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# Science & Technology Studies

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## Guest editorial



## Articles



## Book reviews



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# Expertise and Its Tensions

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While writing this editorial in the end of March 2020, the world is struggling to contain the virus SARS-CoV-2, which has caused the most severe pandemic since the beginning of the 20th century and the Spanish flu. Despite regular warnings of an aggressive pandemic in a number of expert-driven reports in recent decades, it seems that the coronavirus outbreak hit policymakers in most countries by surprise. The media now constantly reports on the efforts of epidemiologists and medical experts to get to know the characteristics of the yet poorly known new coronavirus. Headlines also often highlight how policy makers, public health experts and economists discuss and weigh various societal measures in order to mitigate the social and economic consequences of the outbreak. The contested and negotiated character of expertise becomes visible in how the adopted strategies differ between countries and how people with various backgrounds claim and gain expert positions in pandemic governance in different public forums.

The current pandemic is clearly a textbook example of a wicked problem in which "facts are uncertain, values in dispute, stakes high and decisions urgent" (Funtowicz and Ravetz, 1993: 744). Should we go by the now popular metaphor of a war, the struggle against COVID-19 is taking place within many different regimes of knowledge and the global line of defence is not always uniform. Broadly speaking, the pandemic highlights the multifocality of expertise in contemporary globalised and interconnected societies. It seems likely that the number of societal dilemmas characterised by contested and/or dispersed expertise will continue to increase in the future due to a variety of pressing global issues such as ongoing global environmental changes, the related energy transition and other types of sustainability challenges, novel modes of citizen

engagement in research and innovation, and the proliferation of debates around health and medicine. The aim of this special issue is to open up discussions on the variety of approaches that STS studies provide to strengthen the understanding of the changing role of expertise in shaping the everyday life and futures of our society in this evolving context.

The question of how, and whose, knowledge and expertise are recognised and mobilised in societal processes has been one of the key interests of STS studies of expertise during recent decades. At the level of policy making, on the one hand, the role of experts in shaping policy agenda and framing policy issues has been recognised particularly in traditionally expert driven policy fields such as environmental (e.g. Turnhout et al., 2019) and health (e.g. Smith, 2013; Maybin, 2016) policy. On the other hand, existing science– policy gaps might explain the failures in addressing urgent environmental problems including climate change and loss of biodiversity. These gaps have been argued to result from both the inability of policy makers to make use of scientific knowledge and engage with it in decision-making (Bradshaw and Borchers, 2000; Sharman and Holmes, 2010) and the lacking interactional skills of scientists in articulating the policy relevance of their knowledge (Rapley, 2012).

The emphasis put on the need to continuously articulate and negotiate the societal relevance of scientific expertise highlights the relational nature of expertise more generally. Expertise is not a quality that can be gained solely through education, experience or institutional position. Rather, expert positions are always gained in relation to context specific expectations and needs of knowledge and skills (Lynch, 2014). Therefore, different types of expertise are recognised in varying social contexts and lay experts sometimes acquire considerable epistemic authority in addition to, or even over, institutionally acknowledged professional experts (e.g. Epstein, 1996; Reed et al., 2014; Collins, 2014; Irwin et al., 2018; Saikkonen, 2019). The multiplicity of different types of experts and expertise with different backgrounds, approaches and ways to frame, justify and communicate issues makes the distinction between an expert and non-expert blurry and changing. This blurriness furthermore underlines the importance of understanding the situated constitution of expertise (e.g. Coopmans and Button, 2014; Taipale, 2019).

The field of STS has productively illuminated the social and cultural aspects of expertise in a variety of contexts, but the focus has considerably been on specific theoretical issues, such as the classic issue of expert-lay relations (e.g. Wynne, 1992, 1996; Epstein, 1996), and debates, such as that between realist and relational approaches to expertise (e.g. Collins and Evans, 2002, 2003; Jasanoff, 2003; Rip, 2003; Wynne, 2003;). While the scope of STS has by no means been limited only to these issues, there is certainly room for novel theoretical and empirical viewpoints in expertise-related research, especially if STS is to secure its position as the vanguard of the social study of expertise.

