as they "follow different logics and pertain to different orders". According to Massumi, affect is a pre-personal bodily intensity and force that exists outside of social signification. It is an unpredictable excess, something "*more than* discourse" (Seigworth and Gregg, 2010: 24, emphasis in original). Feelings, on the contrary, are, according to Massumi (1995), personal experience and emotions, finally, are the communication of feelings and are social and public. Here "affect is a 'non-conscious experience of intensity', which permits feeling to be 'felt' and subsequently transcribed into emotion" (Papacharissi, 2014: 21). In line with this conceptualisation of affect, scholars have started to explore social media as "more than" discourse; as a site of intensity, sensations, force and excess (Papacharissi, 2014; Hillis et al., 2015).

I believe it is productive to discuss affect as intensity. Helpfully, Papacharissi (2014) conceptualises public engagement as 'civic intensity'. Papacharissi (2014) shows that social media platforms can *intensify* "public feelings of engagement" (Papacharissi, 2014: 8), this since they allow citizens to *affectively attune* to public politics. Affect as civic intensity, thus, allows feelings to be "felt". Feelings of engagement, I argue, are enabled by processes of (digital) mediation (Kember and Zylinska, 2012), this as these allow for civic intensities. Worth noting, however, is that this does not mean that the Facebook platform *itself* intensifies public feelings of engagement. Rather it is in the meeting between – the relationality of – the platform and humans that feelings can be intensified and invoked. In an STS spirit, I am interested in the specificities enacted by material-semiotic relations (Haraway, 1997; Law, 2009). More specifically, I am concerned with how public feelings are relationally mediated when science communication and vaccine debates move online.

I also draw upon STS inspired device perspectives to digital media (Gerlitz and Helmond, 2013; Weltevrede et al., 2014). Broadly speaking, a device perspective explores the interplay between technicity and humans. Within this approach, devices can be understood as material patterned arrangements that "assemble and arrange the world in specific social and material patterns" (Law and Ruppert, 2013: 230). Using a device perspective helps me to analyse the digital mediation of feelings since it provides tools for analysing the performativity of specific digital features (digital devices). One central aspect of Facebook communication is people's use of the comment feature. That is, people write comments, and they respond to each other's comments. Moreover, they communicate by using the like and share feature. All of these human-technology actions – material-semiotic relations – *do* things, such as mediating public feelings of engagement. By combining a device perspective with Papacharissi's (2014) focus on social media as an arena for public feelings of engagement, it is possible to analyse how digital devices invite citizens to affectively attune to public issues like HPV vaccination. For example, the comment feature is a device that invites citizen to engage with public issues. Reading an affectively formulated comment can invoke a bodily intensity that attunes you to engage with public issues in an affective manner. Such engagement can then, for example, take the form of writing that you are angry, upset or happy (and/or that you click "like"). Therefore, the comment device, as well as the like and share devices, can be argued to mediate public feelings of engagement.

The study and empirical material

The selection of empirical material used as the basis for this article consists of six interviews with communicators, epidemiologists and nurses who worked with the "I love me" campaign (I have interviewed the majority of the professionals who were involved in the work with the "I love me" campaign), and the material from the Facebook site. The latter consists of 537 screenshots of status updates and comments taken by me. To allow for anonymity, I have coded names, organisations and places. This body of empirics is part of a larger project on HPV vaccination health communication initiatives in Sweden (Lindén, 2016).

The Facebook site was part of a larger "I love me" campaign which included posters on public transportations, a vaccination tour to high schools and pamphlets sent home to girls and parents. The campaign was running between 2012 and 2016, and its Facebook site existed between 2012 and 2013. People did not need to be granted access to read and comment on the Facebook site.

I have taken inspiration from ethnographies which follow communication online (Hine, 2000), and that sometimes combines this with offline methods, such as with interviews (Sade-Beck, 2004). However, I did not participate in the communication on Facebook myself, this since I accessed the data after the site was publicly closed down (to enable access, the concerned county council temporary added me as a site administrator). Due to the same reason, I collected all the empirical material at one occasion, instead of observing the communication over time. My approach can be understood as what Haraway (1997) defines as an 'ethnographic attitude'. This is a mode of theoretical and practical attention where one does not "take sides" in a predetermined manner, but instead puts oneself at risk (one's subjectivity, views, etc.) in the meeting with others.

I have used analytical coding to identify similarity and difference in the empirical material. In this process, I have attended closely to the role of digital devices, and how feelings were provoked by such devices. Analytically I have separated between a vaccine critical public and girls, young women and parents supportive of the campaign and the vaccination. I am aware of that this risks reducing differences within the concerned groups. Moreover, I have not included actions, such as comments and likes, that are difficult to locate as either support or critique. While more ambiguous cases exist, the dialogue on the site was, in fact, to a very high degree strongly divided between supportive girls, young women and parents, on the one side, and critics, on the other (worth mentioning is that critics might have been parents, too, but most often this was not something they wrote about).

I start by discussing how the county council framed the "I love me" campaign. Then, I move on to discuss how the communication between the county council and citizens unfolded, and how different devices mediated this. I end with discussing what my study can say about the digital mediation of feelings in public engagement with science, and in vaccination politics.

A "positive feeling" campaign

In three campaign images posted on the Facebook "I love me" site in 2013, girls were accompanied by the phrases, "take care of yourself this summer!" and "get vaccinated against cervical cancer now", written in pink.[3] In another image, a similar photo of girls was accompanied by the text "Nothing is more important than you!", also in pink. Along with the image was the following status update posted: "Spread and share with your friends!". Sharing means sharing *on Facebook*. In these images, HPV vaccination is framed as something girls do to take care of themselves, and their friends. Moreover, getting vaccinated is framed as something that you ought to do now, as an urgency, to prevent something from happening later on, in the future.[4]

Several of my informants described the "I love me" campaign, including its Facebook site, in a similar way. One of them said:

> The basis of our campaign is that we want to empower the girls. We want to, you know, get them to feel and think that "I do something good for myself. It's my own decision, but if I do this I think about my own health and I do it for myself". That is, you know, what's behind the message of "I love me".

Here, as in the images above, getting vaccinated is viewed as something girls do for themselves. In a similar vein, another informant emphasised that the campaign communicates that it is "*your* body, what *you* think of it, I love myself, I love me". The county council wanted the campaign to, as one of my informants said, communicate "a positive feeling". Similarly, on the Facebook site, the county council described in the information about the site that they “want the site to have a nice and pleasant tone”. In sum, the “I love me” message was by the county council emphasised as a positive message about girl empowerment and love.

The county council’s idea with the “I love me” Facebook site was that they could post updates, and that girls, young women and their parents could ask questions and get answers from the county council or from each other. The county council, as my informants explained, envisioned these updates and questions to be about, for example, vaccine fear, as well as about where and how to vaccinate. A deficit model of public involvement in science was central: girls and parents were envisioned to lack knowledge about HPV vaccination, and more (accurate) information was thought to solve the problem. A deficit model was combined with an idea that information needs to be communicated *through* an affective message about love (and here, the “I love me” campaign share similarities with other HPV vaccine campaigns that combine affective and factual modes of address, see for example, Connell and Hunt, 2010). One of my informants explained this as a need for a “combination of messages” where some messages are “strictly fact-based” and others are focused on communicating feelings. This, combined, was by the county council hoped to decrease girls’ and parents’ vaccine fear.

The county council understood it as a problem when citizens used the Facebook site in ways that did not fit the county council’s framing of how communication *should* unfold. For example, one of my informants viewed it as a problem that citizens referred to the HPV vaccine critical site Mothers Against Gardasil. She said that “[e]veryone is allowed to think differently but sometimes it gets a bit … Perhaps it isn’t really things that are in accordance with our main aim that are posted on Facebook”. In a related vein, another of my informants said:

> [D]uring periods, it was many girls that were active and active in a way we wanted […] [T]hey could communicate with each other on this theme [i.e. e.g. where to get vaccinated] and they could ask us questions. “Where do I get vaccinated?”; “Is it dangerous?” […] [B]ut during long periods it was mostly disorder and a mess of different groups of people with different opinions that talked with each other. And that didn’t support the vaccination goal […] It wasn’t at use for the target group […] It became an arena for mud throwing.

Yet another informant said: “I can just think that it becomes so biased that it’s not balanced and, you know, scientific […] It’s a shame that it’s possible to distort science like that”. In these quotes, disorder and mess, mud throwing and Mothers Against Gardasil were seen as problems that complicated the possibility of having a dialogue with girls about matters that were in line with the aim and goal of the county council, and that were seen as helpful for the girls.

These extracts show that the county council wanted the Facebook site to facilitate *specific* forms of public engagement. The Facebook site was an arena for public governance, and this limited what citizens could say and do. Citizens who did not engage with HPV vaccination in the way the county council wanted were seen as distorting the good forms of public engagement. It was a “carefully choreographed form of engagement” (Lezaun and Soneryd, 2007: 282).

The county council eventually closed down the Facebook site since they believed it was not working as an arena for vaccination engagement. Perhaps above everything, this highlights how it was an arena limited by the county council’s framing for how citizens *should* engage with HPV vaccination science and information. When realising that things did not turn out the way they wanted, the county council – not the citizens – had the possibility to close down public engagement. This shows that, while social media enable citizen-expert dialogue, it is certainly not a given that such online dialogue holds up to its promise of opening up science for debate.

To summarise, the “I love me” campaign was framed by the county council as a “positive feeling” message about girl empowerment and love. The Facebook site was envisioned to combine such a positive and empowering message about love with a possibility for girls and parents to communicate with each other, and with the county council, about HPV vaccination concerns. Especially, this was hoped to allow the spread of accurate information, and the decrease of vaccine fear.

Mediating support

When the county council in the beginning of 2013 posted an update with the information that the vaccination was now given free to girls and young women up to age 26, some girls and young women wrote and asked about how, and where, they could get vaccinated. Also, girls and young women showed enthusiasm over the vaccination. For instance, the young woman Karin wrote: "Finally!!! Damn, this is good! The first shot already taken an hour ago ☺ Quick decisions, hurray!". The county council answered these questions and comments by writing information about vaccination locations, the safety of Gardasil, and through encouraging assurances. For example, they answered Karin by writing: "Awesome with action Karin! Great if you encourage your friends, too. Have a super great weekend ☺". Answers like these can be understood as in line with a framing of "I love me" as a "positive feeling" campaign that disseminates accurate information, and provides happy, empowering encouragements.

Many more girls, young women and parents confirmed the "positive feeling" message through enthusiastic comments. For example, as a response to a citizen writing that she has gotten vaccinated a young woman wrote: "U goo girl!!!! […] I have taken the shot and I feel so good…". In line with the governmental framing of the "I love me" campaign, this woman defined HPV vaccination as a case of empowerment ("U goo girl!!!") and as something positive ("I feel so good"). Just a few minutes after this comment was posted, another woman named Annie wrote that she has been afflicted by cervical cancer and that it, therefore, is a given choice for her to vaccinate her daughter. She ended her message with "Cancer sucks!!". Further down, she continued:

> How AMAZING that this is for women […] I who have had cervical cancer and have had surgery, I'm HAPPY and relieved that my daughter can protect herself from having to go through the same thing. […] How could I as a mother and my daughter say no to that[?] Hurray, kill the cancer!!!!!

Here, comments such as "AMAZING", "I'm HAPPY and relieved" and "Hurray, kill the cancer!!!!!" communicate that HPV vaccination is something desirable and good, and that it is a positive, happy message that one can protect oneself or one's daughter against cervical cancer. This is mediated through the comment feature on Facebook.

The girls, young women and parents who wrote that they were happy, relived and felt "so good" did so as responses towards other citizens' comments, and in response towards the county council's status updates. For instance, Annie who wrote that the vaccination was "AMAZING" wrote this in explicit dialogue with other citizens on the Facebook site that, according to her, "are negative or suspicious". Similarity, the woman who wrote that she felt "so good" did so in response to a citizen who wrote that Gardasil does not protect against cancer. As these two women did, supportive citizens mainly answered critics, not by writing angry comments back, but by stressing how good they felt, and how awesome the vaccination is. Importantly, while affective ways of engaging with HPV vaccination information was mediated through the comment feature, citizens' ways of engaging with each other *through* this device was important. It allowed citizens to, in text, respond to others' comments, status updates etc., and that communication between citizens was a crucial aspect of how public feelings of engagement were evoked.

How supportive and critical citizens responded to each other's comments indicates how affect can work in relation to the comment feature. As a device, the comment feature allows for affective engagement as it enables people to write that they, for example are "HAPPY and relieved" in response to a public issue. On the "I love me" site, such comments likely invoked bodily intensities and sensations that *attuned* citizens, when reading the comments, to (further) engage with HPV vaccination matters affectively (by, for example, responding that they, instead, are angry or upset or by "liking" the comment). Therefore, I argue that the comment device mediated public feelings of engagements.

I argue that the comment device not only mediated, but also intensified, feelings of engagement. One way to intensify feelings of engagement is to use different ways to indicate the message's emphasis. In the above-mentioned examples, citizens used, at least, three such techniques: upper-case lettering, punctuation and emojis. Through upper-case lettering ("AMAZING") and through the use of several exclamation marks ("U goo girl!!!!") the enthusiasm – just *how* amazing, great or awesome it was – was emphasised. Since these techniques, through the comment device, enabled the citizens to more strongly and forcefully emphasise HPV vaccination concerns, I argue that they intensified public feelings of engagement.

As Scheible (2015: 10) argues, the practice of punctuation, such as how people use exclamation marks, has in the digital era shifted from being about linguistic clarity, to a means to enrich viewer and reader responses. Also, emoji has been transformed into a punctuation mark used to indicate the affective state of a message (Baym, 2015: 68). Hence, punctuation marks register feelings and expressivity. They "help us hear how text might sound if it were to be spoken" (Scheible, 2015: 10). Based on this, it is possible to see how comments such as "AMAZING", unconventional uses of punctuation ("!!!!!") and emojis may intensify people's feelings of engagement. Reading a comment such as "AMAZING" or "!!!!!" does something to you; it attunes you to – encourages you to – respond back in an affectively engaged manner. On the "I love me" site it seems to have provoked further affective engagement and public feelings of engagement. Here, the use of exclamation marks, emojis and upper-case lettering can be defined as *digitalised literary devices*. Such devices, I argue, can mediate, intensify, enact and transform feelings.

I have shown how the county council's framing of a "positive feeling" campaign was confirmed, and intensified, through enthusiastic and positive comments. Such comments were written in response to the county council's status updates, or to others' comments, and were mediated by the comment feature and digitalised literary devices. I will, among other things, continue to analyse the comment device and digitalised literary devices in the next section. In this section, I turn to how comments from vaccine critics were mediated.

Mediating criticism

A vaccine critical public used the Facebook site to pursue critique. As an example, a man wrote a response to the already mentioned mother Annie who had previously expressed enthusiasm over HPV vaccination. He wrote:

> Gardasil does not protect against cervical cancer … It protects against 4 out of 120 HPV viruses. And it is not at all clear that HPV viruses lead to cancer. Therefore, it is *insane* to pursue mass vaccination like it is done here. Annie, what do you know about all the *awful* ingredients that are a part of the Gardasil vaccine? […] It is *senseless* that this continues (emphases added).

In stating that Gardasil only protects against certain strands of HPV viruses (i.e. HPV type 6, 11, 16 and 18), this man drew upon 'science-as-epidemiology' (Leach and Fairhead, 2007) to critique HPV vaccination as a population-level state intervention (as he wrote, a mass vaccination). By stating that, since Gardasil does not protect against cervical cancer, mass vaccination is *insane* and *senseless* (and that the ingredients in Gardasil are *awful*), this citizen critiqued the scientific basis for the vaccination through an affective comment. In contrast to how the county council framed Gardasil as a vaccine against cervical cancer, and not against HPV, he argued that since Gardasil only protects against some HPV viruses it is insane and awful with mass HPV vaccination. In a similar vein to this citizen, others wrote that the vaccination, and the campaign, were "horrifying", "awful" and "outrageous". All these critical comments were written as responses to the county council or to supportive comments. This is important as it shows how the comment device can *attune* citizens, such as vaccine critics, to critically engage with public issues.

Interestingly, while vaccine supporters – such as the mother Annie who I mentioned in the last section – often drew upon personal (often parental) experience, critics seldom did so. Instead, and as the citizen above who wrote that "Gardasil does not protect against cervical cancer" did, they often disputed scientific evidence about HPV vaccine safety and efficiency through affective comments. As Durbach (2006) writes, radical vaccine critical groups do not always draw upon personal experience. Instead it can be out of, for example, political, religious and/or health-related reasons citizens resist vaccinations. Still, it is nevertheless common that also radicals draw upon personal experiences (Blume, 2006; Hobson-West, 2007). In that regard, the critical public on the "I love me" campaign stands out as different.

Many vaccine critical actors used upper-case lettering, punctuation and emojis as, what I have defined as, digitalised literary devices. For instance, as part of another commenting thread, a citizen stated "IT'S ENOUGH NOW!!!!!!!!!!!!", implying that we need to stop vaccination as it hurts people. Another citizen wrote to the county council was "AWFUL!". As with the enthusiastic and positive comments, these citizens used upper-case lettering and serval exclamation marks, and I argue that these digitalised literary devices mediated feelings of engagement. Moreover, they were not only mediated, but also intensified. Stating that the county council was "AWFUL!" – and not simply "awful" – just *how* awful the county council was, was intensified. Moreover, the use of exclamation marks and upper-case lettering in the comment "IT'S ENOUGH NOW!!!!!!!!!!!!" indicates that the commenter was *very* upset. Such digitalised literary devices help the reader to hear how the comment might have sounded if it would have been spoken, and in doing so they mediate and intensify feelings. They help intensify the affectivity of a comment.

Another by vaccine critics frequently used digitalised literary device was irony. Perhaps it can be questionable whether this is a device, but I argue that such conceptualisation helps attune to irony as a digital technique frequently used by, for example, marginalised actors in political online practice to critique dominant political orders (Rone, 2009). One form of irony used on the "I love me" site was to comment that the county council was joking. For example, in one thread, a citizen reacted when the county council wrote that HPV vaccination lack severe side-effects. "Funny joke! […] You don't fool anyone but yourself!", the citizen exclaimed. Here, "funny joke", of course, means the opposite: it is *really not* funny. HPV vaccination is something dangerous and awful, it is *not* funny. To exemplify with another example, in a comment, the county council stated that if a pharmaceutical would be proved dangerous it would become prohibited by the Swedish Food and Drug Administration. A citizen replied: "Hahaha, today's joke". These citizens used irony to position themselves as the ones who understood that it is all a joke, and the ones that had the true HPV vaccination knowledge.

Here, irony can be understood to intensify public feelings; it encourages citizens to further engage affectively with HPV vaccination issues. Through laughter, mockery and humour, vaccine critics responded to the county council's updates by treating them as funny jokes. In doing so, they presented the county council as *amusing* rather than as an actor worthy of taking seriously. In using such 'humorous technique' (Malmqvist, 2015) to disqualify the county council's updates, the vaccine critics use of irony is similar to that described by Mendel and Riesch (2017). Mendel and Riesch's (2017) analysis illuminates mockery, irony and laughter as central aspects of civic resistance towards online science communication campaigns.

Not only the HPV vaccination, but also the "I love me" message was critiqued through irony. For example, as a comment to a discussion about an image uploaded by the county council of an eye with colorful make up, a citizen wrote: "The image illustrates the thread very well. The common denominator is well painted". Here, through ironic language, it was implicated that the county council, and citizens supporting the county council, "paint over" the truth with nicely done make up, and a nice-looking image. Similarly, another citizen wrote: "Look at how pink, happy and lucky you become when you get vaccinated!", followed by a comment that the campaign is advertising that tax-payers have to pay for. This, of course, means that opposite: you will *really not* become that happy and lucky, the citizen communicates. In these examples, HPV vaccination as a population-level intervention is critiqued through irony, and it is implied that the county council hides the truth about HPV vaccination behind a pink, positive and happy message.

A final example of irony I want to bring up is how trolling and hacking were mediated. Critics repeatedly wrote that the people from the county council commenting on the "I love me" site in fact were trolls – and that the site was hacked. For instance, a citizen wrote that "one could just as well call an automatic answering machine – it is only so-called trolls answering the questions on this site". Another asked: "Is this thing hacked?". When the county council replied that the site was not, the same citizen simply wrote "NO". Quite interestingly turning things around, the vaccine critics who by others in vaccination literature often are accused for hijacking health communication platforms and acting as trolls (Wilson and Keelan, 2013), did in these comments accuse the county council for being the true hackers and trolls. These citizens were, by turning things around, 'misbehaving' by playing with dominant discourses about how vaccine critics act online as trolls and hackers.