One fruitful avenue, which the articles of Francois-Joseph Daniel as well as Line Hillersdal, Astrid Petersen, Bjarke Oxlund and Birgitte Bruun in this special issue importantly explore and contribute to, is the study of the *affective aspects and dimensions of expertise*. Although there is mounting interest in the affective and emotional in the humanities and social sciences more generally (e.g. Clough and Halley 2007; Wetherell, 2012), and increasingly also within STS in different contexts (e.g. Lorimer, 2008; Myers, 2008; Davies, 2014; Kerr and Garforth, 2016; Lindén, 2019), examinations of affects with respect to expertise are lacking in STS. As the aforementioned articles in this special issue demonstrate, such examinations enhance our understanding about the various ways in which expertise is produced, operates, and is negotiated in different contexts, and how tensions in expertise and among experts emerge.

The articles in this issue also suggest and present other directions for broadening the STS scope on expertise. For example, there is a growing interest in following and studying new types of communities engaged in generation and sharing of knowledge and construction of technologies, such as hackerspace communities (e.g. Kera, 2012; Maxigas, 2012; Davies, 2017). In this vein, Eeva Berglund and Cindy Kohtala draw attention to *new types of grassroots communities as sites of inquiry in studying expertise*. Furthermore,

they highlight the *communal, collective nature of the emergence of expertise* in such communities. As the communal nature of knowledge is one of the foundational notions in the field since the early SSK (e.g. Barnes and Bloor, 1982), it is worthwhile to revisit the idea of communality in scrutinising the character and emergence of expertise and expert knowledges. Related to this, Claudia Egher's article highlights the role of the *medium and mediators* in displaying and articulating expertise. The relevance of the medium, arenas and platforms together with mediating actors has been recently emphasised in the social studies of expertise (also e.g. Saikkonen, 2019) and this emphasis will most likely gain importance in the field in the future.

We conclude this guest editorial with short summaries of the seven contributions to this special issue, which shed light on how expertise is constituted in different contexts as a situated practice. This emphasis guides us to pay attention on the socio-material context in which expertise is claimed and performed, as well as to recognise the embodied nature of expertise in terms of personal skills, craft, and affective engagement. Furthermore, the articles explore the connections between particular societal goals and norms, and related recognition of expertise.

Egher discusses how the Internet as a medium of communication shapes the relations between medical professionals and patients. She examines three highly popular bloggers, who combine their situated experience of living with bi-polar disorder with their understanding of specialised medical knowledge, and communicate their ideas to the broader public in the blogosphere. As a result of this activity, and by and large because of the new communicative medium that allows for explication and broad dissemination of patient experience, the three bloggers Egher examines can be understood as a new category of stakeholders that she calls expert online mediators. These mediators are highly influential in translating medical/scientific knowledge to the relevant lay audience or community, and they also provide medical professionals new avenues for collaboration.

Drawing from studies of expertise, Egher employs and elaborates on the concept of interactional expertise (Collins and Evans, 2002) in developing her understanding of what the bloggers do. She expands the notion of interactional expertise by emphasising the relevance of the medium of communication as well as by focusing on the bi-directional character of interactional expertise, i.e., the mediating work. Thus, Egher implies that the relevance of the medium has been somewhat overlooked by Collins and Evans, and goes on to discuss how the internet has shaped the way the bloggers display their interactional expertise, while she also identifies some important challenges that internet poses to performing interactional expertise. Egher also claims that interactional experts can have more substantial exchanges with scientists/professionals (the so-called contributory experts, see Collins and Evans, 2007), than what Collins and Evans have previously envisaged, as shown by her analysis of the illness bloggers. She concludes by discussing the bloggers as entrepreneurial selves. Egher also problematises their influence in the patient community, their effect on hierarchies between professionals and lay people, and also their possible challenge to the authority and trust towards medicine and available treatments.

In their article William Clark Cook, Esther Turnhout and Séverine van Bommel investigate Forest Stewardship Council (FSC) auditor trainings. By analysing empirical materials gathered from the trainings through participant observation and unstructured interviews, the authors specifically focus to make explicit how the trainees are taught, and learn to become, experts in FSC auditing. Cook, Turnhout and van Bommel highlight the paradoxical aspect of how experts need to follow rules and be objective, but how expertise is also about mastering a craft that inevitably involves subjectivity. Their article therefore takes interest in the issue of how the alignment of objectivity and subjectivity through expertise takes place in the auditor training. As a theoretical perspective, the authors employ a dramaturgical lens and draw on Erving Goffman's (1959) concept of performance and Heather Douglas' (2004) notion of three modes of objectivity (object-oriented, value-oriented, and process-oriented objectivity) to scrutinise how objectivity is performed in the trainings and how it is taught for the trainees to be performed as FSC auditing experts. Building

on Goffman's notion of a performance involving a 'frontstage' and a 'backstage' the authors also pay attention to the issue of how successfully performing objectivity in the frontstage as an auditing expert depends on subjective intuitions and values that belong to the mastery of the auditing as a craft that has to be held backstage.

Based on their analysis Cook, Turnhout and van Bommel highlight that while objectivity is considered fundamental to auditing in the trainings, the trainees are also taught how objectivity and interpretation can be simultaneously performed, and are therefore co-supportive of each other, in properly performing the auditing. Moreover, in the concluding discussion they also valuably raise and discuss the more general theoretical issue of how their results indicate how instead of approaching expertise in dichotomous terms either as a performance or as a real ability (e.g. Collins and Evans, 2007) it is important to recognise and study how expertise encompasses both of these aspects. Regarding this, the authors highlight how their study makes explicit that rather than there being a tension between these aspects in forest management certification auditing both the performance of being an auditor and the impact of being an auditor are important parts of the training of FSC auditing experts. Finally, the authors emphasise that recognising the role of subjectivity, values and interpretation in audits is important to understand how objectivity is produced in practice, and that this also enables auditor trainings to be more open and reflect about the values constituting auditing.

In his contribution to this special issue, Daniel investigates resident sniffing teams set up to assess odorous pollution in two urban areas in France where domestic waste treatment biogas production plants have been opened. Daniel bases his analysis on a series of interviews with members of these sniffing teams and builds theoretically on the affective turn in the social study of science. He specifically scrutinises the affective dimensions of how the sniffing teams, as kinds of lay-expert collectives who do odour sensing in an open air environment, get involved in such activity and work to produce observations of odorous pollution. In his article, Daniel therefore especially strives to make explicit the ways in which emotional context plays a role for the emergence of the collective sensory expertise of the sniffing teams. Daniel demonstrates how emotions colonise the daily sniffing work and how the differences in sensitivity among the participants forms challenges regarding the data collection work of the teams. He points out how individuals in the sniffing teams can be affected differently by the smells, and how, for some sniffers, negative emotions emerging can come to influence the reporting of the sniffing as there is a need to maintain attention in the work to an element of their actual living environment that is unpleasant.

In the concluding discussion Daniel further highlights the role of affects in the making of sensory expertise. He points out how the participants of the sniffing teams need to develop an "ethic" of sensing, centered on the sniffers' own feeling, which brings to the fore the affective inner states of the sniffers and those who they represent, the other local residents. Moreover, Daniel emphasises how the development of this sensibility produces a local affective ontology and how the sniffing teams therefore also enable the nuisance to exist within institutional procedures. Daniel also finally draws attention to the democratising potential of utilising the kind of participatory tools such as sniffing teams as they allow for people's sensorial and affective living environments to be better taken into account as industries, cities and infrastructures are developed.

The contribution by Hillersdal, Petersen, Oxlund and Bruun, titled "Affect and Effect in Interdisciplinary Research Collaboration", investigates the working of interdisciplinary research collaboration through a focus on affective tensions emerging in these collaborations. Having worked in two separate interdisciplinary research projects in Denmark, the authors employ an ethnographic approach and draw from field notes, interviews and textual materials in order to observe and analyse the affective landscape of collaborative research work. One of the crucial points here is that the notion of affect contributes to social studies of science as it illuminates how scientific knowledge is produced and made in practice through embodied modes of being and communication. The authors base their article in previous

studies on interdisciplinary collaboration and specifically 'choreography of affect' in scientific knowledge production. In addition, drawing from Helen Verran's (1999) work they point to the fluid ontology of research objects such as pain or appetite, as researchers from different fields negotiate and enact their objects of study through affective practices of, for example, suspicion, jokes, laughter and awkwardness.