Since they are online phenomena, the references to trolling and hacking are good examples of specifics in how irony might be invoked online. On the "I love me" site, comments about trolling and hacking were used in a manner similar to what Mendel and Riesch (2017) describe as a position of a gadfly. By repeatedly writing short comments such as "Is this thing hacked?", critics acted somewhat as a "swarm of gadflies biting at the campaign in order to spur it on to different things" (Mendel and Riesch, 2017: 679). The critics position of being gadflies was an affective engagement that served to mess with the county council's framing of HPV vaccination, and that urged the county council to respond (including that they eventually decided to close the site down).

In sum, critics used the comment feature on Facebook to mediate that the HPV vaccination and the "I love me" campaign were problematic. They "misbehaved" by arguing that the campaign's "positive feeling" message hides the truth about HPV vaccination as an awful and insane population-level state intervention, and they used a range of digitised literary devices (such as punctuation and irony) to do so. With my focus on digital mediation through the comments feature, including how it enabled different digitalised literary devices, I have, so far, ignored two of the most obvious Facebook devices: the like and share features. I now turn to these.

Likes and shares as mediators

Earlier I mentioned one comment where a critic wrote that it is "horrifying" with HPV vaccination. This comment was the one that generated the most likes (22 likes) as part of that specific thread. In contrast, enthusiastic comments from girls, young women and parents, and responses from the county council, received only one or two – and even zero – likes. Yet, the status update from the county council that generated the above critical comment got 409 likes, something which also was the highest amount of likes during the time the site was running. In addition, it received 246 shares.

How to understand this? Similar to emojis, punctuation and upper-case lettering, like and share features mediate communication (Gerlitz and Helmond, 2013), including affective communication (Peyton, 2012). Moreover, to like and share on Facebook is translated into a visual numeric representation. As Gerlitz and Helmond (2013: 1360) argue, on Facebook "numbers have performative and productive capacitates, they can generate user affects, enact more activities and thus multiply themselves". The like and share features mediate communication through numbers, and such numbers can mediate feelings of engagement and can enact further engagement.

The number of likes on the critical comments in the above example is an 'overspill' from how the county council framed the Facebook site. While the county council wanted the site to have a positive feeling about sharing and liking a message about love, it was the critical comments – which did not confirm to the positive feeling of "I love me" – that were liked. In general, critical comments received more likes than the ones in line with the county council's framing. While it is impossible to know if all these citizens clicked on the like button because they in fact liked a critical comment, the act of clicking is performative and can, notwithstanding the intent from the citizen who clicked "like", serve to confirm the importance of a message. Moreover, as Papacharissi (2014: 25) writes, "affective attunement demonstrated through liking a post on Facebook […] is indicative of civic intensity and thus a form of engagement" (Papacharissi, 2014: 25). Just as digitalised literary devices do, likes affect the intensity of a message, and of a commenting thread. They can be understood as a matter of civic intensity in how they can intensify public feelings of, for example, HPV vaccination being horrifying, awful or awesome.

Citizens made use of the Facebook features differently. It seems that many citizens supporting the campaign and HPV vaccination did not engage in the conversation through likes or through comments. Likely many citizens clicked "like" on status updates and sometimes shared a message to enable more friends to get vaccinated, but perhaps they did not do more than that. This is different from the vaccine critical public who quite extensively commented on status updates, and that liked other critical comments. Therefore, while criticism seems mainly to have been mediated through comments and likes, support of the campaign and the vaccination was probably to a high extent done so through shares.

It can be assumed that the share and like buttons transformed the communication. It is assumingly easier to dare to criticise when knowing that other citizens out there support your politics. The like button mediates such support. A high number of likes of critical comments, thus, helped to intensify vaccine critical engagements. Similarly, the share button, through its wide 'reach' (Baym, 2015) to others' walls and to other platforms, likely helped to intensify engagement with the idea that HPV vaccination and the campaign were positive and desirable matters.

Discussion: public feelings and mediated engagement

In this article, I have built upon STS insights about framings and overspillings in public engagement with science, affect theory on the mediation of feelings and a device perspective to social media to show how citizens confirm and overspill public engagement framings. I have analysed how a Facebook campaign for HPV vaccination communication entitled "I love me" was framed by the concerned county council as a "positive feeling" arena where love was to be shared and liked (and fear was to be counter-acted), and where girls and parents were to ask questions about, for example, vaccine safety. In focusing on framings and overspillings, I have analysed how many citizens confirmed the framing of the "I love me" as a "positive feeling" message through enthusiastic comments about how great the campaign and the vaccination were. I have also shown how vaccine critical actors 'overspilled' the county council's framing by arguing that the vaccination and the campaign were upsetting and horrifying, and that the county council, through the campaign, hid the truth. Moreover, I have attended to how different digital devices (punctuation, emojis, upper-case lettering, irony, likes and shares) affected the intensity of commenting threads and spurred further public engagement.

My analysis shows how the digital mediation of feelings can be central to citizens' engagements with science. This differs notably from the work of Papacharissi (2014) on 'affective publics' in online protest movements as my study highlights affective expression within a setting of governmental politics and public engagement with science. One important result from my study is how public feelings of engagement, mediated through digital media, can help to confirm the legitimacy of public health state interventions, and to dispute the same. By commenting that the vaccination was "AWESOME", by sharing the "I love me" message and by liking vaccine critical comments stating that the mass vaccination was insane, I argue that public feelings of engagement were mediated, and, often, intensified.

One central form of mediation is devices. I have introduced the notion of *digitalised literary devices* as a way to analyse how punctuation marks, emojis and upper-case-lettering can intensify public feelings of engagement. I emphasise that these devices are *digitalised* as this denotes how quite mundane literary habits, such as the use of punctuation, have been transformed through the digital era. I have also discussed how the like and share features mediate public feelings of engagement by making numbers performative. Importantly, in mediating public feelings of engagement, digital devices can allow publics to come into being through engagement with issues online, and enable them to confirm and overspill governmental framings of public engagement with science.

This article adds to research on science communication online (see Davies and Hara, 2017) through its focus on civic intensities as important to understand how digital media mediate public feelings of engagement. Moreover, it adds to social studies of vaccinations (see Leach and Fairhead, 2017; Gottlieb, 2018) through it focus on affective mediation rather than, primary, feelings of fear, anxiety, trust and parental love. On the "I love me" site, while the county council framed HPV vaccination as a matter of love and fear, citizens' engagement on the Facebook site included a multitude of feelings. As this case illustrates, citizens' engagements can sometimes be understood through specific feelings, such as love and fear, but often they can be more productively understood as civic intensities that allow diverse feelings to be "felt". Therefore, I argue for the productivity of an approach to health and science communication that attends to civic intensities as important for understanding the digital mediation of public feelings of engagement[5].

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Notes

1 Cervical cancer is associated with specific HPV types, most frequently types 16 and 18. These are the two types Gardasil, and the other vaccine Cervarix, vaccinate against. Also, Gardasil vaccinates against HPV types 5 and 11, which are associated with the development of genital warts.

2 Vaccine critics' critique of the county council's representation of girls as happy and pink is partly reminiscent of media scholars' and sociologists' critique of HPV vaccination campaigns as representing a neoliberal and gendered imagery of girl empowerment (Davies and Burns, 2014; Mamo et al., 2010).

3 All empirical material has been translated from Swedish into English by me.

4 As in these images, the "I love me" campaign tended to frame Gardasil as a vaccine against cervical cancer, and not against HPV. Such 'cancer frame' side-lines sexual politics (Mamo et al., 2010). As Maldonado Castañeda (2018) argues, a 'de-sexualization' of cervical cancer has been common in the public framing of HPV vaccination.

5 The HPV vaccination politics mobilized by citizens on the "I love me" site partly differed from how HPV vaccination has been discussed elsewhere. While citizens who supported the campaign and the vaccination tended to frame HPV vaccination in line with how it is often presented as a girls' choice (Mishra and Graham, 2012), critics tended to frame the vaccination as a matter of illegitimate population control. Thus, the critics differed from how HPV vaccination elsewhere has been discussed as a case of an individualization, yet gendering, of risk and girlhood (Wailoo et al., 2010; Davies and Burns, 2014). Critics were not primary concerned with politics of gender, such as questions of why girls, and not boys, were positioned "at risk" for cancer. Rather than critiquing neoliberalism and gender politics, their actions and statements echoed a long history of citizen mobilization against population-level vaccination, and for individual freedom (Colgrove, 2006).

Science Blogs as Critique—
Building Public Identities in the Field of Translational Research

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Abstract

Clinician scientists are pivotal figures in translational research. Although the discourse on translational research is favorable to clinician scientists, their role within it and their view of themselves has received little attention. In this exploratory study, we analyze the view of clinician scientists on translational research by drawing on surveillance studies and the pragmatic sociology of critique and examining the potential for critique of science blogs. From analyzing science blogs and the blogging selves they represent, we find a fundamental dilemma of being torn between the two worlds of clinic and research. Although translational research seeks to support clinician scientists, it intensifies this conflict even further. The arguments of clinician scientist-bloggers are emotionally charged with feelings of contradiction, unpredictability, and skepticism. These feelings undergird a critical agenda that shows indignation as the result of being a pivotal figure in the discourse on translational research.

Keywords: translational research, clinician scientists, science blogs, sociology of critique, sociology of professions, science communication, public identity

Introduction

Calls for fundamental changes in the organization of research practices in the biomedical field are clearly discernible, and the calls to enact these changes are notably directed at clinician scientists. Claims of serious deficits in the innovation process and of inefficiencies in research practices ('waste') have been brought forward and linked to roadblocks in the translation from research findings into effective clinical practice and the other way round. Commonly referred to as a 'translation gap', a more general shift in the discourse is apparent that emphasizes the term 'translational research' (Contopoulos-Ioannidis et al., 2003). The starting point of translational research is the problematization of current practices in the health care innovation system by especially paying attention to transition stages between basic research, clinical research and public health. In that regard, multiple stakeholders refer to translational research in order to address questions regarding the reorganization and improvement of biomedical research practices. These questions range from methodological, e.g. regarding reproducibility or randomization of experiments, to organizational, e.g. regarding interdisciplinarity and interorganizational communication, to regulatory issues, e.g. regarding guidelines based on meta-reviews or additional funding for regulatory staff. For these questions one group of actors promises to hold the necessary interactional expertise and to carry the translational shift: clinician scientists. Fulfilling two roles at once, the clinician scientist is perceived as the essential conduit between biomedical research and clinical practice (Lemoine, 2008).

The expectation of fulfilling two roles in one is an excessive demand on everyday practice and results in "situations of crisis" (Boltanski and Thévenot, 1999) for individual clinician scientists. Solutions to the crises are left to the individuals, due to the fact that clinician scientists do not represent an independent profession with institutional platforms, e.g. the Office of the Profession in New York (US) (http://www.op.nysed.gov/), (educational) departments and systems, or rules of professional conduct for justifying needs and concerns. However, one platform where such professional issues can be discussed and observed are science blogs, of which there are a sizeable number authored by clinician scientists. Multiple studies have called attention to the fact that blogging contributes to the empowerment (Farrell and Sides, 2010; Farrell and Drezner, 2008) and development of professions (Ezzamel, 2013; Bodell et al., 2009).

Our interest lies in how clinician scientists participate in the discourse on translational research and how their role as clinician scientists is performed by speaking out with respect to their individual crises as a form of critique. An active community of clinician scientists publicizes their daily working practices, challenges and tasks in the context of translational research on science blogs. In the tradition of science communication research (Bucchi, 1998; Shanahan, 2011; Bonetta, 2007; Kouper, 2010), we focus on the meaning of new media forms for scientific practice. We provide an exploratory analysis of these blogs with respect to three questions: How do clinician scientists describe and problematize their position? How do they contribute to the discourse on translational research? How do science blogs provide a venue for critique in the public context of translational research? In answering these questions, we contribute to the ongoing debate on the role of new forms of science communication, such as science blogs, in building public scientific identities. Following a neo-pragmatist perspective (Boltanski and Thévenot, 1999, 2006), we performed a three-tiered analysis disclosing self-images of clinician scientists: We find that (1) clinician scientists see themselves in a dilemma between the two worlds of clinic and research, leaving them too little time to be simultaneously successful as researchers and as clinicians. (2) Translational research as a professional framework remains vague and devoid of guidance for translational practice, thus, exacerbating this conflict. (3) Being a pivotal figure in the discourse on translational research, blogging clinician scientists present themselves as affected by contradiction, unpredictability, and skepticism. As a result, their professional agenda is articulated in a mode of critique based on indignation.

The crisis in biomedical research and the emergence of translational research

The discourse on translational research has its roots in the USA, which is well reflected in the development of the journal landscape on translational research in biomedicine (Blümel et al., 2015). As such, the recent history of translational research is strongly tied to the North American context, from where it has spread globally over the last two decades. The wide spread has, partly, been made possible by the fact that the term translational research remains unspecific and malleable (Butler, 2008). Translational research functions as an *empty signifier* in most situations, for instance, as it does not contain any specific practical advice for 'doing translation'. Translational research as a research framework has thus developed an overall global character. Its compatibility allows various stakeholders from different nations, institutions, and research fields to take part in the discourse and to voice their agenda through translational issues (Krüger et al., 2018).

A brief history of the emergence of translational research within the last four decades has to take note first of increased efforts and investments into research and development (R&D) in the field of biomedical research while simultaneously the output of novel therapies has been declining (Wehling, 2008; Center Watch, 2016). Investments in R&D in biomedicine rose from $13,6 billion to over $27 billion from 1993 to 2003 and led to higher expectations for innovation, which has largely resulted in disappointment (Kraft, 2013; Pisano, 2006). Diagnoses of innovation deficits in the pharmaceutical industry and of declining approval rates for drugs and therapies have been prominently cited since the 1970s (Kraft, 2013). The National Institutes of Health (NIH), the US medical research agency, problematizes this issue by stating that "[a] novel drug, device or other invention can take about 14 years and $2 billion to develop, with a failure rate exceeding 95 percent" (https://ncats.nih.gov/about). As a consequence, the improvement and acceleration of the translation from research findings into clinical practice has become one of the most important issues in biomedicine "as one of the reasons for this widening gap between input and output is the difficult transition between preclinical ('basic') and clinical stages in the R&D process" (Wehling, 2008: 1). These unique developments indicate fundamental changes in the way research is organized in the biomedical field. How to improve translation has thus become a prominent question with the spotlight on the transition from preclinical to clinical research and practice.

The issue of translation is controversial, and an expanding literature identifies various problems and possible causes for the lack of translation. Friese (2013) found that providing quality care for laboratory animals is a crucial dimension for the translation of pre-clinical research into clinical practice. Another much discussed example focuses on waste that results from a lack of quality standards in biomedical research studies. Especially influential in that regard was a series of articles published in The Lancet under the headline "Research: increasing value, reducing waste" in January of 2014 (see https://www.thelancet.com/series/research). A limited number of specific roadblocks for successful translation were emphasized and attributed to lack of methodological skills, research design and analysis (Macleod et al., 2014), publication bias towards the publication of positive research results (Glasziou et al., 2014), decisions about research funding (Chalmers et al., 2014), issues in research management and regulation (Salman et al., 2014), and the role of fully accessible information of biomedical studies (Chan et al., 2014). Recommendations for solving these problems are as varied and numerous as the multitude of issues in the discourse on translational research in general. The stratified nature of the discourse, comprised of heterogeneous sets of definitions of the problem(s), of causes for failing translation, and of necessary measures creates fertile ground for attempts to reduce or shift this multilayered discourse towards unitary concepts that promise to cut through the tangled and puzzling discursive situation. A solitary figure, such as the clinician scientist, promises to be responsible and effective in managing the seemingly unmanageable complexity in translation and thus provides an attractive one-size-fits-all solution (Hendriks et al., 2018).

The clinician scientist

Who are these clinician scientists and why do they seem so promising at cutting through the layers in the discourse on translational research? In the simplest case, clinician scientists are those rare professionals in the biomedical field holding both an M.D. and a Ph.D. who also work both in clinical care and medical research. Ideally, the time between both areas is evenly split. In general, a more specific and agreed upon job description is not available, and the definition of clinician scientists varies between different national and thus regulatory contexts as well as between different training and funding programs based on specific institutional strategies. However, in order to set a rather consistent definition who clinician scientists are, we follow Zemlo et al. (2000) in defining those individuals as clinician scientists who are working in the clinic, at the bedside, while also performing and understanding research as an essential activity in their professional role, at the bench. As such, clinician scientists represent a minority as most scientists producing knowledge relevant to clinical healthcare are not active in clinical practice and most clinicians have no practical link between their work with patients to relevant research projects (Lander et al., 2010).

The practical link between research and clinic provides the source for the clinician scientist' status as the essential conduit to translation. In contrast, 'pure' scientists and clinicians seem to be lacking the necessary interactional expertise to bridge the translational gap. Policymakers and educators have discussed the clinician scientist in this key role for translational research intensively (Garrison and Deschampes, 2014) and a focus on the professional role of clinician scientists has spread from the United States to various countries in Europe—especially Germany (DFG, 2015) and the United Kingdom—as well as to Asia (Woo et al., 2011; Sakushima et al., 2015). As a consequence, educational programs to develop clinician scientists as a professional group and targeted funding strategies were implemented. The overall expectation is that clinician scientists "are able to bring their research from bench to bedside, and they are also uniquely capable of doing the reverse—incorporating results of clinical studies into new research and treatment approaches" (Roberts et al., 2012: 267). Thus, we find an increasing demand within science policy to (re-)professionalize the clinician scientist (Vignola-Gagné, 2014; Vignola-Gagné et al., 2013).

Although the clinician scientist is perceived to be the one capable of successfully translating research findings into clinical practice, the number of clinician scientists is still low (Milewicz et al., 2015). The proportion of physicians engaged in research in the US declined from 3.6% in 1982 to 1.6% in 2011 (Morel and Ross, 2014), but different funding and training strategies to promote the clinician scientist aim at counteracting the decline. To put these numbers in context, some historical developments are helpful: Combining research and medical practice has a long tradition, with roots going back to classical antiquity (Schafer, 2009; Rosen, 2011). Until the 1970s, biomedical and clinical research were tightly linked, and research was mainly performed by clinicians. Medical research was mostly done by so-called physician scientists, who were also responsible for patient care (Butler, 2008; Roberts et al., 2012). The number of clinicians in research decreased from the 1970s onward as a result of structural changes: "[B]iomedical research emerged as a discipline in its own right, with its own training. The bulk of biomedical research is now done by highly specialized PhD scientists [...]" (Butler, 2008: 841). Biomedical research and medical practice got separated, and the clinician scientist became a minority.

Many stakeholders saw the marginalization of the clinician scientist as a challenge and called attention to the problem that they might completely disappear. James B. Wyngaarden—who would later become director of the NIH (NIH, 2015)—was the first to raise awareness of the tremendous decline in the number of research training fellowships for M.D.s (Wyngaarden, 1979; Garrison and Deschampes, 2014). In 1984, under the headline "The End of the Physician Scientist?", Gordon N. Gill pointed to economic and intellectual changes that made research much less attractive for young physicians, causing further decreasing numbers of clinician scientists. Physicians who engaged in research had increasingly been drawn to laboratory research (Gill, 1984; Garrison and Deschampes, 2014). The situation seemed unchanged in 1999 when Leon Rosenberg wrote that "there is a defect in the structure of the country's medical research edifice, which must be repaired soon [...which is...] the progressive, dangerous decline in the number of physician-scientists" (Rosenberg, 1999: 331). Rosenberg found a growing burden on medical school graduates, an increased length of postdoctoral training, and an instable research career to be the main factors for the decreasing number of physicians participating in biomedical research (Rosenberg, 1999).

The decline of clinician scientists has been analyzed as a problem that had either individual (Löwy, 1987; Lemoine, 2008; Kraft, 2013) or structural (see e.g. Morel and Ross, 2014) causes, but few studies explicitly dealt with how clinician scientists portray their role in the wider biomedical research environment, especially in the context of translational research. In that regard, the study from Wilson-Kovacs and Hauskeller (2012) addressing the clinician scientist' self-image in the biomedical research context is relevant. Their case study analyzes how clinician scientists in stem cell research in Germany and the UK portray, explain and justify their role in the clinical research environment. Furthermore, Vignola-Gagné (2014) discusses the paradigm shift to translational research as a cause for self-empowerment of clinician scientists and the work from Brosnan and Michael (2014) addresses the centrality of the clinician scientist figure in visions for translational neuroscience.

More frequent are studies discussing how physicians as a profession are challenged by new concepts of quality and quality standards that are entering the field of biomedical science. Translation is thus but one of the notions that challenge the quality of biomedical research. To give some examples, the study from Fisher (2008) shows how neoliberal mechanisms change the concept and routines of clinical trials and thus the role of the investigators within it. Timmermans and Angell (2001) discuss how the notion of evidence based medicine (EBM) as a quality concept affects the training of medical students. They find that EBM triggers a 'paradigm shift' in training physicians from a rather authoritative education model towards a more sophisticated model, leading to new forms of uncertainty in the daily practice of physicians. More historically oriented, Marks (1997) who studies how the upcoming 'well-controlled' study design in the context of clinician trials challenged the credibility of the trained investigator.

We follow up on this line of research by drawing attention to those challenges to the medical professions that refer to translational research. Since clinician scientists take center stage in the discourse on translational research, their self-image is of strategic importance and can give insights into hurdles and barriers regarding their professional situation and development. The few clinician scientists giving voice to their profession have a high probability of being heard in the wider context of translation and of influencing the construction of problems and solutions in the discourse. We thus ask how clinician scientists portray themselves, what kinds of problems they experience, and how they criticize their biomedical research environment? Answering these questions empirically with an explorative approach by analyzing blogs from clinician scientists allows us to provide insights regarding the ways clinician scientists present a professional self-image and regarding the potential of blogs to provide forms of critique in a digital media ecology.

Decentralized panopticism and critique from blogging selves

We construct our identities in a media ecology and in societies that have seen significant technological change. Many have argued that the technologies through which we present, represent, and ultimately know ourselves are so pervasive as to amount to societal conditions of visibility (Brighenti, 2007; Turkle, 2005), surveillance (Lyon, 2014), and vigilance (Staples, 2013) that can be called decentralized panopticism (Hörl, 2011; Maasen and Sutter, 2016). Our subjectivity emerges more and more through interactions with technological objects and networked platforms: smartphones, computers, implants, trackers, Facebook, blogging, etc. (Maasen and Sutter, 2016: 176). These put us in heterogeneous actor networks that are characterized by spatio-temporal immediacy (Thompson, 2005). Our communications have audiences beyond our accustomed frames of reference in social space and time (Lyon, 2014). As a consequence, our subjectivity and our identities are the product of collaborative cultures of users in which we participate and which we control through our "blogging selves" (Lovink, 2012). These are not just what we know and do but also what we feel, as they "express personal fear, insecurity, and disillusion […] and unveil doubts and insecurity about what to feel, what to think, believe, and like" (Lovink, 2008: 17–18).

Our communication within these socio-technical infrastructures may seem trivial or old-fashioned individually, e.g. when the content of our blog posts amounts to nothing more than what we wrote in our diaries long before the internet was invented (Nardi et al., 2004) or when we post family pictures on Instagram that are the same ones we used to put into albums on our book shelves. But because the current socio-technical infrastructures give us less visibility as to when and by whom we are seen and read while at the same time maximizing our visibility to others, our blogging selves engage in "self-fashioning" (Greenblatt, 1980). We construct our identities self-reflexively and artfully to account for media ecologies in which we see and are seen through a decentralized panopticon (Maasen and Sutter, 2016). By drawing on the tradition of surveillance studies and emphasizing the world of blogging selves as a decentralized panopticon, the setting in which critique, as a specific form of communication, takes place can be seen as complex and omnipresent. Bloggers are, at least partially, agnostic about who is 'watching' and 'judging.' Critique then has to be articulated in ways that are compatible to various and undefined audiences (Hendriks, 2018) which advance types of professional identity building that are geared towards the global. The analysis on the basis of a decentralized panopticon is thus directed towards the global professional stance of clinician scientists.

In the current digitally networked media ecology, our blogging selves are what we use to participate and create communities (Davies and Horst, 2016a) and through which values are enacted that may form the basis of social movements and collective political action (Davies and Horst, 2016b). Blogging selves thus produce critical moments, and science blogs are places where the blogging selves of scientists provide critique that draws on scientific values. To test empirically how science blogs are a venue for critique that is based on scientific values, we extend surveillance studies by drawing from the neo-pragmatist sociology of critique established by Luc Boltanski and Laurent Thévenot (1999).

The pragmatist tradition within the sociology of critique pays close attention to critical moments as situations in which the conflict between different actors plays out verbally. The conflicting parties draw on their reflexive capacities in order to justify their positions. People have the reflexive ability to distinguish between 'world' and 'reality' and thus to define how the world should ideally be (world) and how it actually is (practice) (Boltanski and Thévenot, 1999). Criticizing is thus a reflexive practice in that blogging selves are fashioned in reaction to those social circumstances that trigger indignation; that again, is constituted by the cognitive differentiation of world and reality. Boltanski and Chiapello (2005) introduced the term indignation to emphasize the meaning of individual critical stances that are emotionally charged with frustration, anger, and rage and raised by people in ordinary day to day situations: "Without this prior emotional—almost sentimental—reaction, no critique can take off" (Boltanski and Chiapello, 2005: 36).

Various aspects of sociality are processed through the bloggers perspective and form a blogging self that represents social reality and its critique through self-fashioning. By describing the world in which the blogger is involved, states of how the world is and how it should be are made visible and form critical moments (Boltanski and Chiapello, 2005: 27). What is rare, however, is that blogging involves a dispute between different parties invoking different orders of worth to justify their respective views. The way Boltanski and Thévenot stipulate that disputes are resolved, either by one order of worth winning over the other or by building compromises (Boltanski and Thévenot, 1999: 374), seem equally rare in the context of blogs.

Blogs are public forms of interaction in which orders of worth are articulated, but the ways they produce critical moments and the means with which they provide justification are different from the pragmatist model within the sociology of critique. Interaction through blogs allows for communication that is not restricted by co-presence in space and time. The setting in which blogging selves articulate themselves hardly resembles the ideal public situation for discourse with face-to-face interaction and, as argued above, is better described as a decentralized panopticon. As a consequence, communication on blogs is not necessarily committed to justification and commonly shared orders of worth and is better described as self-fashioning in a mode that is based on justified indignation. Critique thus takes the form of self-images that are placed within a discourse in which they function as symbols or objects that can be used as one element in justification. We suspect that the blogs of clinician scientists are just such objects, and ones that take a central position in the discourse on translational research. Their potential for critique lies not in convincingly argued justifications but in making visible blogging selves that are committed to common scientific as well as clinical values. As a consequence, their daily struggles or frustrations become objects the translational discourse has to contend with.

Method, data, and ethics

We sampled science blogs within the "web sphere" (Schneider and Foot, 2005: 158) related to translational research and written by clinician scientists. In general, science blogs are numerous and provide plentiful material. Riesch and Mendel (2013) categorize them into four types of science blogging, whereby individual blogs usually contain elements of more than one type. Mainstream media blogs such as "Guardian Science"[1] and the BBC blog "Goes the Theory"[2] comprise the first type. Second are institutional blogs, e.g. the "Cancer Research UK – Science blog"[3]. Third are blogs written by practicing scientists addressing their own academic research such as the recently in Nature (Brown and Woolsten 2018) discussed "DoctorAl blog"[4]. Fourth, and most relevant to our case, are blogs that are only partially perceived as science blogs as they are written by scientists but raise issues that are personal and relate only peripherally to their own academic research but centrally to their working experiences. The "Jack of Kent blog"[5] is an example for this category, which gained prominence among science bloggers for the analysis of the Singh libel case. For our study, we selected blogs and blog posts that were written by clinician scientists and that contain 'personal issues,' in line with the fourth type from Riesch and Mendel (2014). The contexts (institutional, mainstream, or private) vary among these blogs.

We started our web search for blogs on the website "Top 100 Science Blogs on the Web"[6] and used a 'snowball strategy' mainly through hyperlinks. We collected individual blogs that are hosted by scientific blog networks. In a first step, we collected blogs discussing the concept of translational research in general. In a second step, we reduced the sample to blogs that were written by clinician scientists discussing translational research with respect to their daily working practice, which limited the sample to 32 blogs (see tab 1). The self-description of the blogger had to contain the keywords 'clinician scientist,' 'clinical scientist,' or 'physician scientist.' The sampling strategy further aimed to collect blogs from clinician scientists from diverse biomedical disciplines, diverse job contexts, and job positions as well as institutional settings and national contexts in order to provide insights into a widespread, even global, clinician scientist self-fashioning.

The sample contains research contexts from hematology, oncology, psychiatry, psychology and behavioral science, cancer research, cardiology, and pharmacology. The identified career positions are professors and assistant professors working in university hospitals, research coordinators in governmental institutions, and medical doctors doing their Ph.D. or other research training programs. Not all job positions could be identified. Some of the bloggers also write for newspapers (e.g. "Huffington Post" and "The Guardian") and science magazines.

The most frequent topics within the blogs are the non-compatibility of clinic and research, dealing with working requirements in hospitals (workload and patient care), dealing with research (demands and needs for successful research), education and training (medical degree and clinician scientist program), the economic situation (doctor salary and research funding), and work-life balance.

We selected posts that were published between 2009 and 2016, a time when discourse on translational research in (bio)medicine was already widespread. Blog authors are from the United States of America, Canada, the United Kingdom, India, and China. Most are written by male authors, in line with the underrepresentation of women among clinician scientists (Andrews, 2002; Ley and Rosenberg, 2002; Rosenberg, 1999; Andriole et al., 2008), resulting not from less women entering a career as a clinician scientist but from more women dropping out.

The number of blog posts within any single blog varies as some platforms host more clinician scientist blogs than other platforms, such as "BioMedCentral" or "PsychologyToday." It is up to the blogger on which platform they post, but we assume that platforms specialized for a biomedical and psychological audience are more often used from clinician scientists than other blogs that are not specialized for biomedical research, such as "Nature" blog.

Judging from language use and content, the blogs address an anglophone audience with professional biomedical knowledge. In most of the science blogs, a commentary function was available in which anonymous bloggers could comment on the main blog text or previous commentaries. Judging from the comments, the readers seem to hold similar job positions such as clinicians, researchers, medical students, or clinician scientists. Re-comments from clinician scientists were included in our qualitative analysis.

Analytically, we proceeded in two steps. First, we extracted information about structure, issue, length, and wording with linguistic methods (Hewson et al., 2003). Second, a qualitative content analysis (Mayring, 2000) was used to develop appropriate codes inductively and formed the main basis for the interpretation. The coding process was technically supported by the qualitative data analysis software MAXQDA. To ensure reliability of codes, we discussed data and findings frequently in common sessions. Due to the exploratory and inductive approach, part of the analysis was to build a suitable coding scheme through an iterative process. Parts of the material were coded; the emerging codebook was discussed and revised; further parts of the material were coded; the codebook was revised again, until we agreed that a point of saturation was reached (for code book see Table 2 in Appendix 1).

Even though our material consists of publicly available blog posts we, nonetheless, aim to protect the 'internet-identity' of the bloggers as much as possible. Despite a wider discussion on research ethics in online research (Jones, 1994; Bordia, 1996; Buchanan, 2004; Hewson et al.,

Table 1. Coded science blogs

Scientific blogs / networks	Blog posts	Words	Comments
Scientific American Blog Network	1	2411	2
Mind the Brain	1	1547	4
BioMedCentral	4	6148	9
Kevin MD.com	1	1727	5
Science Blogs	5	22035	43
Academic Matters	1	1995	0
PLOS Blogs Network	2	3607	8
Nature.com Blogs	1	1278	1
Psychology Today	4	4687	1
Psychometrics Forum	1	864	0
Asian Scientist	1	799	0
Science Mag (AAAS)	1	1794	0
Broad Institute MIT, Harvard	1	788	0
Research Forum India	1	783	2
Give Well Blog	1	3041	1
One Earth Future	1	1150	0
Queens University	1	608	0
Science-Based Medicine	1	5128	0
Psychometrics Forum	1	864	0
Private Blogs/Other	2	4659	0
Total	**32**	**65913**	**75**

2008), a consensus on which web material should be seen as 'private' is missing (Hookway, 2008). We did not request permission from the bloggers to use their public blog posts as research data but pseudonymized the quoted passages and deliberately selected quotations for publication that contain non-sensitive issues. In line with the argumentation from Hookway (2008), we distinguish between 'public online data' and 'private online data' whereas private data are blogs that are written for 'friends only' and this data becomes only accessible by setting up an account. However, in our research we only used public and easily accessible blogs, which may be personal but not private and Walther (2002: 207) suggests that such public accessible data that constitute an Internet archive does not require participant consent.

This study uses an exploratory approach attempting to reveal critical stances from blog posts published by clinician scientists independently from their nationality, gender, or training program in order to give insights about the overall constitution of the professional identity of clinician scientists. Our approach provides a suitable way for the identification of the professional situation of clinician scientists via their public critique that is revealed by their blogging selves, but it also has some limitations. The most critical one is that our study is limited to a small group of clinician scientists who blog actively and problematize their situation as clinician scientists in the daily practice. This study therefore does not provide insights from those clinician scientists who are not active in blogging, and thus their perspective remains invisible to our study.

Empirical findings

We present and discuss the empirical findings along three lines. In a first step, we outline how clinician scientists establish a critical stance by characterizing and problematizing their own position; this involves specifying what challenges clinician scientists are confronted with. Above all and not surprisingly, much of what clinician scientists problematize can be interpreted as a typical role conflict, in that the blogs voice personal concerns and individual (in)capabilities for action. Second, we reconstruct the patterns of critique indicating a more structural conflict between translation and profession that forms the basis of the role conflict. Third, we integrate the different sources of indignation into a critical agenda for clinician scientists, transforming their self-fashioning into collective political action.

The critical moment as an individual role conflict

We find two distinct roles for clinician scientists that correspond to the two worlds of research and clinic. The bloggers refer to these two domains by describing their work as having to act in "two worlds" or having to "wear two hats." The perception that clinician scientists combine two different domains is common, in fact it defines who they are. It provides the most fundamental premise for the blog posts in that this combination of the two worlds is framed as problematic and the ensuing account draws essentially from this premise. We call this premise 'the two-world dilemma': Holding the status of a clinician scientist brings the problem of having to combine two distinct worlds. Presenting the two worlds of clinic and research as problematic by those having to "wear two hats" implies a partial incompatibility that may make it difficult to form an identity that draws from both worlds. As a consequence, we start with more exploratory questions: How do clinician scientists describe themselves? What seems to motivate them in their daily working practice? What kind of challenges do they present in their blogs? And what do they criticize in that regard?

The clinician scientist bloggers fashion themselves as primarily motivated in their role as physicians rather than researchers or clinician scientists. Motivation particularly comes from being a medical doctor and thus from improving patients' health. Research, as a daily task, is then perceived as something that disturbs the aim of the clinician, to improve the health of their patients in daily clinical situations. Being a clinician predominates, and other professional tasks are evaluated as subordinate to their daily clinical practice. Reproducing the two worlds of research and clinic as distinct leads to a role conflict, and clinician scientists then prioritize the clinic over the lab. A female clinician scientist from psychiatry made the following statement, exemplifying this process:

> So, soon after starting research training, my unanticipated secondary dilemma became this: committing to conducting serious research appeared to lie in conflict with my desire to be an active clinician. *My need to solve important problems in health disparity was, ironically, taking me further from the very patients I wished to serve* (Blog V, 2012, par.: 19).

The wish to do research, aimed to "solve important problems in health disparity" (Blog V, 2012, par.: 19), takes the clinician scientist physically away from the patients she actually wanted to help. The idea of combining the two worlds is primarily motivated by helping patients right on site, and the struggles in combining the two worlds set in soon after starting research.

These struggles in combining clinic and research have to be overcome by clinician scientists on a practical level but lead to a specific kind of conflict, as the expectations of both roles would have to, in principle, be met in full and separately within the two distinct worlds. We found that clinician scientists, who represent themselves in science blogs, moreover believe that research and clinic should take an even amount of time, ideally split 50/50. Thus, a reduction of one part, research or clinic, intensifies the conflict. The following statement demonstrates this conflict when research reduces time spent on patient care:

> I remember this anecdote so well because in my career as a physician-scientist, the two worlds of science and clinical medicine rarely overlap [. . .]. Most of my time is spent in my stem cell biology laboratory [...]. Roughly twenty percent of my time is devoted to patient care, treating patients with known cardiovascular disease in clinics, inpatient wards and coronary care units (Blog I, 2014, par.: 10).

This 'time gap' represents a fundamental problem dimension for clinician scientists, because it intensifies the conflict between research and clinic. The time for research and clinic affects the different career paths of both roles. Having to fulfill the requirements of both career paths leads to the circumstance that clinician scientists always feel they do not have enough time to do both. Time is very often raised in the blogs as a relevant resource in handling the two worlds. From an individual perspective, more time for research seems to be the solution for clinician scientists as more time makes it "easier for physicians to be scientists" (Blog II, 2010, par.: 120).

> People have been moaning about the lack of physician scientists since at least the 1990s when I was in med school. But no one seems to want to enact the obvious solution: make it easier for physicians to be scientists. Make protected time truly protected, [...] make sure hospitals consider time spent in research as service to the university and don't penalize physicians for not seeing patients during that time, etc. Until that happens of course there will not be many physician scientists. If you make it impossible to do something, people won't do it. End of story (Blog II, 2010, par.: 120).

This statement clarifies that provision is made for research time, but in fact this time is not "protected" enough from clinical obligations. Time becomes especially important with respect to career paths when the option of becoming a full-time researcher or going back to being a full-time clinician remains possible. If the clinician scientist wants to be successful, more protected time is needed, so that the career requirements for both roles can be fulfilled simultaneously. As a consequence, a career choice away from being a clinician scientist—either towards research or clinic—seems to be a solution. Career choice means therefore choosing between a successful career as a researcher or a physician instead of a clinician scientist.

> But soon after entering the world of research, and much to my dismay, I discovered what I think is another important reason: the physician-scientist who is able to successfully *and simultaneously* be both active clinician and clinical researcher is indeed hard to find. Embarking upon the competitive and perilous track toward becoming an independent clinical researcher appears to involve a trade-off—a sizable, if not total reduction in the amount of time spent in providing direct patient care. Something, I imagine, is hard for many physicians to stomach (Blog V, 2012, par.: 14).

The clinician scientist career that is fashioned in blogs seems to remain at the edge of two other strong professions either in medicine or science.

And both professions contain clear tasks and requirements that have to be fulfilled in daily practice. When clinician scientists reflect on those demands, they conclude that the clinician scientist's career path lacks clear descriptions of unique tasks. The resulting feeling is indignation. A blogger articulates one such challenging situation with reference to the work edited by Andrew Schafer (2009) "The Vanishing Physician-Scientist":

> [T]he reality, as well as the perception for young-scientists, watching their more established role models attempt to continue in careers as physician-scientists is that most will fail (Blog IX, 2009, par.: 29).

Another clinician scientist remarks that

> [c]linician scientists are a rare breed. While the experiences one can obtain on this career path are extremely meaningful and rewarding, the path is also fraught with unpredictability. Most medical students prefer clinical jobs, which not only provide economic assurance but also the flexibility to decide on their extent of involvement in research (Blog XVI, 2013, par: 4).

Although the challenges the bloggers express may seem expected and almost stereotypical, they form the most widely shared description of the basic crisis clinician scientists see themselves in. The two-world dilemma and the time gap provide vocabulary that is understood by all clinician scientist-bloggers. The reason for this vocabulary remaining unspecific we see as an indication that the crisis, on the one hand, is considered larger than can be grasped from an individual perspective and, on the other hand, is not solvable with individual means, such as hybrid forms that allow for simultaneous research and clinical work. The second part of our analysis was thus guided by the following questions: What are indications in the blog posts for the 'larger issues' beyond the individual crisis? What are more specific tasks or forms of work that the bloggers see as 'doing translation'?

The critical moment in context of translation

The discourse on translation presents clinician scientists as the solution to fundamental translational problems. These include methodological issues such as the lack of individual skills and knowledge with respect to methods. We find that bloggers fashion themselves as the solution to those translational problems in biomedicine:

> Traditionally, Clinicians diagnose diseases and treat patients whereas, Scientists do the research work […]. However there is a gap between clinicians and the scientists. The clinicians, having spent most or rather all of their time with patients do not know about the various research methodologies, for example RT-PCR or Western Blot. On the other hand, the scientists are not familiar with the patient; they just receive the tissue sample that has to be processed. This is precisely why we need some doctors to become Clinician Scientists! (Blog XIX, 2015, par.: 4).

Bloggers in general "agree that [clinician scientists] are in an ideal position to effect translations from bench science into clinical practice" (Blog IX, 2009, par.: 35). However, they also critically note that translation needs more than just a few individuals who speak the two languages of research and clinic. Translation particularly depends on individuals who are able to let those languages communicate:

> The mark of a good "translator" is not merely the ability to understand and speak both languages—research and medical—but to let the two languages communicate (Blog XIX, 2016, par.: 15).

Doing translation on a professional level thus means more than just practicing research and clinic side by side. In order to link lab and clinic it needs "good translators," i.e. individuals who are able to transform laboratory work and clinical practice into translational research. With that competence,

> [c]linician-scientists can be [...] knowledge brokers or bridge builders. In our highly specialized medical and research modern environment, they possess an interesting and much needed profile allowing them to make connections between people and expertise (Blog XVII, 2015, par.: 63).