The authors conclude that while interdisciplinary research is often marked by affective tensions stemming from internal differences and clashes of disciplinary expertise, such tensions can become productive of 'new connections between people and problems'. As affectively charged moments bring forth the instability of knowledge, they may also be understood as promoting an innovative and reflexive mode of scientific knowledge production.

Bonno Pel's and Julia Backhaus' article "Realizing the Basic Income: Competing Claims to Expertise in Transformative Social Innovation" looks into how 'utopian' and yet-to-be-realised policy practices such as the implementation of universal and unconditional basic income (BI) question deeply ingrained modes of knowing about the world, and are thus revealed as field in which tensions on expertise manifest particularly strongly. At the center of their paper is the concept of BI 'realisation' that refers to the dynamics of how the advocacy on BI requires active work on both scientific and political domains of knowledge and how this work is distributed into vast networks of scientific, political and non-governmental actors. By drawing on interviews and observations with relevant actors, they trace overlapping yet in some ways also distinct waves of BI realisation, and tease out a 'fourth wave' of BI advocacy, in which BI advocacy employs experiment-driven and reflective strategies in its claims for expertise. Developing this argument, the authors present analytical observations of how various phenomena such as crowdfunding projects, the flow of information in the Internet as well as civic initiatives and petitions may shape the debate on, and knowledge of, BI. They conclude that "the case of BI advocacy is particularly revelatory for the politics of expertise that current social innovation initiatives are inevitably engaged in" and discuss how BI advocacy practices tend to tread a messy path between alternative-spirited counter-expertise and evidence-based 'expertocracy game'.

Berglund & Kohtala's article is a participant ethnographic study of DIY-activism and 'dirt way' learning in DIY-activist communities, which involves dealing with and being engaged in the use of contingent concepts and messy practices. A backdrop note to both the article and the emergence of its object of research pinpoints that the trustworthiness of expertise has suffered recently (e.g. due to the mainstream experts' disputes about sustainability). The background of their study is the critique of mainstream expertise's way to form closures of knowledge by 'meaningful simplifications' (Collins and Evans, 2002; Åkerman, 2016). Maker communities do have the same concept of expertise. However, they differ from the mainstream understanding of expertise in questioning its commitment to the social practices that serve capitalism driven consumerism and in perceiving knowledge making as practices of consciously designing futures under a likely danger combined with unacknowledged ignorance (Jasanoff, 2016). In the post-enlightenment ontology more or less present in DIY-activism, angry mountains and a higher God whose intentions remain unknowable, nevertheless, can affect human affairs. In the authors' ethnography, knowledge and ignorance jostle against each other in a fruitful way, reflecting their fuzzy object of research. To their credit, authors discuss succinctly 'socially robust' knowledge of the science policy discourse and its links to problem solving devoted exclusively to cognitive capitalism.

Sophy Bergenheim's study discusses how the Finnish Population and Family Welfare League (Väestöliitto) constructed and developed its expertise, and how the league changed from an influential interest organisation into a concrete housing policy actor. The author shows that this development started from the construction of a social problem, namely, the recognition of lower socio-economical classes' risks related to defective housing that the pioneers of Väestöliitto coined 'barracks'. The solution that came around in the

development of expertise of the organisation was to build so-called garden cities for the imperiled population. The article narrates the development of new knowledge – about how ideas and orientation developed into new practices, and how the use of modern architecture and modern construction industry fed in to the development of an active and effective housing policy expertise.

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To round up, the guest editorial board wishes to thank all contributors to this special issue. It is our belief that this collection of papers provides an interesting contribution to social studies of expertise. The on-going global changes and their local implications will undoubtedly generate an increasing need to study the contestation, negotiation and various roles of expertise. It is our hope that ideas presented in this special issue can inform some of those future studies.

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# **Online Expert Mediators:** The Rise of a New 'Bipolar' Stakeholder or Going Beyond Interactional Expertise in the Blogosphere

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## Abstract:

Using Collins and Evans' (2002) concept of interactional expertise, this article examines the online activities of three bloggers diagnosed with bipolar disorder. It argues that by combining medical knowledge with their situated experiences, and by utilizing the affordances of blogs, these bloggers have become a new type of stakeholder, the online expert mediator. Collins and Evans' concept is extended by taking into consideration the role of the medium through which interactional expertise is displayed and by showing that its bi-directional character is more substantial than they had envisaged. The rise of this new stakeholder category denotes a possible turn from community activism to exceptional entrepreneurial selves. Despite views that the internet would have broad democratizing effects, the findings show that the high standing of online expert mediators is not the result of a subversive use of this medium, but of a dynamic alliance with 'traditional' experts and of a strong media presence.

**Keywords:** interactional expertise, illness blogs, entrepreneurial selves

## Introduction

Relations between important stakeholders in the field of mental health have been significantly transformed by the internet (Barak and Grohol, 2011). This medium has affected the identity and the type of interactions between knowledge producers and users (Wyatt et al., 2013), contributing to the diversification of sources of medical knowledge away from clinical environments (Nettleton, 2004), closer to the everyday settings of people diagnosed (Lucivero and Prainsack, 2015), and leading to the re-appreciation of other types of knowledge (Schaffer et al., 2008). Such changes have taken place in a context where pronounced neoliberal tendencies have introduced a market logic in the provision of healthcare and have encouraged individuals to assume responsibility for their health (Rose, 2007; Novas, 2006). Web 2.0 technologies, such as blogs and social networking platforms, enable users not only to consume information but also to engage in its production (Lupton, 2014). As people have become increasingly involved in their health, these technologies have contributed to the development of new entrepreneurial subjectivities (Tutton and Prainsack, 2011). In this article I study the online activities of three bloggers diagnosed with bipolar disorder (BP)

using Collins and Evans' (2002) concept of interactional expertise. I show that through their skillful use of the internet, some individual patients have become highly influential, and argue that this medium has thus helped facilitate the emergence of a new type of stakeholder- the online expert mediator.

First, I consider how the role of patients in mental health has changed over the last decades, focusing on the internet's influence in these transformations. The analysis of the online activities of three bloggers indicates that they hold interactional expertise. I then show that the bi-directional character of interactional expertise is more substantial than Collins and Evans (2002) considered and expand their concept by considering the effects of the medium through which it is articulated. As Kivits (2013) argues, the current dominant imperatives to stay or become healthy by seeking and sharing health-related information have contributed to the development of a space where new forms of agency can develop. The findings indicate that through the knowledge they display and the alliances they forge, these bloggers have successfully positioned themselves within this new space, and have expanded their influence beyond that of most authors of illness blogs. In so doing, they have become online expert mediators, a new stakeholder category whose attributes I describe and discuss from a critical perspective in the conclusion.

## Greater mental health patient engagement and the internet

### *Patient engagement*

As many medical sociologists have indicated, since the last decades of the 20th century patient engagement has been promoted in different areas and for different goals (Barello et al., 2014; Turner, 1995), through top-down processes (Hogg, 2009; Godfrey et al., 2003) or as the result of grassroots activities (Rabeharisoa et al., 2013; Landzelius, 2006; Novas, 2006; Kushner, 2004; Taussig et al., 2003; Barbot and Dodier, 2002). The meaning and consequences of patient engagement vary (Rowland et al., 2017; Hickey and Kipping, 1998), however, putting it simply, it is clear that by becoming more involved in their health, people have also come to grasp the conditions of complexity and uncertainty under which medical professionals operate, leading to a growing awareness of the limits of medical expertise. These realizations have had a profound resonance in mental health, where the authority of medical professionals has been challenged since the late 1960s (Pickersgill, 2012). Most medical insights in this field have thus been criticized in many ways, including arbitrary diagnosis (McPherson and Armstrong, 2006; Wright and Cummings, 2005), the pathologizing of normal human emotions (Horwitz and Wakefield, 2007; Scott, 2006), the rationale and effectiveness of medical treatments (Whitaker, 2011; Kirsch, 2010), and the skewed power relations between medical professionals and people diagnosed, exemplified in rare(r) but still ongoing practices, such as forced hospitalization or treatment (Brodwin and Velpry, 2014). Combined with official restructuring initiatives and considerable openness among people diagnosed towards new approaches and types of knowledge, such challenges have contributed to the proliferation and diversification of mental health professionals (Grob, 2005; Brown, 1988). The relations between existing stakeholders have thus been modified, and new stakeholders, such as life coaches, homeopaths, online platform owners, and citizen scientists, have entered the field of mental health. The role of patients has also changed from passive recipients of care (Barnes and Shardlow, 1997) to consumers entitled to choose the type of care they receive (McLean, 2000). While some patients consider themselves survivors and actively militate against medical conceptualizations and interventions (Whitley, 2012; Speed, 2006; Crossley and Crossley, 2001), many others have engaged in processes of knowledge production (Gillard et al., 2012; Kemp, 2010), evaluation (Director, 2005), and implementation (Davidson, 2005), thereby acquiring a greater role in mental healthcare.