The clinician scientist role is pictured as to be able to withstand the ongoing trend of specialization that pushes research and clinic away from each other. This picture is in line with the discourse on translational research that demands successful communication between biomedical research and clinical practice in order to provide translation. However, bloggers criticize that biomedicine, despite the fact that it claims translation, does not represent translational research. The two domains of research and clinic are reproduced permanently in daily business. Conferences, for instance, as a potential place for interdisciplinary exchange are highly specialized towards either basic research or clinical practice. These circumstances, when reflecting the gap between reality and world, lead to feelings of indignation as these daily tasks, such as giving talks at conferences, are clearly lacking the aim of translation:

> Here, instead, I wish to articulate the feeling that these talks evoke in me, a feeling I suspect is shared among countless clinician researchers and even some, yes, if you'll believe it, physician scientists, who might admit this only in private. That feeling is: "No. Please stop. Dear God. Please. Stop. I beg you." […] But, no matter whether you think of molecular medicine as salvation or self-promotion, can we at least agree that the talks are boring? They bore the clinician-physician [as part of the clinician scientist] in all of us *who is concerned* with how people live in sickness and health and what medicine does, can do, and should do to help them (Blog VII, 2012, par.: 7 – 11).

These critical stances from the bloggers reveal that research and clinic coexist rather than overlap or even intertwine in daily practice. Although there is this overall accepted notion that lab and clinic should be linked in order to perform research quality in (bio)medicine, the actual daily routines seem to hinder a stable linkage. The following statement reflects the impossibility of furthering a clinician scientist career due to everyday constraints.

> Clinician-scientists no longer drive biomedical research. It is not possible to be truly proficient in both modern clinical care and experimental basic science. In addition, and because they rarely elucidate the latest biological mechanism, their research output will not always be considered as they would have wished by some basic scientists and top tier scientific journals. The constraints of the daily routine of medical practice, including the increasing financial pressure on the health system, lack of time and even the lack of training are major obstacles to the development of broader research activity within academic teaching hospitals (Blog XV, 2015, par.: 56).

Overall, bloggers seem willing to transform daily practices towards translation but blame a clinical environment that seems rigid and not (yet) open for translation. Such a supportive environment is needed for individuals to persistently perform the role of a clinician scientist. When problematizing environmental conditions, policy regulations are foregrounded. One blogger stated this incompatibility between translational aspirations and established routines succinctly to the point:

> *I am skeptical of some of the arguments people have made for the importance of translational science*. These arguments often do not distinguish between different possible definitions of "translational science," and often do not make a strong case that nonprofit funding (as opposed to industry funding) is what's needed. In addition, it seems quite possible to me that the goals of promoting "translational science" might be better served by policy change (on regulatory and intellectual property law, for example) than by [an individual's] scientific research. With that said, I think the idea of translational science is worth keeping in mind, and that certain kinds of research in this category could be under-invested in because they do not fit cleanly into an academic or for-profit framework (Blog XIV, 2015, par.: 52).

Translational research sets new quality standards in order to perform biomedical research. In this context, clinician scientists must be good translators to achieve successful communication between lab and clinic. By doing translation—combining research and clinic successfully—clinician scientists meet the existing expectation of becoming a knowledge broker. However, in day-to-day practice clinician scientists do not find themselves in a research environment that rewards translational practices, leading some clinician scientists to the opinion that translational research should be regulated more on a policy level rather than by individual clinician scientists, who are in need of stable support mechanisms.

Discussion

We started by noting that clinician scientists participate in the discourse on translational research by being seen as pivotal for translational success. As a consequence, the self-fashioning of clinician scientists is more than identity work of an emerging profession; it holds the potential for critique that carries weight. We have seen that the blogging selves of clinician scientists mark a critical moment through the two-world dilemma and the time gap. These critical moments draw from a more complex notion of translation that is rooted in daily working practice. From these more complex notions, it becomes more tangible how the role of science blogs as a platform that allows for transforming individual blogs into a general (embodied) critique. We summarize our findings regarding this landscape of critique by formulating a critical agenda for clinician scientists. This critical agenda is based on indignation, a critical capacity individuals are equipped with, expressed by bloggers individually and by the situation of decentralized panopticism. We find different sources of indignation that relate to the pivotal role of clinician scientists in the discourse on translational research. These reflect the critical stances towards experienced uncertainties in daily working practice:

a) To be a pivotal figure in translational research triggers *feelings of contradiction* as it demands a combination of research and clinic in the daily working practice, i.e. translation *should be* based on the combination of lab and clinic (world), yet combining the two different roles can hardly be fulfilled in everyday work. The worlds of research (publishing, applying for grants, lab supervising, and research projects) and clinical practice (patient care, improving patient health, and clinical duties) *are too specialized to combine them successfully* in everyday work (reality).
b) The circumstance that clinician scientists have to act in a highly specialized professional environment that, in particular, rewards either biomedical research or clinical practice (reality) triggers *feelings of unpredictability regarding individual career paths*. Biomedical research *should reward translational practices* (world), but rather research and clinic coexist and do not intertwine in daily practices. These circumstances cause a permanent time gap for clinician scientists, who face the challenge of meeting the requirements of both roles simultaneously in their daily working practice.
c) Translational research triggers *feelings of skepticism,* because while it *seeks to consolidate research and clinic* (world), it actually reproduces both worlds continuously as separate. Translational research lacks regulatory and/or organizational mechanisms to combine research and clinic, which neither *offers precise information for the individuals involved on how to practice translation successfully* nor rewards translation (reality).

Conclusion

Translational research promises to solve many of the key challenges (bio)medicine faces today, sometimes polemically referred to as ‘overcoming the valley of death’ or ‘reducing research waste’. In our analysis these challenges are the result of specialization and ensuing professional quality concerns in the biomedical field. This is what the discourse on translational research refers to and why it assigns clinician scientists a pivotal role in overcoming these challenges. Even though many observers have predicted or analyzed the discourse on translational research as favorable for the clinician scientists to regain professional strength, the critical view of clinician scientists themselves has received little attention. We analyzed science blogs by clinician scientists to describe their blogging selves within the discourse on translational research by paying special attention to their potential for critique.

Our approach is rooted in research on science communication (see e.g. Bonetta, 2007; Bucchi, 1998; Shanahan, 2011) in the field of biomedicine and extends this STS perspective through the neo-pragmatist sociology of critique by Boltanski and Thévenot. This allows, on the one hand, to use online data to understand the social construction of professional identities in biomedicine. On the other hand, it shows these identities to be constructed from the critical capacities of individual professionals against the backdrop of a larger discourse (i.e. translational research).

We found that clinician scientists fashion themselves prima facie in a dilemma between the two worlds of research and clinical practice, which does not afford them enough time to fulfill either role—as researcher or as clinician—sufficiently. By interpreting this conflict in the context of translational research, we find a more deep-rooted professional challenge facing the clinician scientist profession: With its vague definition, translational research does not offer enough guidance on how to practice translation successfully. Leaving clinician scientists with the demand of combining research and clinic, despite the mismatch between translational ideals and professional guidance.

Despite all the promises and potential of translational research, the view that emerges from blogs of clinician scientists is critical. Their self-fashioning offers forms of critique that rest more on structural rather than individual challenges. The demand of being a clinician scientist is an overall source of uncertainty regarding individual career paths. It provokes a high individual risk of not fulfilling the expectations for either of the two separate career paths. However, clinician scientists accept their role as being responsible individually for making translational research work. Even though much of the discourse on translational research envisions solutions that are organizational, political, or infrastructural, clinician scientists seem trapped in a form of uncertainty that is a double bind: Accept your pivotal role and bear the price of incompatible expectations or redefine the translational in your work and risk losing your pivotal role. Indignation then is the consequential mode of critique that forms a critical agenda when conceptualizing the world of blogs as a decentralized panopticon, a public stage allowing clinician scientists to utter their critique to a wide audience. Showing feelings of contradiction, unpredictability, and skepticism forms a critique of translational research as a source of indignation. These feelings reflect major uncertainties which the individual bloggers experience within their clinician scientist career that result from mismatches between the imagination of translation, as it ideally should be, and the actual practice of translation buried in an existing biomedical research environment. Without losing their pivotal role, this critique is limited to performing blogging selves that are overstrained by uncertainty. However, it remains effective in working to shape this pivotal role in the discourse on translational research.

Two, more general, questions emerge from our study that may extend research in science communication and in the sociology of critique, respectively. For science communication: How is individual critique rendered effective in digital media ecology? In our study, individual capacities for critique align with the discourse on translational research. As a result the professional critique from individual scientists is performed as individual dissatisfaction with work arrangements. What would it take in the context of digital media for critique either to be shared and performed as collective interests or to emerge from conflict between different parties? The latter would be expected from the sociology of critique and our case thus extends this perspective with questions regarding how public critique is verbally not only inscribed in protest and dispute but also on alternative and new communication platforms such as online blogs. In our case we interpret blogging selves as critical voices in the discourse on translation even though there is no discernible dispute between different parties. The resulting question should be of concern to the sociology of critique in the future: What are minimal criteria for online communication to still be considered as critique?

To conclude, it remains an open question, if such critical voices are heard given the decentralized shape of translational medicine—and if they are heard—by whom and to what effect? In other words: How does the voiced critique in science blogs change those social conditions the actors criticize? Further empirical research could help to enlighten the role of critique in science blogs as a condition for social change in biomedicine and more broadly.

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Appendix 1.

Table 2. Code book

Main categories	**Information in Codes**	**Themes and questions of codes**	**Number of codings (incl. cross coding elements)**
Background Information	Name and origin of blog	How is the blog named? Where is the blog published? When was the blog released?	113
	Date of release		
	Job position and research field	Which kind of job position does the blogger held? What is the research field of the blogger?	
	Sex (of bloggers and commentators)	Gender of blogger and commentators	
Reference groups	Relevant (named) reference groups	Interpersonal communication, relationships and contacts (e.g. with academic staff, clinical staff, family members, etc.)	74
Public Identity – Defining the clinician scientist role	Translational research practice	Working and research contexts, research conditions, aspects of knowledge transfer, collaborations	185
	Expectations regarding clinician scientist role	Formal working criteria, working time, policy regulations, overall working conditions, education and educational training, work-life-balance	
	Worth and values of TR	Why should translational research be done? What are general aims of research and clinical practice, and their contribution for TR?	
	Motivation	What motivates the blogger to be a clinician scientist?	

Main categories	Information in Codes	Themes and questions of codes	Number of codings (incl. cross coding elements)
Conflicts between research and medicine	Reproduction of two worlds (research and clinic)	In which way are the distinct worlds of clinical practice and research reproduced? How are both worlds thematized and criticized? How often are both worlds named and in which context?	316
	Self-descriptions and self-definition	How do the blogger define themselves? What are priorities in the identity process of clinician scientists?	
	Problem dimension	What are the main problems by handling the two roles? What are key conflicts regarding each role (research and clinic)?	
	Time dimension	How does the time dimension strengthen the role conflict? What kinds of problems are produced by limited time?	
Total			688

New Bikes for the Old:
Materialisations of Active Ageing

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Abstract

In the last 15 years, STS has established a research programme focused on the sociotechnical reconfiguration of later life, particularly as new political programmes aim to deploy 'active ageing' in contemporary societies. In Denmark, the bicycle is a key technology in this aim, because of how it articulates sustainable living, health and social participation. Thus, two new 'inclusive cycling' initiatives for older people have been developed. Drawing on ethnographic data, we explore the ways the bikes differ, and how they explicitly mobilise active ageing as a form of 'good old age' in different ways. We argue that whereas 'Cycling without Age' rickshaws attempt to assemble social participation for older people, 'Duo-Bikes' aims to enable capacities through physical activity in later life. We further explore what happens when these two schemes meet, and suggest how searching for a compromise will be necessary to enhance opportunities to cycle in later life.

Keywords: Bicycles, enactments of old age, functional capacity, participation, co-existence, compromise

Introduction:
Bringing the bike back in

The bicycle has been an iconic technology in the establishment of STS as a field of research, serving as a lens to understand the mutual shaping of technology and society (Pinch and Bijker, 1984). Perhaps because of its relative technical simplicity, the bicycle enables exploring the relationship between a complex array of infrastructural, social, cultural and political components. However, possibly due to STS' peculiar captivation with 'new' technologies, the bicycle's 'old' character has made it recently a less attractive object. An emerging confluence of processes justifies a new look at the bicycle: First, the promotion of sustainable modes of transportation and liveable cities, where the extended use of the bicycle for city commuting is a consistent policy aim (Bae, 2004; Mapes, 2009; Lutz and Fernandez, 2010 Vivanco, 2013). Second, the consolidation of programmes that emphasise the role of physical activity in health maintenance, in which the bicycle has been reconfigured as a key health technology (Pucher et al., 2010; Vivanco, 2013). Third, this emphasis on health has been particularly directed to older people, where 'active ageing' programmes aim to extend healthy life expectancy (Fernández-

Ballesteros et al., 2013; Lassen and Moreira, 2014). However, the role of the bicycle in bringing to bear this complex social and technical assemblage in older people's everyday lives is only now starting to be explored. In this paper, we explore how two co-biking initiatives for older people in Denmark differently materialise active ageing, and how political and epistemic formats of the good are used to justify the specificities of their crafting.

In the last 15 years or so, STS scholars have established a programme of research that aims to understand how science and technology is both shaped by social and cultural enactments of the life course, and transforms the meaning and material practices of later life (Joyce and Mamo, 2006; Moreira, 2017; Joyce et al., 2017). In this, STS research has provided rich and detailed accounts of the imaginative ways in which older people interact with knowledge making institutions and technological processes, delivering innovative normative grounds for sociotechnical practice (e.g. Joyce and Loe, 2010; Peine and Moors, 2015; Mort et al., 2015). Many STS studies of later life have focused on new and digital technologies such as telecare (e.g. Hyysalo, 2004; Sanchez-Criado et al., 2014; Aceros et al., 2015), or service robots (Neven, 2010). In this research, a key aim has been to determine whether older people are being left behind – widening the technological or 'digital divide' (Jæger, 2004) -, or are able to engage with the new demands of technological use. Hinged on this aim, and in order to move beyond ageist representations of older people as passive recipients of new technologies, as well as to challenge "our concepts and metaphors on old people and ageing" (Östlund, 2004: 3)., terms such as 'technogenarians' (Joyce and Loe, 2010) or 'innosumers' (Peine et al., 2014) have been proposed to highlight the active and creative appropriation of technologies in the everyday life of older users. Drawing on this perspective, in their study of e-bikes, Peine and colleagues (2016) have suggested that older people have challenged age-based assumptions of innovation diffusion, not only becoming early adopters, creatively appropriating e-bikes in their everyday lives, but also ultimately shaping the design and specification of the technologies themselves.

In a similar vein, we investigate two Danish schemes aimed at promoting bicycling in later life (see Figure 1): a) Cycling without Age (CwA), a platform operating since 2013, which facilitates bike rides for older passengers on rickshaw bikes driven by volunteering 'pilots', and b) Duo-Bikes (DB), a side-by-side tricycle designed in Jutland, Denmark, which is frequently used in nursing homes by residents and volunteers. Both initiatives have been explicitly linked to the role bikes play in the Danish national self-understanding, and can be seen as embedded in Denmark's political investment in the bicycle as the technological articulation between economic growth, lived environment and population health (Larsen, 2017). They aim to extend this configuration to older people, contributing to the creation of an 'age-integrated society' (The Strategic Research Council, 2006). In this respect, approached superficially, CwA and DB resemble each other in many aspects. Both deploy two large and weighty bike designs acquired by municipalities, and are placed

Figure 1. On the CwA, the pilot is placed behind the passenger(s) and only the pilot pedals. On the DB, pilot and passenger are next to each other and both are able to pedal. Photo to the left: Cycling without Age, June 8 2016. Photo to the right: Lassen, August 17, 2017.

at or nearby nursing homes with the intent to get the residents out on the streets assisted by volunteers. Both aspire to transform residents' experience of old age by explicitly drawing on the concept of 'active ageing'.

Active ageing, however, is not a single, unitary techno-political assemblage, it being possible to identify two distinct co-existing models (Lassen and Moreira, 2014). The first of these, mostly associated with the World Health Organization (1999; 2002), focuses on the variability and malleability of the ageing process to design technological, social and political devices that support the enhancement of functional capacity across the life course. The second, proposed by the European Union (European Commission, 1999; 2011), emphasises the value of institutional inclusion to maximise the participation of older citizens in economic, social and cultural spheres. Our argument is that CwA and DB are best understood as materially assembling these different formats of active ageing.

Denmark is an ideal site for studying cycling in old age for various reasons. The capital Copenhagen is often emphasised as an ideal space for everyday biking (Larsen, 2017) and its biking infrastructure is used as a model for inclusive design internationally (Clayton et al., 2017). The infrastructure and commuting habits of Danes have become export commodities and used as tourist branding (Visit Copenhagen, 2019). On average, Danes bike 1,63 km per day, and only from 75+ years does this drop below 1 km per day (Center for Transport Analytics, 2018). The Danish Cyclist's Federation (2015) argues that bikes increase mobility and prevent loneliness and functional decline among older people, and works to instigate more measures ensuring safety for older bikers. In their recommendations for physical activity targeted to older people, the Danish Health Authorities draw on the Cyclist Federation recommendation to inspire to ways of being physically active (Danish Health Authorities, 2019). As such, cycling is seen as a key element in public health in Denmark, and the cycling culture and infrastructure has been used as a model to follow in countries such as Canada, France, Spain and The United States (Copenhagenize, 2019).

Because the CwA and DB bikes in question are not 'new' designs but instead adaptations of existing models – the famous Christiania bike (CwA) and a disability tricycle (DB) – conceptual frameworks in STS such as ANT do not fully capture the process of tinkering, adjusting and re-qualifying these artefacts for new uses. In order to do analytical justice to our empirical data, it is necessary to attend both to the making of contingent relationships between technology, social practices and relations (Latour, 2005) and to the mobilisation of moral and cognitive frames that qualify objects and persons "for a certain mode of coordination" or format of the good (Thévenot, 2006: 112). We thus explore both the mundane ways in which building new uses for each of the bikes entailed establishing specific combinations of heterogeneous elements such as local volunteering practices, care home procedures or national imaginaries (see below) but also how those combinations significantly differed in how they explicitly mobilised 'active ageing' as a format for the 'good old age'.

Thus, in the first and second analytical sections of the paper, we carve out the differences between the two bike initiatives. We argue that while CwA draws on a format of active ageing that emphasises the benefits of social participation in later life, DB is more closely aligned with implementing active ageing through the functional health benefits of physical activity. In the former, wellbeing is realised through the opportunity to remain an involved member of society, through being able, as CwA's publicity often puts it, to 'get wind in the hair' and tell their life-story where it happened. By contrast, in DB, the 'wind in the hair' is a means to a different end: the maintenance and/or 'optimisation' of individual functional capacities.

In the third section of the paper, we ask: what happens when the two assemblages meet. We have identified three ways in which these assemblages can be related. The first possibility is that of mutual critique, a situation where actors strive for equivalence drawing on different formats of the good (Boltanski and Thévenot, 2006: 215-236), thereby emphasising and reinforcing the divergent political and epistemic commitments. On the ground, this results in the creation of rigid boundaries between the two schemes, where mutual learning is next to impossible. The second possibility can be described as pacific co-existence, where diverse uses and qualities are distributed across different sets of actors (Mol, 2002). This however results in the emergence of asymmetries and imbalances between to two schemes, reducing the possibilities of engagement with cycling in older age.

In the conclusion, we thus suggest a third possibility that entails the creation of a compromise. This speculative intervention would require the crafting of composite objects that can bring together different worlds (Boltanski and Thévenot, 2006: 277-92) While this is speculative analysis, we suggest that such compromises are key to the ways the material specificities of the ageing society are crafted, and to the reformulation of the good old age that such specificities attend to.

Setting and fieldwork

We draw on ethnographic data collected mainly by Lassen between 2015 and 2017. The fieldwork was conducted as part of a collaboration between the Centre for Healthy Aging and the municipalities Ishøj and Vordingborg, focusing on researching the links between the everyday life of older citizens, civil society and the municipal policies of old age and health. The two municipalities are ideal case studies because of their explicit engagement in promoting 'inclusive cycling' for older people, but their socioeconomic and geographic differences enhanced our analysis. Ishøj is a suburban municipality with just more than 20.000 citizens, located 20 km south of Copenhagen. Most citizens live close to the centre, and there are bike lanes connecting the city with the local beach, parks and marina. Vordingborg is a rural municipality with a low population density, located 100 km south of Copenhagen. The land consists of many farms, and the small towns in Vordingborg Municipality generally have scarce bicycling infrastructure.

Ethnographic fieldwork entailed a diverse set of data collecting/analysis activities. Principally, Lassen volunteered both as a CwA 'pilot' in Ishøj and as a DB rider in Vordingborg. As a volunteer he conducted participant observations and engaged in conversations with passengers, and has taken extensive field notes from these observations and conversations. He has also participated in workshops with municipal officers and citizens on each municipality on the issues of health and participation for older people. He participated in a variety of public events promoting biking in both municipalities, collecting photographic documents of these. Fieldwork also included following the local controversy regarding the implementation of CwA in Vordingborg. Lassen has conducted interviews with municipal officers in both sites (N=12), including managers of the old age sector, nursing home managers, community nurses and internal consultants. Interviews were also conducted with 5 CwA pilots and 6 DB pilots, one manager from the central body of CwA and one representative of the manufacturer of DB. All quotes have been translated from Danish, and all informant names have been changed due to confidentiality.

Our approach to data collection and analysis is ethnographic. Ethnography is uniquely adequate to investigate situated and emergent constituents of cycling practices, and to identify and understand their fragile and contingent character. In this, we build on an ethnographic and STS tradition of studying practices and technologies on the ground (Latour, 2005), as the ways policies are materialised and practiced – the ways stories 'perform themselves onto the material world' (Law, 2000: 2) - can only be studied by inquiring into local specificities. While current regimes of innovation often include user-perspectives in the crafting of needs (Jensen, 2012) they often do so in superficial manners (Lassen et al., 2015) not accounting for their often contingent changes in direction (Akrich et al., 2002), and usually oversee the tinkering (Mol et al., 2010) and adjustments of technologies once they become practiced. Ethnography enables a performative account (Law, 2004) of how policies are materialised locally, and how innovations 'in the wild' (Callon, 2007) are negotiated and justified.

Also aligned with the ethnographic tradition, the analysis of the data was synchronous with its collection. Fieldwork was punctuated by a series of data analysis sessions conducted by both authors, which shaped the direction of subsequent fieldwork, and the analytical model presented in the next section. The analytical model is proposed as a device to attain symmetry in our analysis of the two assemblages and their justifications, and not as a comparative exercise, as we are not aiming to identify the causal configuration of dimensions leading to different outcomes.

Differences

In order to symmetrically explore sociotechnical differences between the bicycle initiatives, we identify 10 key dimensions of analysis (see Table 1), which structure the data presented in the subsections below. *Background* refers to the social and technological setting from which the initiative emerged. *Technology* focuses on the technical specifications of the bicycle used in the initiatives. *Scale/Networks* characterises the size and dynamics of the initiatives, and the means through which those dynamics are sustained. *Matching* identifies the typical ways in which participants in the initiatives are matched together. *Value* categorises how the worth of each initiative is enacted in particular forms of technoeconomic organisation. *Volunteering* distinguishes the two modes of justification used by unpaid participants in the initiatives. *National imaginary* aims to identify how characteristics in the imaginary of Danish national identity are drawn upon in the initiatives. *Gifting* pays attention to how the contribution of unpaid volunteers is enacted in the technologies used in the initiatives. *Attachment* refers to the emotions that are practically articulated in the initiatives. Finally, *politics of old age* differentiates the two models of active ageing materialised in the initiatives. We flesh out the ethnographic details of these dimensions in the two sections below.

Cycling without Age: Brokering active citizenship and effervescence

> Every morning I cycle to work, because I love cycling. And one morning I noticed an old man sitting on a bench on a sunny spot with his walking frame next to him. He sat there the next morning and for the following two weeks. (…) I realised that he too, must have been cycling his bike every single day too, and most likely enjoyed it as much as I do. (Kassow, 2014)

Thus begins the origin story of CwA as told by founder Ole Kassow in a Ted Talk in 2014. The scene that Kassow describes above concerns Thorkild, a 97-year nursing home resident. Moved by the vision of Thorkild's past as cycle commuter, Kassow rented a rickshaw bike and offered to take the residents from Thorkild's nursing home on bike-rides. It was a success, which prompted him to suggest that his own municipality should acquire a rickshaw bike. This, in turn, received a positive response from the 'co-creation consultant' of the municipality, telling Kassow that this was exactly the kind of 'active citizenship' that they were keen on supporting. They offered to acquire five bikes. When launching these bikes, Kassow and the municipality managed to stir a lot of media attention. The scheme soon spread

Table 1. Key dimension of the bicycles' sociotechnical arrangements.

	CwA	**DB**
Background	Active citizenship turned into worldwide association	Local company with a specific bike design
Technology	Christiania rickshaw bikes	Disability duo-bikes
Scale/networks	Expansive and digital	Small and analogue
Matching	Platforms and booking systems	Nursing homes and activity centres
Value	Brokering, network economy	Capital investment, commodity
Volunteering	New public governance, co-creation, active citizenship	Traditional, individually organised
National imaginary	Social entrepreneurship	Engineering
Gifting	Clear	Blurred
Affect	Effervescence	Strained familiarity
Politics of old age	EU, dementia, participation, local engagement	WHO, disability politics, functional capacity

across the country, and, at the time of writing, there are more than 4.000 volunteers, in more than 70 out of Denmark's 98 municipalities. CwA has thus been described as a national movement aiming to enhance quality of life in old age (Cycling Embassy of Denmark, 2014; Aged Care Guide, 2017). Further, CwA has at the time of writing been exported to 40 countries on 5 continents.

CwA mobilises a particular format of the good old age centring on participation and well-being, and envisions the rickshaws as key due to its abilities to support mobility, fresh air and social relations. From this perspective, the good old age embedded in the CwA assemblage is much in line with the format of active ageing promoted by the European Union since the 1990s (e.g. European Commission, 1999, 2011; Walker, 2008). So, for example, when asked about the desired effects of the CwA scheme, volunteers and care personnel refer its capacity to increase quality of life amongst the passengers, exemplifying this with stories about passengers who have regained the ability to talk and engage in social relations, or people with severe degrees of dementia who have momentarily regained memories.

The bike most commonly used by CwA is a slightly modified version of the Christiania-bike, an iconic boxbike-type of cargo tricycle. The name of the bike is linked to its origins in Christiania, a so-called freetown at the heart of Copenhagen. Placed on a 10-acre property previously owned by the Ministry of Defence, the area was squatted in 1971, its inhabitants aiming to build a commune, prompting a series of disputes about land use and attempts to close or 'normalise' it over the years (Amoroux, 2009). Currently, Christiania is one of Denmark's most visited tourist attractions, as the freetown is seen to embody a peculiarly Danish open-minded, progressive and experimental way of living. It was in this setting that the Christiania-bike was developed in 1984, aimed at transporting goods around the car-free freetown. As Copenhagen experienced the transition towards bike friendliness, Christiania-bikes spread to the surrounding city, where it is mostly used by families to carry children and goods. CwA uses a modified version of the original design, where a bench, a backrest, a metal footrest and a folding cover for wind and rain replace the box in front of the bike. It also includes a battery to assist the pilot with propulsion (see Figure 2).

Key in the growth of the CwA network was the deployment of a digital platform to organise bike rides. Similarly to other app-based service platforms, CwA's booking system matches pilots with passengers. This technologically innovative aspect facilitates easy implementation across municipalities (Torfing, 2015). Further, the CwA team are experienced in brand and media management, understanding that the sustainability of the initiative relies upon suggesting it embodied a different way of organising nursing home activities in Denmark. The platform is supported through member municipalities's payment of a monthly subscription, comprising of insurance costs and a fee to use the online booking system.

Figure 2. The original Christiania bike to the left and the slightly adjusted bike for CwA to the right. Photo to the left: Lassen. Photo to the right: Lassen, March 23, 2016.

Data from our participant observation in Ishøj suggests, however, that care personnel are also essential to the sustainability of the enterprise, as they arrange and fit rides around the work-schedules and care-practices at the nursing home. Care workers organise it so that the passenger is suitably dressed and prepared on time for the ride, having often to physically transport the resident in wheelchairs to the outside and secure them on the seat. As one of our informants, Jørgen, stated on a CwA-trip, this means that CwA constitutes a new load on the work schedule of care workers. As a result, there are often more pilots offering trips than there are passengers. To circumvent this gatekeeping, Jørgen explained how he had written a list of potential passengers who lived independently or in protected housing and could be contacted directly, as he was tired of waiting for the nursing homes to find him passengers. The municipality took Jørgen's list as a sign of 'active citizenship', and a coordinator from the municipality ended up sharing the list among the pilots.

This list points to a deeper issue within CwA. Enabling pilots to ride passengers without setting foot in care environments, the list also supported pilots in avoiding what some perceived to be uncomfortable and anxiety-provoking meetings with "the severely demented, the drooling and the aggressive" (Bent, CwA pilot) residents at nursing homes. This distance from the more unpleasant aspects of the ageing process was, to some extent, as suggested above, already facilitated by the online booking system, care workers taking the burden of preparing and 'making presentable' nursing home residents. CwA thus attracts volunteers who find the bike-rides more enjoyable than engaging in care, and who like the flexibility provided by the booking system.

CwA's strength is underpinned by its brokering between the so-called 3 P's: pilots, passengers and personnel. But this brokering is more than just the matching of preferences, it is a reconfiguration of agential capacities and identities. Through the process, the volunteer becomes a pilot, via a composite system that includes training certification and documented abidance by 'rules of conduct' in ride logs. Similarly, the resident becomes a passenger through an embodied investment of CwA symbols such as helmets, flyers for passers-by, etc, and of CwA endorsed, insurance-backed behaviour such as not incurring in economic exchange behaviour by paying the pilot in money or kind (a coffee or lunch). As for the personnel, they become identified as facilitators of the volunteering relation. Indeed, the character of CwA is defined by how the value of volunteering depends upon the infrastructural interconnectedness of a variety of actors, which include the 3Ps but also municipal officers, system designers and maintainers, etc. Thus, it is not a surprise that CwA's narrative often draws on models of the network economy and the importance of brokering therein.

In this, there is also a crucial role played by brokering in the transformation of the Welfare State towards a co-created endeavour (Jensen and Krogstrup, 2017). Part of a turn towards new public governance, co-creation policies stress the importance of active citizenship, and aim to establish strong collaborations between citizens, governing bodies and the private and voluntary sector in what has been termed a 'plural state' (Osborne and McLaughlin, 2002) or 'welfare mix' (Evers, 2005). With the term co-creation, the Danish municipalities seek new ways to tap into the strengths and expertise of voluntary citizens and organisations. CwA is often seen as the 'gold standard' of co-creation in Denmark, as it combines active citizenship with technological innovation and the 'entrepreneurial spirit' to challenge care-systems.

For CwA members, the key objective of co-creation is to replace a one-sided provision of help or assistance to older citizens by one of reciprocity. As one of the central organisers of CwA explained,

> For us, it is important to stress that it is not just the pilots that provide a service. The talks with the residents give so much back to the pilots. It is life-affirming. (Interview with organiser of CwA, 2015)

The reference to the value of 'talk' in the reciprocal relation is of crucial importance here. It is materialised in the bike design: the pilots give the gift of pedalling; they provide the force that enables the bike to move around in the city- or landscape – and the passengers provide the gift of talk, often in the form of reminiscing about places previously inhabited by the passengers. On a bike ride, the passenger requested the pilot, Jørgen, to be driven to a forest 15 km away, in which he had played as a kid and not seen since. Although Jørgen was anxious about the effects of the ride on his knees, and whether the batteries would last long enough, he said that he wanted to give this experience to the passenger, he himself gaining from this by relating the forest to someone's life story. Indeed, CwA pilots recognise that revisiting biographically meaningful places - incident places (Rowles, 1983) - is an important aspect of the ride, because it is often through the evocative powers of place that the passengers are inspired to provide accounts of their life and experiences. As the CwA website states: "Older people have so many life histories, tales and wisdom, which will be forgotten, if we do not reach out and listen to them" (Cycling without Age, 2018).

CwA enacts a form of intergenerational relationship whereby the gift of physical propulsion by the younger 'pilot' prompts the gift of wisdom and transfer of knowledge from the older person. This is particularly obvious in the events organised by local departments of CwA, where piloting is part of the activities in history classes in high school, or where pilots and passengers are brought into home economics classes in mid-school to teach traditional Danish cookery (see Figure 3). CwA further engages volunteers in many local and national events, transporting senior citizens to elections, and organising group tour rides abroad. Underpinned by this intergenerational dynamic, these events are caught by a sense of collective effervescence (Durkheim, 1912). This is further reinforced by an overwhelming presence of Danish flags, linking the CwA initiative to a national imaginary of participation, active citizenship and social entrepreneurship. By drawing on this configuration, CwA explicitly makes the case for re-assembling old age through more civic participation and well being.

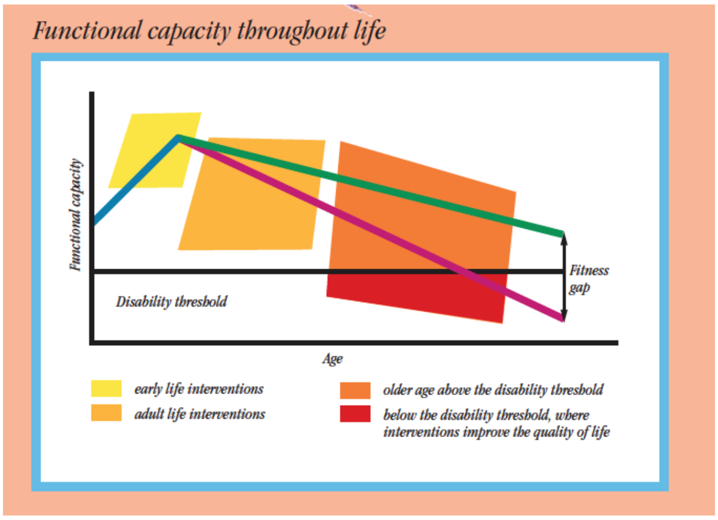
Duo-bikes: Exercise for older people through solid engineering and fragile networks

> All people in Denmark start out on a 3-wheeled bike [as kids](…) and everybody ends on a 3-wheeled bike. It makes perfect sense. I think that we can really sense that people basically still want to cycle [in old age]. And all it needs is a gentle push from their doctors, to say 'listen to me: it is no good for you to sit in the couch, because then we get old, then it goes too quickly'. We need to get out and get some exercise. Then they say, 'well what can I do? I can cycle'. It might be that the balance is no longer there, but then we can come with this 3-wheeled bike, so they won't fall. (Neil, salesman from PF Mobility, June 2017)

This extract, from an interview with an employee of the designers and manufacturers of DB – PF Mobility -, is striking in how it relates Denmark, an idea of the life course with a natural decline in functional capacity (the arch of life), health maintenance and bicycling. For Neil, the market demand for a tricycle for older people 'makes perfect sense' because bicycling is the most obvious form of exercise for a Dane who wants to keep active physically despite some age-related

Figure 3. Children at Vallensbæk Skole welcoming pilots and passengers with flags to the left. Pilots and passengers engaged in cooking and teaching at home economics class on Vallensbæk Skole. Photos by Lassen, November 25, 2015.

Figure 4. Functional capacity linked to interventions throughout life (World Health Organization, 1999: 14).



functional decline. The tricycle design makes this co-productive relationship possible, because it recognises that functional capacity declines with age but also that what the World Health Organization has called the ‘fitness gap’ (see Figure 4) can be bridged by engaging in physical activity. Further, the tricycle is intended to lock into older Danes familiarity with the bicycle thus facilitating this engagement by avoiding the age barriers that might be experienced in other forms of exercise.

As Neil also suggests, the tricycle is nowadays mostly associated with early childhood, but this was not always the case, them being especially popular in the 1870-1890s among elites as a form of genteel leisure pursuit (Herlihy, 2004). During the 20th century, a new association between tricycles and particular groups developed, linking the specific design – with or without engine - with the disability of ‘the extreme ends of life’ (Vivanco, 2013: 38). It is from within this socio-technical configuration that the DB tricycles emerged: in 1985, two craft engineer brothers in the small town of Haderup, in central Jutland, designed a tricycle solo-bike for adults. The design interested a local businessman who bought the drawings, and started producing the tricycles on a small-scale. This company eventually merged with another local small-scale bike-producer to form what is now PF Mobility. The company´s main market and product is solo-bikes for private customers with different kinds of disabilities, expanding beyond Denmark towards Germany, Netherlands and other European countries.

The DB design has two independent drive trains connected to two autonomous hub gear systems, both pilots and co-riders being able to contribute to propulsion. However, only the pilot has a steering handle bar. PF Mobility has decided

Figure 5. The solo-bike to the left and the DB to the right. Both bikes are marketed as disability bikes and stress the regaining of freedom. Photos from PF Mobility (2019).

to build the DB out of steel, as it is designed to carry two persons of up to 125 kg. Steel's robustness is also preferred to a lighter aluminium frame, because the tricycle is aimed at affording intensive, multi-rider usage in varying road conditions. As a consequence, the DB comprises a battery connected to the hub gear system. Its robustness, endurance, comfort and safety makes, according to PF Mobility, the DB a competitive model in the market for 'inclusive mobility', along with solo-bikes, mobility scooters and wheelchairs. What makes DB distinctive is its ability to support physical activity for people who can no longer ride a bike on their own, based on what they promote as solid and local Danish engineering.

Contrasting with CwA reliance on digital platforms and networked business models, the DB is mostly sold through traditional sales practices: personal face-to-face networks, long-lasting relations with retailers and municipalities, or Danish flag ornamented exhibitions on trade fairs. This is reinforced by an emphasis on a bespoke service. Sold and distributed through old-fashioned methods, DB is especially dependent on the charisma and trustworthiness of salesmen like Neil, for whom the Jutlandic saying "a handshake is a handshake" is a key business rule. This local rootedness is important to PF Mobility, guaranteeing the quality of their product and service. While such 'analogue' sales-methods and retailer/customer network might impede a quick and global spread, in the eyes of PF Mobility, it ensures a sound business model with good values and satisfied customers. DBs are designed as the embodiment of a local, small, knowledge- and engineering-based manufacturing economy.

In Vordingborg, DBs have been placed at several of the nursing homes for a number of years, although nobody knows exactly when they were purchased. In there, they have lived a quiet life with little usage until 2016, when the local division of Dane Age, the main Danish association representing older people, discovered the un-used bikes, and made a call for volunteering pilots. A small group of pilots gathered, and some of those have since driven both residents at the local nursing home and non-residential users of the activity centre connected to the nursing home. Working on a set time and place, the matching required for DB rides is minimal. It is also much easier for care workers to organise the rides and prepare the co-riders, the rides becoming part of the routine and work schedule. Finally, this seemingly fragile process is also ideal for pilots, who fit the bike rides into their own weekly schedule.

The scheme is simple: municipalities buy a bike for nursing homes, and rides take place at set times and places. This said, this simplicity is underpinned by a wider sociotechnical arrangement linked to each individual tricycle, which only became visible during fieldwork. This arrangement includes important maintenance work not only of the tricycles themselves – bike sheds, recharging stations, repairing kits and expertise – but also of the personal relations between pilots, co-riders and care personnel. Indeed, the sustainability of the scheme depends on this maintenance work, performed and negotiated locally on fragile relations: if a pilot falls ill, if the bike is damaged, if the key for the shed is gone or if the bike is not charged, all of which happens occasionally, DBs are immobile. In the nursing homes, DBs networks are in constant risk of falling apart. Once, when one of the tires got punctured during the first ride of the spring season, Arne, the pilot, was quick to express concern that it might be his last, as he could not see management finding money for another season of constant repairs. He considered repairing the tire himself, but decided not to because as he put it, 'I have been organising and fixing things my entire life. Now I just want to bike'. The work of maintaining DBs small networks is so complex that, as a result, the pilots at Brænderigården (the main municipal senior centre in the city of Vordingborg) do not look to expand the scheme or amount of pilots.

But Arne's hesitation about whether or not to fix the tire reveals another aspect of the DB networks. Whereas in CwA actors adopt stable identities and roles in the intergenerational relations it performs, in DB, identities are more blurred and fluid. This is most acute in relation to the role of the two riders. On a particular ride, Lassen followed Søren and Jenna, an older non-resident user of the activity centre. During the ride, Jenna talked a lot, but was not be seen to pedal much. At one point, Søren intervened:

> *Søren:* My wife says that women are able to multitask.
> *Jenna:* Yes, yes.
> *Søren:* Then you can pedal and talk at the same time!

Jokingly drawing on a gender stereotype, Søren's remark aimed to re-establish the normative order of the co-riding situation, and it made Jenna pedal dutifully for the rest of the trip. The most obvious normative expectation of the DB rides is that both riders are expected to pedal. More exactly, they are expected to be seen to pedal. That is to say that, while the design of the DB suggests an equal relationship – two persons pedalling sitting side by side –, the independent hub gear system enables differential contribution to the tricycle's propulsion. Both Jenna and Søren, as all other DB rider pairs, contribute to the conversation and the pedalling, but on rather unequal terms. This is a tacitly accepted feature of the DB arrangement, which means that on top of his co-rider role, Søren becomes an enforcer of compliance with the physical activity aims of the initiative, the conversation being a means for Jenna to exercise her legs. The design of the DB supports this complex and fluid configuration of roles, whereby Søren's actions blur between co-participation in a conversation, co-riding and health maintenance coaching.

The exchange of gifts deployed in DB rides is not specifically intergenerational, because the key difference between co-riders is in the relative gradient of functional capacity. In this respect, DB are in line with proposals aiming to reconstruct social relations by replacing chronological age markers with 'functional age' (Moreira, 2016). Thus co-riders value conversations on DBs because of how they bring shared, often locally-based topics or concerns to bear, a feature enhanced by the side-by-side seating arrangement. Equally, conversations tend to be present-based rather than reminiscent, deploying a version of place actualised and renewed by the ride. It is this combination of familiarity with the struggle of physical activity that makes up the affective and socio-technical arrangement of DB. As Neil put it, in the extract presented at the beginning of this section, DB tricycles enable older people to remain within their habitual ways of being while doing "some exercise".

Co-existence and critique

As it is clear, the format of active ageing enacted in DB differs considerably from that in CwA. Above, we have suggested how CwA deploys a politics of active citizenship and participation in later life, while DB is linked to a techno-politics of enablement that aims to incite older people to engage in physical exercise. We have also explained how these are scaffolded on different, alternate normative formats of 'good old age'. In this section, we ask: what happens when the two assemblages meet? While not ignoring that this question is associated with the key STS problem of coordination, for which a number of concepts have been developed (e.g. Latour, 1987; Keating and Cambrosio, 2003), we want instead to identify the actual justifications qualifying the active ageing formats in practice, as well as the possible compromises between the bicycling schemes. Our point of departure for this analysis is situations where the two bicycling assemblages come to co-exist in the municipalities we have followed.

In Vordingborg, the push for CwA by local grassroot volunteers has been controversial, mostly because the municipality already uses DBs to implement its policies on active ageing. In Ishøj, on the contrary, the introduction of CwA has been driven by municipal ambitions of co-creation and participation of older citizens. There, the two bike schemes have been running alongside each other. In the following, we will explore these two modes of co-existence and how they lead to unsatisfactory outcomes.

When the rumour of a possible local chapter of CwA reached the DB riders in Vordingborg, it was met with resistance, as exemplified in the following fieldnote:

> When I came to Brænderigården, Stig and Elisabeth were about to drive away, as they were done biking for the day. Stig was the man who had had a blood cloth, with whom I had ridden the DB back in March. Elisabeth, his wife, stopped the car when she saw me. She said she didn't think it was possible to compare the DBs with the [CwA] rickshaws. For her, it was absolutely central to get the "venous pump mechanism going". She added that in rickshaw bikes "you might as well drive in a wheel chair or drive in a car". There was no other solution, she argued, but to exclude rickshaws in

> the municipality, because it was important to get older people moving. "The older one gets, the more important it is", she concluded. (Excerpt from fieldnotes, Brænderigården, August 2017)

As the fieldnote above shows, the differences between the bikes are obvious and crucial to Elisabeth. Since Stig had the blood cloth, physical activity had become an important aspect of their life together, using DBs regularly. This seemed in some way challenged by CwA's growth in national popularity, and her argument – and fury – was directed at the possibility of seeing so many people who could still pedal themselves, ending up sitting inactive in rickshaw bikes. As it happens, the managers in Elisabeth's municipality agreed with her, as did the manager at Brænderigården, who stated that "the entire idea with the bikes is to get people out and moving. The users should pedal".

From this perspective, CwA is criticised as missed opportunity, engaging older people only to reinforce received and ageist ideas about the limited possibilities of physical ability associated with age. In addition, DB supporters point to the potential ephemeral quality of CwA, not having the local rootedness to provide sustainability to the scheme. Finally, this ephemerality is reinforced by PF Mobility's claim that the CwA rickshaws are brittle, PF Mobility expecting them to break (and hence a lot of orders on DBs) when the first CwA bikes have been on the roads for three to four years. As result, the local supporters of the DB bikes reinforce their commitment to a particular format of the good old age wherein functional capacity is improved by physical activity, supported by robust local networks and bikes that endure.

Challenging this epistemic and normative commitment causes local controversy. When Morten, a CwA enthusiast in Vordingborg, was interviewed in March 2017, he had been engaged in organising CwA in the municipality for two years. It started well and smoothly in 2015, when he promoted the initiative at the local summer festival, and consequently received a private donation for a CwA bike. However, the municipality would not subscribe to CwA. Convinced of the opportunities for active citizenship afforded by CwA, Morten continued his quest, and during the summer festival of 2016 a local businessman donated a second rickshaw. Morten found housing for one of the bikes at a nursing home, but as the municipality is not a member of CwA, pilots and passengers were not insured, making it almost unusable.

Morten became increasingly annoyed by the difficulties and did not accept the political stance that the CwA bikes were ageist, with which he was received at meetings with municipal officers. Eventually, he was so frustrated that he locked the second (homeless) bike with a large lock to the railing in the city council during Christmas, with a note stating that this was a Christmas present to the municipality that needed housing. He added his telephone number and signed the letter as Santa Claus. Approximately 10 days after new years' eve, a municipal manager scheduled a meeting with Morten, and the municipality agreed to house the second bike in one of their nursing homes. However, the municipality still did not subscribe to CwA. The CwA-founder, who attended the meeting with the municipality, ended up offering Morten a discount for the subscription, if he could find local donors.

Eventually, Morten convinced the mayoral candidate from the social democratic party to promote CwA, in a promise to enhance co-creation and old age participation in the municipality. This mayoral candidate was eventually elected as mayor, but the CwA was introduced prior to elections, apparently partly because the old administration did not wish for the bikes to become part of the campaign. As result, the bikes now co-exist in Vordingborg, but the local controversy about the ideal bike for older age only seems to have intensified, and the integration of CwA in Vordingborg is experiencing difficulties, as the bikes are still seen as ageist amongst personnel and DB-pilots. Despite some publicity in local and social media, Morten is struggling to find co-volunteers and support amongst the care personnel, and the introduction of CwA in Vordingborg only seems to have reinforced that the municipality is committed to the DB as implements of a good old age focused on the enhancement of functional capacity.

The situation in Vordingborg exemplifies the first possibility of co-existence, that of mutual critique and controversy. In this situation, the two initiatives and their ambassadors mutually argue that the other bike is flawed by drawing on different justifications: because it is inherently ageist (CwA), or conversely because it poses a normative ideal of good old age that is narrowly focused on functional capacity (DB); because it takes older people to be passive, or alternatively because it excludes older people who might not be able to engage in physical activity; because it takes volunteering closer to the organisation of the 'gig economy' or because it relies on 'old', obsolete ways of volunteering; because it is inflexible in its scheduling, or because it is more suited to those living independently; because it is – socio-materially - too 'light' or too 'heavy'. This situation generates neat spatial and cognitive boundaries between the assemblages and the identities therein, reinforcing their internal coherence, epistemic difference and hindering mobility of actors – human and non-human – across the bike initiatives.

The second possibility of co-existence can be exemplified through the way the bike initiatives are coordinated in Ishøj, where they are seen as having different qualities and users. Ishøj became a member of CwA in early 2015. This coincided with the local Old Age Administration's push for more co-creation initiatives in the sector. Municipal officers were employed to start the Older People's Network which, through peer to peer contact, social media and their website, promoted Ishøj as a good place to grow old within a closely knit community. The network established lunch clubs, where older citizens could gather weekly in different parts of the municipality to buy and eat lunch for a small amount. Volunteers set the tables, and local musicians or other types of entertainment would sometime come to perform. The municipal officers were mindful not to call the participants 'guests', and organised people to actively participate in food preparation and other chores. A pool of money was set aside for municipal home care assistants to transport immobile older citizens to and from the club.

As part of this network, and in this atmosphere of co-creation, CwA was launched as an opportunity to do something good for the community. The initiative received much local attention, and was integrated in a range of events (see section "Cycling without Age: Brokering active citizenship and effervescence"). Many volunteered (although the majority only volunteered for a couple of bike-rides and afterwards disappeared) and local kiosks and cafes supported the initiative with free coffee for pilots and passengers. Soon, the bikes were used by pilots to transport older citizens to the cafés, as the funds for municipal home care assistants to transport the older citizens ran out. The older citizens got to meet new people and engage in conversation during the ride and at the lunch clubs.

At this time, Ishøj already owned DB bikes, and had done so for 12 years. As in other DB local schemes, these were used once weekly by few volunteers – three so-called bike-men – with no publicity or fuss. This co-existence is somewhat working. There appears to be a distributive arrangement whereby the different initiatives are engaging with different actors and institutions, with different narratives and justifications supporting each of them. Nursing home residents, or those coming to their day care centre, use DBs through its regular, rooted networks and procedures. The three volunteers come every Monday and have a list of passengers from which they agree with the personnel (who dress and prepare the passengers) who should have a ride. The local nursing home manager is pleased with the DB and the bike-men, as she "like[s] the equality between the riders" and finds it problematic that so few residents get outside and exercise. While she justifies the DB with how it performs equality and enables exercise, she does not contrast this to the CwA initiative. Between the assemblages, there is not so much as a boundary, but a mutual indifference. The bikes are placed in different bike sheds, are used by different volunteers and passengers, and are organised by different actors from the same old age administration.

Our fieldwork data suggests that this pacific co-existence is, however, fragile. As we have proposed above, the dynamic of CwA is sprawling and proselytist, its sustainability being supported by an ever extensive range of pilots and passengers. In Ishøj, this was reinforced through linkages to social media and political networks that cemented the format of active ageing as participation and inclusion through bicycling enacted by CwA. While the physical activity embedded in DB was not resisted, physical activity and functional capacity was not used to justify biking in old age. This meant that the CwA network would inevitably come in contact with DB if only to make it increasingly invisible. Established through an expansive mode, CwA comes to stand as the exclusive cycling for 'active ageing' approach. As a result, DB's distinctive approach comes to lose some of its legitimacy, detached from the wider networks of old age programmes and their politics. A temporal frame of explanation emerges, where the old DB bikes are silenced at the margins of local old age policies. The DB justification is supporting a different format of active ageing than the one being politically supported in Ishøj. In this setting, DB becomes increasingly 'obsolete' in the face of CwA.

Above, we have unfolded two different possible modes of co-existence. In both cases, the local administration favours a specific format for active ageing and the good old age. In the case of Vordingborg, the format is challenged thereby causing explicit controversy. The different actors justify 'their' bike scheme with arguments of functional capacity or participation respectively. They do not attempt to argue by borrowing from the 'other's' way of justifying, but stick to their own political and epistemic commitments. In the case of Ishøj, the format promoted by the local old age administration makes the already-existing bike scheme increasingly obsolete. But as the bike-men are not engaging politically in attempts to justify the format of the good old age embedded in the DBs, the co-existence is more pacific, albeit fragile for the silenced bike scheme, as they become increasingly invisible.

In search of a compromise

In this paper, we have shown that CwA and DB are best understood as different materialisations of 'active ageing', the former assembling social participation and the latter configuring bodies towards functional health. We examined how such enactments of bicycling-as-active-ageing are related to differing arrangements with specific scaling effects – CwA relying on a dynamics of growth, while DB being linked to configuring use as 'locally' rooted. We explored how these divergent scaling effects are linked to practices of valuation of things, attachments and bodies, and how they are linked to national technopolitical imaginaries of old age. In this, we have detailed how CwA on the one hand deploys a digital politics of active citizenship and participation in later life, and how DB on the other hand is linked to a local politics of enablement that aims to incite older people to engage in physical exercise. While these initiatives are locally rooted in Danish cycling culture and old age policies, they also entail a larger story about the ways practices embody policies, and how such practices rely on political and cognitive formats to justify their specific configuration of an active old age.

Our analysis suggests that existing attempts to articulate between the two assemblages create either conflict or dominance of the 'light' over the 'heavy', reducing passages between initiatives and diversity of opportunities to cycle in later life. Compromise, then, appears as the route towards enhancing those opportunities. Although we have not observed this form of co-existence in our fieldwork, we think it should be possible for the two initiatives to learn from each other, creating a socio-technical compromise that is neither territorially based or relying on 'waves of innovation' and their technoscientific promises.

Compromises require the establishment of a composite object that transcend differing orders of worth (Boltanski and Thévenot, 2006). Based on our fieldwork and analysis, we suggest that finding a compromise in this situation entails local experimentation and actors willing to challenge their practices and ways of justifying their specific bike schemes. We propose that a possible compromise could rely on the building of passages (Moser and Law, 1999), i.e. transient and fragile routes that support the transference of objects and actors, between the two assemblages, as a possible way to form and experiment with composite objects. Unlike trading zones (Galison, 1997) passages are not institutionalised communication platforms. The concept of passages attends to the specificities of not just objects, but also of the passages between them, and the ways such specificities form the abilities or disabilities of persons. This is needed because of the assemblages' uneven power and access to resources. Thus, the co-learning between them would be based on specific issues and items, to avoid one being incorporated into the other. Searching for a compromise would address questions such as: Could the seeming equivalence between pilot and passenger enacted through DBs, which enables better conversation, be used in the technical design of the CwA? Could digital platforms be used in expanding the use of DBs? Could CwA's politics of participation and local engagement be supplemented by DB's politics of inclusion and enablement?

Exploring these and other questions would establish, we propose, passages between the objects (bikes, sheds, booking systems, etc.), capacities (pedalling, physical activity, community, participation) and human actors (volunteers, passengers, care personnel, repairmen, etc.) of the two assemblages. We submit that their exploration can only be done in practice, through local experimentation. This would be best done without policy co-ordination, avoiding the desire to build a composite out of the 'best features' of both initiatives. Instead, our proposal is that specific arrangements need to be worked through the material contingencies of everyday co-cycling in later life, a form of 'distributed innovation' where designers and users, in collaboration with social scientists, attempt to adjust and enhance the articulations between existing practices of active ageing, creating 'passages' across assemblages. These would inevitably be transient and fragile routes that support the transference of objects and actors between the two assemblages, and serve as a possible way to form and experiment with composite objects. We hope this paper might serve as point of departure in such collective exploration.

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Researching Collaborative Interdisciplinary Teams: Practices and Principles for Navigating Researcher Positionality

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Abstract

Collaborative interdisciplinary research is on the rise but can be difficult and daunting. There is much to learn by studying the inner workings of collaboration, to the potential benefit of both science and technology studies (STS) and those who collaborate. We have been studying the inner workings of a collaborative interdisciplinary team using formative accompanying research (FAR). Assuming multiple insider-outsider vantage points implied adopting dynamic positionality in relation to the team. In this article, we outline an approach to navigating positionality based on these research experiences. Navigation is aided by identifying learning orientations to a collaborative team, to learn about, with or for the team; and by adopting practices and principles to balance i) observation and participation; ii) curiosity and care; and iii) impartiality and investment. We illustrate what we have learned so far, demonstrating how to apply these navigating instruments so that the skilful use of FAR positionality can advance the understanding and practice of collaborative interdisciplinary research.

Keywords:interdisciplinary collaboration, research methodology, dynamic proximity, critical reflexivity, embedded relationality, participant observation

Introduction

The proliferation of collaborative interdisciplinary research is well documented (e.g. Klein 2015; Stokols 2014). By collaborative interdisciplinary research, we mean research conducted through teamwork that integrates two or more disciplines or fields of knowledge (National Academy of Sciences et al., 2005; Pfirman and Martin, 2010). Indeed, such is the contemporary appeal of interdisciplinarity that Jasanoff (2013: 99) has portrayed it as "the new Canaan, the promised land where ailing scholarly traditions go to be reborn and academic creativity is set free." However, it remains difficult to translate aspirations of productive and meaningful interdisciplinary collaboration into successful research projects (Darbellay, 2015; Strober, 2011; Weingart, 2014). Barriers to success range from the institutional and administrative to the interpersonal and emotional (Fitzgerald et al., 2012; Klein, 1990).

At the interpersonal level, epistemic and social difficulties can arise from the complexity of dealing with high levels of heterogeneity. Members of an interdisciplinary team are tasked with integrating different research goals, research methodologies and types of knowledge, which involves working across different disciplinary cultures and working styles while engaging with plural quality criteria, value systems and norms (Boix Mansilla, 2006; Hampton and Parker, 2011; Strober, 2011). Thus it is unsurprising that there is considerable ambivalence with regards to collaborative interdisciplinary research – what Padberg (2014: 96) refers to as 'reservation' and Ledford (2015: 309) as 'resistance'. Ambivalent team members constitute an additional difficulty, sending mixed messages that can foster confusion and inertia in collaborative teams. In sum, there is a tension between assumptions on the one hand that interdisciplinary collaboration can address the complexity of contemporary research questions and thus deserves considerable investment of time, effort and funds (e.g., Gleed and Marchant, 2016) and, on the other hand, the myriad barriers and uncertainties faced when engaging in such collaborations.

Considerable research attention has already been paid to learning about collaborative interdisciplinary research and to advancing it. However, there is relatively little research on the inside, lived experiences of interdisciplinary collaboration (Callard et al., 2015; Mauthner and Doucet, 2008), where interpersonal difficulties manifest (Barry and Born, 2013). For example, Fitzgerald et al. (2014: 701) note that the field of science and technology studies (STS) has not given much account of "what it is actually like to participate in such a research space." However, when reading the few accounts that do exist, such as those by Fitzgerald and colleagues about their involvement in a collaboration between neuroscientists and social scientists (Callard and Fitzgerald, 2015; Fitzgerald et al., 2014), it is difficult at times to discern whether they are describing their experiences as STS researchers or those of the collaborative team they were studying. Indeed, STS investigations into the lived experiences of collaboration can create enmeshed "… obligations, concerns, loyalties, friendships, contradictions, hopes and fears" (Balmer et al., 2015: 9), particularly if there is a shared interest in the research topic. The resulting risk is that a researcher who moves between the inside and outside "can lose her sense of herself" (Humphrey, 2007: 23) and, we would add, lose track of her positionality in relation to the team. The possibility of becoming disorientated is particularly strong in the complexity and "messiness" (Cosley et al., 2014) of a large collaborative interdisciplinary project. Acknowledging the inevitability, and merit, of a certain degree of entanglement, we propose methodological guidance to navigate it and thus reduce the risk of an STS researcher losing their bearings altogether.

To this end, we introduce a methodology we are using to conduct research in a large collaborative interdisciplinary project. This methodology, which we have called formative accompanying research (FAR), is committed to promoting knowledge about interdisciplinary collaboration while collaborating. The first author, (Rebecca Freeth) is conducting FAR as a member of the collaborative team, supported by the second author (Ulli Vilsmaier). We both span disciplinary boundaries in our own research work, sharing an interest in the field of sustainability as well as in inter- and transdisciplinary knowledge regimes. We have worked with collaborative teams over many years, facilitating, co-ordinating, collaborating with and accompanying inter- and transdisciplinary research projects. When taking on certain of these roles we had experienced advantages of being mostly outside the core team. But we had also identified the limitations of lacking a deep understanding of the challenges and difficulties that are faced inside collaborative teams. Drawing on these experiences, we developed and implemented FAR, operating on the assumption that being on the inside offers a deep vantage point to experience the inner workings, while explanations about the mechanisms of such collaborations benefit from the distance afforded by moving further away.

The distinctiveness of FAR lies in its dynamic positionality, which emerges from its characteristic movement between learning *about*, *with* and *for* a collaborative research team. Learning *about* has the epistemic goal to create transferable results, pursued in the role of scientific researcher.

Learning *with* has the goal to learn alongside the team, in the role of a team member. Learning *for* has the goal of supporting the team to advance its research outcomes, in the role of an intervener. To support purposeful movement between the three learning orientations, in this article we identify and discuss the following as navigational aids, which also serve to define FAR:

1. Three balancing acts: between observation and participation; between curiosity and care; and between impartiality and investment;
2. Three practices to negotiate the paradoxes implicit to each balancing act: a practice of dynamic proximity to navigate between observation and participation; a practice of critical reflexivity to guide the exercise of curiosity and care; and a practice of embedded relationality to balance impartiality with investment; and
3. Three anchoring principles: congruence, sensitivity and translucence.

Thus we seek to traverse dualistic imaginaries of a researcher being and doing either this *or* that by substituting a practice of fixed positionality with practices of dynamic positionality. Our intended contribution is a methodology that has potential to advance collaborative interdisciplinary research by remaining oriented and fleet of foot amid the inevitable entanglement, complexity and messiness.

To make this proposal, we start by introducing FAR in relation to neighbouring methodologies and the collaborative project in which we have applied it, entitled Leverage Points for Sustainability Transformation (Leverage Points). Then we outline the methodology itself in terms of its approach to dynamic positionality and the balancing acts that this involves, and present a series of practices and principles to navigate those balancing acts. Using examples from our experience, we demonstrate how this approach can work as a heuristic for navigating dynamic positionality and identify modest initial successes as well as pitfalls. The article ends with prospects for further investigation.

Locating formative accompanying research

FAR can be located in relation to other, neighbouring, methodologies that learn about, with *or* for projects. We start with the two at the core of the FAR terminology – i.e. formative research and accompanying research. Accompanying research is a direct translation of *Begleitforschung* in the German-speaking context. However, *Begleitforschung* refers to an amorphous range of research activities, broadly studying the impact of technology, and is most directly comparable to ethical, legal and social implications research (ELSI) (Fiedeler et al., 2010). In a bid to address the semantic and methodological confusion, Defilia and Di Giulio (2018) have proposed a typology for accompanying research, which differentiates complementing, meta and integration-oriented types. Using this typology, the distinguishing feature of FAR is that it can move between all three.

Formative research runs contemporaneously with a (research or other) project, generating information to trigger ongoing reflection and adjustment. It aims to strengthen project design and implementation through iterative cycles of feedback and learning (Reigeluth and Frick, 1999; Chen, 2010). The possibility to not only learn *about*, but to learn *with* and *for* a collaborative team gives FAR opportunities to play a formative role, helping to shape a collaborative project while there is still malleability in its design. It is also here that the potential to advance collaborative interdisciplinary research lies, at the micro scale of the project. None of the existing descriptions of accompanying or formative research capture the idea of research positionality constituted in movement, between insider and outsider roles as proposed in FAR.

FAR can also be considered in relation to methodologies designed to research and promote interdisciplinary collaboration, such as Socio-Technical Integration Research (STIR) (Gjefsen and Fisher, 2014) and the Toolbox Dialogue Initiative (O'Rourke and Crowley, 2013). What they have in common with FAR is an appreciation of the value of "interactional expertise" (Collins and Evans, 2002) in collaboration – i.e., the capacity to engage meaningfully across disciplinary and other differences in academic environments. However, their strategies are intervention-oriented, to remedy largely predefined problems of collaborative interdisciplinary integration (Fisher et al., 2015) as opposed to FAR's slower and more exploratory emphasis on learning *about* and *with* a collaboration, alongside possibilities to learn *for*.

FAR bears similarities to, and is distinguishable from, embedded research (e.g., Hackett and Rhoten, 2011) and ethnographic research (e.g. Beaulieu, 2010). Like embedded research, FAR foregrounds the advantages of being positioned within the project being researched. However, embedded researchers tend to be temporary sojourners, having a primary research home elsewhere, and their research has pre-formulated and instrumental outcomes – such as strengthening the efficacy of health systems (Olivier et al., 2017). By contrast, a formative accompanying researcher remains *in situ*, anticipating a strongly emergent flavour to learning outcomes. While FAR does not share the sociological or anthropological disciplinary roots of most ethnographic research practices, it gains from a rich ethnographic tradition of research into research (e.g., Beaulieu, 2010; Rabinow, 2011; Thompson, 2009) and has potential to contribute further insights into the "chameleon"-like qualities (Balmer et al., 2015: 16) of an ethnographic STS researcher.

Thus we locate FAR within the field of STS, acknowledging the diverse sources of intellectual inheritance on which STS draws (Jasanoff, 2013). A FAR approach is intended to slip free of the ethical, legal and social implications (ELSI) era of STS and thus avoids joining the ranks of "joyless and humourless handwringers" bent on keeping science accountable (Balmer et al., 2015: 7). While we see potential for FAR to strengthen practices of interdisciplinary collaboration, this is about generating awareness and learning within collaborative projects rather than sanitizing them or imposing order. Thus FAR aligns well with the post-ELSI approach to STS, which seeks to be more intimately engaged and constructive, with the aspiration that "…'working with' scientists and getting further entangled could help to produce novel and more diverse forms of objects *and* knowledge for *all* participants." (Balmer et al., 2015). Furthermore, this takes advantage of what the European Science Foundation notes as "the emergence of a *self-consciously interdisciplinary practice* within the modern academy" (Fitzgerald et al., 2012: 11 emphasis added). The Leverage Points project is an example of more self-consciously interdisciplinary research.

The Leverage Points collaboration

The Leverage Points project aims to critically examine deep leverage points for sustainability. Inspired by the work of Donella Meadows (2008), it focuses on three realms of leverage: restructuring institutions, re-connecting people with nature and re-thinking knowledge production for sustainability (https://leveragepoints.org; Abson et al., 2016). The international team consists of 23 researchers from multiple disciplinary and interdisciplinary backgrounds spanning the social and natural sciences, as well as law, engineering and design. The Leverage Points project is a case of "functional interdisciplinarity" characterised by "data exchanges and common epistemological approaches linking different disciplines and framing integrated research projects" (Whatmore, 2013: 166–167). Co-locating all the researchers at Leuphana University in Germany facilitates day-to-day collaboration. Deeper integration is attempted through combining conceptual work with empirical research and transdisciplinary case studies. When the project was initially conceived, it was decided that one of the researchers would study the team itself, in the role of a formative accompanying researcher. The purpose, as expressed in the initial project description (Lang et al., 2014: 19) was to investigate processes and team dynamics of collaborative knowledge production and to use the insights gained to "inform, shape and improve the research process" of the Leverage Points project on an iterative basis. Thus the ultimate objective of FAR was not only to learn about, but also to advance the practice of collaborative interdisciplinary research in this project, and to the benefit of other interdisciplinary research collaborations.

As the formative accompanying researcher, Rebecca Freeth has been provided with two offices. One is co-located with the Leverage Points team and the second is under the auspices of the Methodology Center, where FAR has been conceptualised. Despite the strong presence of natural science expertise in the team, the majority of team members have experience or a qualification in social science and there was a mix of methodological preferences. As a result, and in contrast to some STS accounts in interdisciplinary collaborations (e.g., Callard and Fitzgerald, 2015; Viseu, 2015), the formative accompanying researcher was not isolated or embattled by virtue of being in a disciplinary or methodological minority. Instead, the main challenge for FAR at the outset was one of positionality.

Navigating positionality: Balancing acts and practices

What we miss in much of the STS work as well as other ways of studying collaborative research, such as science of team science (SciTS), is an approach that does methodological justice to the complexity of the research situation being studied. Given that FAR is constituted on the move, we are seeking ways to work with the complexity in a methodologically sound way. For this, we draw on Haraway's (2004: 5) argument in favour of creating "situated accounts", which involves being "in the action… finite and dirty, not transcendent and clean" (Haraway, 1996: 439), without getting lost in the action. Our approach to FAR is based on how this theoretical stance could apply in practice, providing guidance rather than guidelines. Organizational scholar Czarniawska (1997: 177) notes that, as researchers, "…we generally remain blind to our own role and position." If this is true for research in general, how much more significant is it that research into research makes its positionality explicit, particularly when studying collaborative interdisciplinary research? However, Balmer et al. (2015: 19) observe that in STS research, a reflexive approach is "more talk than practice".

The concept of positionality indicates the situatedness of any researcher and enables the context of their research to be taken into account (Vilsmaier, 2012). Our approach to positionality is both epistemological and methodological. We understand positionality of a formative accompanying researcher to comprise three interrelated aspects. At a practical level (i) positionality describes *physical location*, the temporal and spatial proximity to the research team with which a formative accompanying researcher works, and their constantly shifting positions in relation to the team. These movements indicate that (ii) positionality also represents *methodological strategies* a formative accompanying researcher can adopt to navigate degrees of proximity. These strategies further imply that (iii) positionality is a *reflexive research practice* of adjusting proximity, taking seriously the ethical considerations of power inherent in being both participant and observer (Eyben, 2009).

Figure 1 presents three sets of tensions a formative accompanying researcher is likely to encounter that may pull them in multiple directions. We translate these tensions into three balancing acts for a researcher to navigate, guided by practices and principles. The first balancing act between participation and observation amplifies well-documented tensions inherent in conducting participant observation, (e.g. Pink 2012; Quinn Patton 2014). This is also expressed as being an "insider-outsider" (Humphrey, 2007) and has implications for what the researcher can see by virtue of their location in relation to the collaborating team. A second balancing act between curiosity and care relates to how the researcher sees, through the kind of scientific gaze they adopt (following Haraway, 1988). The third balancing act between impartiality and investment deals with the visibility of the researcher's own interests, related to

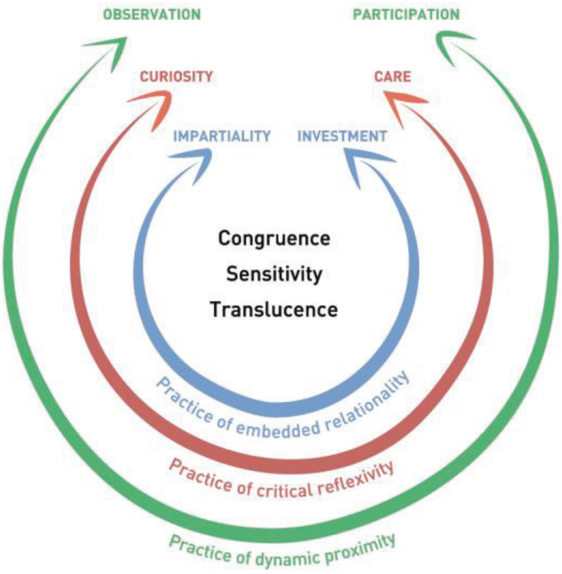

Figure 1: Navigating FAR positionality: Balancing acts, practices and principles

dynamics of partiality and power in research relationships (e.g. Blædel 2013).

If one assumed that balance was something to be found and then maintained, it would be tempting to use these balancing acts as an answer to the question: should the FAR researcher be an impartial *or* invested observer *or* participant, acting with curiosity *or* care? Instead we propose that each balancing act represents a continuum and that all positions along this continuum are possible and appropriate at different times. Moreover, no position exists independently but in relation to other positions on the continuum. Each continuum is curved to express the idea that the ends are not polar opposites (Fig. 1). This opens up the possibility that moving from one end of a continuum to the other could happen by traversing the full line between them, or by leaping the gap. Presented this way, the balancing acts are designed as an instrument to identify, at a particular moment in time, the particular co-ordinates of the researcher's positionality, and movement between different moments in time. This helps to inform a reflexive FAR practice without inhibiting its characteristic fluidity.

Balancing Act 1: Observation and Participation

Bruno Latour (1999: 26), accustomed to tracking scientists and their science in laboratories and archives, "decided for a change to observe a field expedition", accompanying a team of natural scientists to Brazil to take soil samples. As the others busied themselves with the technical rigors of their science, he turned his observing lens on himself, "What about me, standing here, useless, arms dangling …?" (Latour, 1999: 47). When does a researcher, primed to do participant observation, instead find himself an awkward, gawking spectator?

This question about the degree to which a researcher is, at any time, more a participant or more an observer is a function of two interdependent aspects: their *location* nearer or further away, and their *role* as insider or outsider - or more accurately, as both insider and outsider. In terms of location, different degrees of proximity afford different perspectives (Berger, 2013), which holds "not only in a spatial but also in … a metaphoric sense." (Breuer and Roth, 2003: 3); A researcher's proximity, whether literal or figurative, creates blind spots. One type of researcher blind spot is born of over-familiarity; a hazard of being too close or "too much of an insider" (Gunasekara, 2007: 469). Another risk of close proximity, but the opposite of a blind spot, is magnification. If a researcher is highly sensitized to a particular phenomenon, they might exaggerate its presence in their observations (Russell and Kelly, 2002). Science has been studied across a spectrum of proximities, from far away in space and time (e.g. Kuhn's reconstruction of Newton's scientific revolution) to very close in space and time (e.g. Knorr Cetina's ethnographic work in laboratories). However, Knorr Cetina was an outsider to the scientific team, pursuing her own research questions. Hackett and Rhoten (2011) differentiate between inside-out and outside-in STS. FAR represents a case of the former, pursuing research questions developed in consultation with the collaborative interdisciplinary team being researched.

Inside-out research has consequences for how the researcher's role is perceived, often resulting in multiple, conflicting expectations (Brohm, 2009). The ones being researched may harbour and express concern about this role, not least because of the legacy of the science wars, which continue to cast a shadow (Fortun, 2005). Humphrey (2007: 23) warns that an inside-out researcher "can be pushed and pulled along an invisible insider-outsider continuum by others who have a vested interest in who she is and what she is doing …"

We propose a practice of dynamic proximity to manage the inherent paradoxes of this balancing act between observation and participation. Inspired by the dialectical approach of Eberle & Maeder (2011) to organizational ethnography, a FAR practice of dynamic proximity guides movement between:

- Being near enough to pick up details, and far away enough to be able to see as much of the whole-in-context as possible;
- Being near enough to discern opportunities for team reflection, but not so close that this happens solely by virtue of the formative accompanying researcher's intervention; and

- Being near enough to perceive when the conditions are ripe for team-level learning, and to nurture these conditions, and far away enough to avoid imposing a learning agenda.

Studying a team from multiple perspectives along the observation – participation continuum gives the researcher access to internal dynamics that either enable or disable collaboration. Given that such dynamics are "rarely recognised let alone discussed" in academia (Strober, 2011: 2), it becomes important how the researcher balances curiosity and care in the scientific gaze they direct towards the collaborative team.

Balancing Act 2: Curiosity and care

Curious researchers can set in motion a series of unintended consequences for the situation they are studying. If even the seemingly benign act of interviewing can trigger changes in interviewees' relationships with what they had previously taken for granted (Müller and Kenney, 2014), does the researcher have a responsibility to take greater care?

STS research has at times been characterised by a particularly intrusive brand of curiosity, epitomizing "powerful rhetorics of witnessing and revelation" (Garforth, 2012). The question of care has gained significant attention in recent years with moves from a dispassionate stance to recognition that "[I]f something is constructed, then it means it is fragile and thus in need of great care and caution" (Latour, 2004: 247). Puig de la Bellacasa (2011: 98) builds on this, suggesting that where other people are involved, "care is a doing necessary for significant relating". Conscious that care taken by women researchers could fall into gender stereotyping traps, she asserts that it is possible to care in a non-sentimental fashion. In a similar vein, Atkinson-Graham et al. (2015: 746) refer to a "politics of care". Thus scientific curiosity, described by McCarty (2016: 79), as the "urge to know" is still given free rein, but is a more careful curiosity, attuned to possible impacts of the research on the other and the potential that "accompaniment" in science can "…contribute to and constitute a *flourishing* existence" (Rabinow, 2011: 217).

In the case of FAR, the notion of 'accompaniment' implies walking in step with those being researched. This implies that the researcher's gaze is not always directed straight at the collaborative team but is sometimes cast with interest in the same direction in which they are looking. We propose a practice informed by "critical reflexivity" (Haraway, 1991: 197) to balance scientific curiosity and care, avoiding the extremes of cavalier intrusion and paralyzing caution. If critical reflexivity infers "turning of the researcher lens back onto oneself to recognize and take responsibility for one's own situatedness within the research and the effect that it may have on the setting and the people being studied … " (Berger, 2013: 220), a FAR practice of critical reflexivity enables movement between:

- Being curious enough to stay in inquiry mode, alert to surprise;
- Being caring enough to know when is the right time to dig deeper into inquiry. Some developments in collaborative teams need time to mature before being scrutinized; and
- Being non-sentimental enough to care about a team's wellbeing without becoming custodian of it.

Insights gained from learning *about* a team's epistemic and social dynamics in this way can potentially be used to learn *with* a team, opening up possibilities to reflect together on how team interactions either facilitate or hinder achievement of their shared research goal. However, this also creates the risk that the formative accompanying researcher becomes overinvested in the team's research success, which ushers in the third and final balancing act of impartiality and investment.

Balancing Act 3: Impartiality and investment

Where once the scientist's invisibility and detachment were sources of trustworthiness, now Haraway (1996, 2004) and Jasanoff (2004) suggest that the scientist is trustworthy only when they no longer erase their presence from their scientific work and instead deal with the consequences of presence.

Wherever a researcher is positioned on the observer – participant and curiosity – care continuums at any one time, they have vested interests that carry power. Thus in our third balancing act, we propose impartiality at one end of the continuum, distinguishing 'impartiality' as being aware of interests but seeking to remain unbiased, from 'neutrality' as claiming to be interest-free and/or unaware of interests. At the other end of the continuum is investment. When a FAR researcher observes a project meeting in which decisions are being made which affect her as a member of the project team, she is invested. The continuum as a whole is about degrees of conscious interest by a researcher in what is at stake. Haraway (1988: 585) does not see a contradiction between being objective and partial, advocating for "… a practice of objectivity that privileges contestation, deconstruction, passionate construction, webbed connections, and hope for transformation of knowledge and ways of seeing." Whether learning about, with or for an interdisciplinary team, the researcher is in relationship with the people and situations she is researching. What, and who, she is studying matters to her.

To balance impartiality and investment, we propose a third practice of embedded relationality, that considers partiality – which is not the opposite of impartiality – an inevitable consequence of being in relationship. Haraway's (1991: 191) understanding of "embedded relationality" is that it produces "partial, locatable, critical knowledges sustaining the possibility of webs of connection called solidarity in politics and shared conversations in epistemology." A practice of *embedded relationality* involves:

- Sometimes explicitly claiming the power granted by an insider-outsider perspective to interpret research material;
- At other times deferring to the interpretations of team members by virtue of their insider lived experience; and
- Most times, an engagement between researcher and team to enrich interpretation from both perspectives without resorting to lowest common denominator compromise.

If the positionality of a participant observer can never be interest-free, the alternative is to actively deal with the interests and power vested in their position. For this reason, we advocate identifying principles that can realize an ethics implicit to navigating positionality.

Anchoring principles

The three balancing acts and practices can serve as navigating instruments for a highly mobile approach to researcher positionality. However, this could still result in too many degrees of freedom. We therefore propose that researchers identify key principles that can act as anchors for their practice, securing a starting point and enabling movement within a certain circumference. The principles we found useful may not be as relevant to other researchers due to the singularity of each research situation.

We anchored our FAR practices in the following principles:

- *Congruence*: STS researchers have been criticised for repeating the epistemological or methodological 'mistakes' that they critique others for committing (Roth and Breuer, 2003). To be congruent in our FAR work, as it became increasingly focused on the difficulties of interdisciplinary collaboration, meant that our own research practice would have to pay particularly close attention to how we collaborated with others;
- *Sensitivity:* If we are studying projects and people in process, then "engaging with their becoming … affects the way we produce knowledge about things." (Puig de la Bellacasa, 2011: 100). According to Corbin & Strauss (2008: 41), sensitivity is derived from "immersion" in the research situation and hence being able to "…respond intellectually (and emotionally) to what is being said in the data…"..
- *Translucence*: Demands for greater transparency in research (Beaulieu 2010) represent a welcome (re)claiming of power by those who are researched, but transparency has become a cliché and thus lost the nuance of its meaning. There are also occasions that demand

> some degree of opacity, for example when early research findings are too embryonic to be shared productively. We are in favour of a FAR *principle of translucence* that allows light through while certain shapes remain indistinct. For example, in the process of drafting this article, we presented our key ideas about FAR positionality to the Leverage Points research team for discussion and improvement.

The final part of this paper describes experiences of practicing FAR in the Leverage Points project. A series of three narratives, drawn from the research journal of the formative accompanying researcher, demonstrate how the balancing acts can work in practice for navigating positionality, providing some initial considerations for other STS researchers who aspire to advance collaborative research.

Producing situated knowledges: Three FAR narratives of navigation

The following narratives, presented in a chronological order, relate to experiences of moving between the three orientations of learning about, learning with and learning for a collaborative interdisciplinary team. Learning with and for a team opens up a messy world of possibilities, which the balancing acts can help to both anticipate and analyse. A particularly perplexing possibility appears where STS research and intervention meet (Zuiderent-Jerak and Jensen, 2007). The prospect of intervening can be both seductive and disorientating for an STS researcher (Hackett and Rhoten, 2011). Thus each FAR narrative provides a different window on our experiences of navigating positionality, when opportunities to intervene beckoned. The first narrative is an account of uninvited intervention. It demonstrates how the balancing acts (Figure 1) can be used as a heuristic instrument to track one's own navigation of positionality. The second and third narratives demonstrate more and less successful examples of navigating positionality, respectively, leading to reflections on the approach we have proposed in this article and what this implies for future research.

A situation of uninvited intervention

Six months into the FAR research, the formative accompanying researcher was observing a project management meeting. The nub of the discussion was about how to manage the consequences of making decisions, under resource constraints, that could trigger dynamics of inclusion and exclusion in the collaboration. Those present expressed acute concern about the impact on levels of happiness and trust in the team, while feeling pressure to take decisions. The discussion was open and those involved seemed unguarded and constructive in their exploration, but the meeting ended awkwardly, with an air of incompletion.

Cognisant that the dilemma had not been satisfactorily addressed and that the stakes were high, the formative accompanying researcher leaned forward from her position outside the circle of chairs and asked if she could speak "in the spirit of not only being an observer but also having a reflection role." After getting a clear yes, she did three things: First, she provided a perspective garnered from one-to-one interviews with team members (including all the people at the meeting), which had revealed a perceived ethos of goodwill and trust in the project, and which had been experienced as fostering creativity and productivity in the early stages of the collaboration. Second she posed a question to reframe the dilemma by saying: "If you knew that this ethos was a resource in the project, how could you handle this situation in a way that both assumes its availability, and continues to build it?" Third, she offered the opinion, that "each of us in the project is responsible for our own happiness."

This narrative demonstrates a FAR practice of dynamic proximity, with movement from one research position to another in response to considerations of care and investment. The primary move was from a position of learning *about* the team to learning *for* them, in support of the team. Prompted by a practice of *critical reflexivity*, it combined the roles of researcher-as-observer and researcher-as-participant by providing information gleaned from an exercise in *curiosity* (interviews) that only she had access to. And while it risked compromising perceptions of her as *impartial*, it prioritised the principle of *translucence* in the face of an ethical concern (wellbeing and trust in the team). In this way, the formative accompanying researcher's intervention represented *sensitivity* to a critical juncture of the project. Where these movements lost balance and over-stepped the principle of *embedded relationality* was in expressing a personal opinion about happiness, which referred to 'us' from her perspective, rather than perspectives gathered from her research.

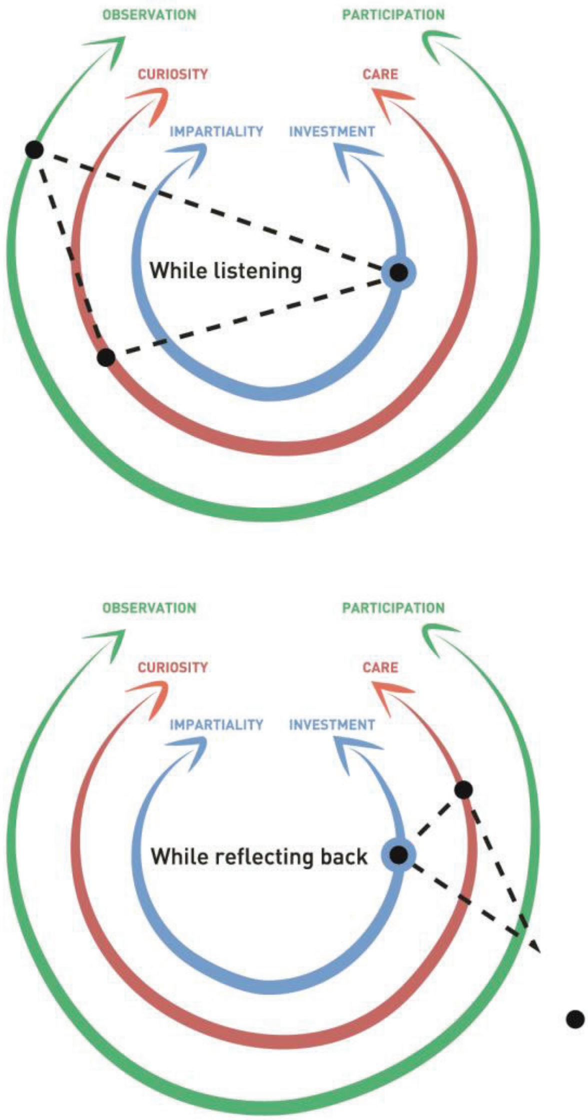

Figure 2: The balancing acts as a heuristic. Tracking dynamic FAR positionality while conducting participant observation. The top figure presents co-ordinates of the researcher's positionality while learning *about*. The bottom figure demonstrates how this changed when the researcher moved to learning *for*.

A situation of co-created intervention

Mid-way through the Leverage Points project, the team was in a transition phase from open and divergent explorations of its research question, towards needing to demonstrate progress and move towards convergent outcomes. Inevitably, this transition was creating some disruption, and team morale dipped. A team meeting came to a somewhat disgruntled close, making these dynamics more evident than they had been before, but remaining un-named. As her colleagues started to move towards the door, the formative accompanying researcher who was attending as a participant observer opened her mouth to name these dynamics and then closed it again. The timing was wrong to make an unsolicited observation.

Minutes later, a senior member of the team knocked on her office door. He was worried about the prevailing "heavy atmosphere"; was it possible to do something about it? After discussing the situation and some options to address it, the formative accompanying researcher approached one of the project managers to share with him insights arising from that discussion. Initially, he didn't agree that it was a team-wide issue, but rather a manifestation of academic stresses on individual members. The formative accompanying researcher countered his analysis, drawing on material from recent observations and interviews, which indicated that the project as a whole was grappling with the transition phase. The manager responded fast, immediately issuing an invitation to the team to attend an informal meeting to discuss reasons for low morale and how to address them. The ensuing meeting, co-facilitated by the manager and formative accompanying researcher, seemed to act as a pressure relief valve while also distributing responsibility for addressing sources of frustration among different members of the team.

In this situation, the formative accompanying researcher decided not to act on her concerns about morale until initiative had come from within the team itself. Because she had come to *care* about the team's wellbeing and was *invested* in the team navigating this transition well, she interpreted the knock on her door as a nudge to intervene (i.e., to learn *for*) rather than as merely interesting information (i.e., learning *about*). However, she had to rein in a desire to 'rescue' the situation single-handedly. It proved much more effective to work alongside the manager to create a team experience of collectively making sense of the situation and reaching decisions about what was needed (i.e., learning *with*). The meeting itself was a further source of FAR data in which *curiosity and care* could continue to co-exist. In a concrete instance of being *translucent* but not transparent, the formative accompanying researcher produced two versions of the notes she took during the meeting; one for her own field notes and a less detailed record for the team, later distributed by the manager.

This co-created intervention demonstrated, in a very modest way, the potential to combine learning about, with and for a team, in the interests of advancing collaboration. It was one of several small initiatives that helped the team to move into the next phase of integration.

A situation of invited intervention

A few months later, the formative accompanying researcher was invited to join the integration team while one of the principal investigators was on maternity leave. She accepted with alacrity; her curiosity to learn *about* the team was starting to run dry and it was a relief to be asked to expand her role by actively contributing to project outcomes, learning *for* the team in its integration efforts.

However, taking on this new role restricted the formative accompanying researcher's fluidity of movement between different learning orientations. The integration role had hooked her in several ways; it called on her process facilitation expertise, activated her interest in the content of the collaboration's research, and triggered a sense of responsibility for ensuring successful project outcomes. She found it increasingly difficult to discern when to *observe* what was happening and when to intervene and attempt to address what was happening. It became clear to her that she was too close to the team and too static in her positionality, and that this was inhibiting her effectiveness in all three learning orientations. On several occasions, she felt that her sense of *care* for the team was crowding out her *curiosity* about the team. This experience suggests that learning *for* a team should be approached with caution.

Reflecting on these experiences, we see the following early indications of advantages and limitations of navigating positionality in the way we have proposed. We found the three orientations to learning – about, with and for – to be a powerful combination. Together, these orientations produced information *about* the collaboration, which fed into collective (although not necessarily consensus-based) understanding and insight *with* the team, which served as a resource *for* the collaborative work, enabling the team to learn and adapt *in situ*. Moreover, the proposed balancing acts served as a useful heuristic device to monitor and navigate positionality at any given moment, and over time. A collaborative research project constantly evolves through different phases, and the FAR role has to adapt alongside these changes. The practice of embedded relationality helped to track what was happening, both in the team and between the formative accompanying researcher and the team. The practice of critical reflexivity enabled seeing what this implied for FAR positionality, and the practice of dynamic proximity guided next movements in response. The temptation to intervene was very strong. We learned, through trial and error, the value of maintaining tension between the three learning orientations instead of overbalancing into intervention.

Conclusion: FAR's prospective contribution to interdisciplinary collaboration

This article took as its starting point that there is a growing demand for and interest in interdisciplinary research, but that this kind of work is difficult and there remains a lack of empirical study to bolster its practice. Such a situation can be described as constituting risk for interdisciplinary collaboration. As stated by Callard et al. (2015: 6),"Interdisciplinarity is necessarily and irrevocably a practice that entwines bodies, minds, geographies and temporalities in creative, ambivalent and often conflictual ways. The point of tracking the signal and tracing the noise of its explicit and not-so-explicit contours is precisely to do justice to these dynamics." The question of how to do justice to these dynamics is key. Our approach to positionality is designed to enable a formative accompanying researcher to learn *about, with* and *for* interdisciplinary collaboration, exploring its explicit and not-so-explicit contours of success and challenge. The dynamic positionality we developed combines multiple aims. Beside a more conventional researcher positionality that allows for empirically analysing an interdisciplinary team, the FAR methodology implies learning *with* the team, paying collective attention - especially where there is difference, ambivalence and conflict that could threaten collaboration. This dimension of FAR bears the possibility for interdisciplinary research teams to reflexively learn how to collaborate while collaborating (Freeth and Caniglia, 2019). Finally, FAR also includes the possibility to learn *for* the team to support it to address identified difficulties through an intervention.

What we have not addressed in this article is the possible range of relationships of a formative accompanying researcher to the content of what the collaborative team is studying. If a sense of curiosity and investment are turned not just towards the researchers, but also towards their research questions, this has further implications for positionality. STS researchers engaged in interdisciplinary projects in the fields of synthetic biology (e.g. Calvert and Martin, 2009), neuroscience (Callard and Fitzgerald, 2015) and nanotechnology (Viseu, 2015) have addressed this, but there has been little focus yet on the interdisciplinary field of sustainability.

After developing FAR in the context of the Leverage Points project, a vital question remains open at this stage: Can a formative accompanying researcher advance collaboration? While we see small positive indications of this, for instance in the second narrative of co-created intervention, we also see the pitfalls of intervention. In the next phase of our research, we will conduct ex-post analysis to investigate whether the FAR approach has significantly advanced collaborative interdisciplinary research in the Leverage Points project, as the project draws to a close. What we can claim already is that we have learned something useful about how to navigate positionality by adopting a particular presence and set of practices, guided by a "no-nonsense" (Haraway, 1991: 197) brand of congruence, sensitivity and translucence. This, we argue, will contribute to an STS research practice that can fruitfully "track the signal and trace the noise" (Callard et al. 2015: 6) of interdisciplinary collaborations amid a cacophony of signals, noises, distractions and demands.

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Pablo Kreimer (2019) Science and Society in Latin America: Peripheral Modernities. New York and London: Routledge. ISBN: 9780367218034

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The last few years have seen a growing number of works dealing with the global development of the social sciences. Pablo Kreimer, an Argentine sociologist of science, has published his latest book in English in order to engage in more direct conversation with the “global South”. He not only chooses to place his concepts and ideas on an equal footing with those put forward in the (Northern) field’s canonic literature, but also interrogates, addresses, and challenges it. This is not merely a conceptual contribution, but an attempt to break with the subaltern perception of science in the peripheries and the marginal place usually reserved for it in knowledge hubs around the world.

This is an honest, important, highly readable book. It spans twenty-five years of the author’s personal intellectual development. The prints of his endeavors to investigate science, its social determinants and consequences, are clearly visible in what Dr. Kreimer calls his “pilgrimage” in STS.

Our paths crossed early in Kreimer’s career, when he discovered what a few of us in Venezuela and Brazil were doing about something we used—in the absence of a better term—to call ‘peripheral science’ (Díaz et al., 1983). The perplexity then triggered in him by the study of molecular biology in his home country, Argentina, led him to embark on a long intellectual journey of exploration and reflection, and more recently to the idea of ‘peripheral modernity’. He began by exploring Chagas disease as one of the earliest objects of research into Argentine and Brazilian molecular biology. The intriguing lack of use of locally produced knowledge that followed international canons in the Southern peripheries led him to study the tissue of international relations in an attempt to understand the processes of scientific development.

Among the central questions of his inquiry are: How do new disciplinary fields emerge? What kinds of relations are there between the construction of social problems and the formulation of scientific problems? How have relations between centers and peripheries changed in recent decades? At their heart is the long-standing tension between international knowledge production and the social utility of knowledge.

Kreimer tackles several problems while admitting that, in the final analysis, he is always addressing different facets of the same issues. In this sense, each chapter can be read as a contribution toward completing the image and strengthening the (always partial) view of certain aspects of reality that overlap with previous ones. But his travels, linked as they are to a need to explain the limited, local, situated, “peripheral”, provincial, and parochial nature of his subject matter, have led him to explore the relevance and implications of his world—which is our own: Latin America—for the global field of the social studies of science.

For this book, he has selected texts with a pronounced reflective tone, written and rewritten over twenty-five years, charting the different stages of his intellectual journey. Following this itinerary, we can appreciate how his convictions slowly morph and change.

Kreimer's focus has always been Latin America, observing sometimes vast, sometimes fine differences in mainstream science. His concerns have led him to study science-oriented policy issues in an attempt to understand the roles played by science studies in science policies. His doctoral program evinced his interest in the microsociological analysis of research labs. He went on to study the construction of traditions through intergenerational filiation, and later, the relations between hegemonic and peripheral centers, an area that exercised him for many years.

He has repeatedly observed that the idea of the situated nature of knowledge seems not to have been internalized by Northern researchers. Their theoretical proposals were blithely unaware of the limitations in the social, economic, geographical or cultural contexts. Critical of cognitive domination by the major Northern knowledge centers, he sets about exploring the complexities of local, subaltern, provincial, "peripheral", sciences in Latin America, which he shows to be part and parcel of the international institution of science.

His Latin American perspective does not make him indifferent to what happens elsewhere on the planet. Kreimer argues that, if we do not take such dimensions into account, our alleged analysis of Science and Technology in Latin America will be limited and ultimately unreal. This international outlook pervades every chapter in the book, but particularly in Chapters 7, 8, and 9.

One can only applaud the differences in perspective and approach, and the social relevance of Kreimer's research into scientific practices in science hotspots around the world. In one project, he explores the current viewpoint and perception of Latin American scientists vis-à-vis their European counterparts in European research consortia. Two extremely interesting and valuable papers that came out of this project, are summarized for us by Kreimer here, in Chapter 8.

He examines the waning value of the region's S&T policies' role. The elites of today's Latin American scientific communities are geared more to areas where they can collaborate with their European peers than to more "purely local" issues. Indeed, domestic research policies foster researchers' participation in European projects without setting a role for the thematic orientation of networks and projects. By bestowing a subordinate position on Latin American groups, European groups concentrate on the research design and are able to centralize their data and produce theoretical and conceptual interpretations. Moreover, the consortia rely on the participation of European business firms, from which it can be inferred that, if it occurs, the industrialization of knowledge will fundamentally benefit European firms and countries.

From a Latin American viewpoint, a crucial motivation for participating is closer ties with prestigious European research groups and the possibilities of coauthorship. Participation in European programs is highly unlikely to produce applied research to tackle local challenges. While some Latin American scientists may think there is no change in scientific agendas, the results of Kreimer's study suggest a process whereby local issues lose out to international ones in what begins to constitute a new global "science regime".

Of course, the effects of this differ considerably in the developed and developing countries. The situation is one of "outsourcing" of research work by countries with resources, which thereby maintain and increase their control. By contrast, the results for Latin American countries appear somehow absurd. The functionality of the interaction seems to be fairly minor: the production of papers in coauthorship and little else.

This, however, is part of the rigid academic evaluation system adopted by the region's science councils. In practice, it discourages an orientation toward thinking on the challenges of our countries' development under the mirage of blind participation in international cutting-edge science.

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Bernike Pasveer, Oddgeir Synnes and Ingunn Moser (eds) (2020) Ways of Home Making in Care for Later Life. London: Palgrave Macmillan. 312 pages. ISBN: 9789811504051

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Throughout the Western world a paradigm of "ageing-in-place" is expanding. According to this paradigm, we are facing a twofold crisis of a rapidly ageing population on the one hand, and a care deficit on the other. As a response to this problem the provision of *home care* is increasingly regarded as a gold standard for the organisation of care. *Ways of Home Making in Care for Later Life* wants to critically engage with the expanding paradigm of ageing-in-place by asking how home is made when it intersects with new forms of care as a result of ageing. In the current political ageing-in-place discourse home is seen as a noun – a singular, stable and given location "that naturally affords the inhabitant to live and age well" (p. 3). Building on a material semiotic approach, this book seeks to question this discourse and instead proposes an understanding of home as a verb – a making, which requires relations and arrangements between different actors, such as older persons, care workers, doors, technologies, spaces and policies to name a few.

Altogether, this is a welcome, thought-provoking, and intriguing book. Theoretically and methodologically rigorous – yet, accessible and comprehensive – it will be of significance to anyone interested in research about health, place, age, and society. Home making in and with care has not been systematically introduced before, and the authors of this volume successfully show why it is important to pay attention to how home is made when care enters the lives of people as they grow old at home or in 'homely' institutions.

The editorial introduction challenges the ageing-in-place discourse by offering three lessons. The first is that *doing home with care is a material and situated practice*. This important message is reminiscent of the authors' previous work. In prior publications the very practices of care were in focus, and it was argued that care is a material and situated practice (Mol et al., 2010). The second lesson is more political. The authors want nothing less than to fiercely challenge the view of home making in care for later life as all about "independence and autonomy and control" (p. 13). Home making with care is instead about new modes of becoming entangled. Growing old with care, the authors argue, is therefore about "*learning to become dependent"* (p. 13, italics in original). The final message is that the authors do no shy away from the normativities of their own stories and concerns. Rather, the authors underscore the importance of *moving and thinking with the many makers of home with care*. In line with feminist scholars, the authors point to the importance of situated knowledge and their responsibilities as researchers (Haraway, 1988; Puig de la Bellacasa, 2011).

This edited volume is part of the *Health, Technology & Society* series that has already published more than twenty books on recent developments with health technologies in various areas. The book addresses a range of geopolitical context (with a clear pull towards Norway) and authorship covers a range of disciplines including medical anthropology, science and technology studies, narrative medicine, and psychology. Consisting of fourteen chapters the volume is organized in three main parts. Drawing on array of qualitative methods including autoethnography, document analysis and poetry, each chapter seeks to "uproot the trope of home and care as stabled and fixed repository" (p. 6).

The first part of the volume, "Moving imaginaries", deals with imaginaries of home, tracing their ideals and material expressions and manifestations. This part of the volume includes insights into the social, political, and cultural imaginaries of home and shows for example how narrations and home sickness can be ways of home making (chapter 2 and 4).

The second part, called "Negotiating institutions", explores how home making takes place in places which exist beyond what we normally consider home. Here the authors write about the negotiation of home in places that operate along a logic of care (Mol, 2008). A most important example of such negotiation is found in Pasveer's analysis of four modes of (dis)entangling home and care in hospices (chapter 10). With a keen eye for ethnographic details Pasveer investigates "the in-between spaces of accessibility and control, of the private and the common and of the still living and already dying" (p. 207).

The last part of the book, "Shifting arrangements", explores in more detail how home is an always emergent quality of shifting arrangements of people, things, places and affects. Here, the trajectories of transformation of person and places are explored by Wackers in a beautiful autoethnographic account of home death (chapter 11). The transformation of the home is also under focus in chapter 14. Drawing on two case stories of families working to accommodate the growing dementia of one of their members, Ceci, Moser and Pols show how the home itself is transformed from a singular care place into one of many parameters to be tinkered with.

Unlike previous publications by the authors, care is left somewhat undertheorized in the volume – and perhaps rightly so – as it is not the focus of the volume. The authors build on Law's (2010: 69) definition of care as the work of "holding together that which does not necessarily hold together" and adds that home and care are always and already intertwined. One chapter poignantly address how age, gender and home are made together (chapter 8), and another make use of a circulation of care framework – how care unevenly flows in transnational family networks – to trace the asymmetrical reciprocal exchanges of care (chapter 3). However, more current perspectives about the non-innocence of care and recent insights concerning care's exclusions (Martin et al., 2015; Murphy, 2015) are missing in this volume. According to Martin et al (2015) care has a dark side and violence is sometimes committed in the name of care. These perspectives could have generated interesting questions about potential problematic aspects at the intersections of home making and care. While I think it is important to describe good care as it is commonly "is silently incorporated in practices and does not speak for itself" (Mol, 2008: 2), issues of for example the gendered and often racial nature of care work tend to be rendered invisible in such an analysis.

Overall, the volume provides empirically meticulous and important insights and offers a compelling theoretical framework to the study of how home and homely institutions are made.

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