### *The internet in mental health*

Used in mental health since its early days, the internet has importantly shaped the participation of people diagnosed in knowledge production. Already in 1999, Barak (1999: 231) noted that "the rapid developments in computers and information technology over the past decade have had an

impact on psychology, which has moved (…) from local computer applications to network applications that take advantage of the Internet." Health policy makers hoped the internet would empower patients by facilitating their access to information and the development of virtual communities (Haker et al., 2005; Eysenbach et al., 2004). It was further expected that online technologies would facilitate the development of mental health interventions at lower costs and would reach people in remote areas (Oravec, 2000). By now, numerous studies have indicated the potential (Smith et al., 2011; Barak et al., 2008; Carlbring and Andersson, 2006; Proudfoot, 2004) and variety of online interventions for mental health (Barak and Grohol, 2011; Kraus et al., 2010; Marks et al., 2007; Ybarra and Eaton, 2005). BP is among the mental health conditions affected by such approaches, as more and more people with this diagnosis use the internet (Lamberg, 2003), and various online therapies and different types of mobile phone applications have been developed (Nicholas et al., 2015).

Initially, the internet was considered "the site of a new struggle over expertise in health that will transform the relationship between the health professionals and their clients" (Hardey, 1999: 820). Since then, it has contributed to "a new way of 'doing health'" (Kivits, 2013: 220), leading to the emergence of new mediators between information producers and seekers (Wathen et al., 2008), and changing the relations between knowledge producers and users (Wyatt et al., 2013). Some patients have used their newly acquired knowledge to question and/or challenge the expertise of medical professionals in various ways (Gowen et al., 2012; Orsini and Smith, 2010; Mulveen and Hepworth, 2006; Fox et al., 2005). Others have engaged in various scientific activities, ranging from monitoring themselves using various self-tracking devices and sharing their data with others, to using collaborative platforms, such as PatientsLikeMe, to test medical hypotheses (Kallinikos and Tempini, 2014). By using the internet, such 'citizen scientists' or 'health hackers' have gone beyond the mere provision and exchange of medically interesting information, connecting with other people with the same diagnosis to 'conduct clinical trials on their own diseases' (Bottles, 2013: 88), enacting thereby particular values and ideals of patienthood (Sharon, 2017). Such online opportunities have been all the more important in the field of mental health, where study participation has traditionally been difficult, as the symptoms of people diagnosed often rendered their adherence to specific interventions problematic, while the desire to avoid stigmatization made them reluctant to attend face-to-face meetings (Naslund et al., 2015).

There are important differences in approach, motivation, and goals among patient organizations focusing on the same condition (Barbot, 2006) and even among members of the same group (Epstein, 1996). The internet has helped render more visible the heterogeneity of bipolar patients, as various online platforms testify to their different needs and preferences. It has also contributed to the emergence of new types of involvement for people diagnosed with BP, by diversifying the range of stances at their disposal. By using the internet, they have been able to develop new skills and to acquire various resources. This has not only rendered bipolar patients more salient stakeholders, but it has also contributed to a diversification of the type of stakeholdership they could take up. It is important to note that other factors and stakeholders play an important role in shaping the field of mental health, such as governmental agencies, the biopharmaceutical industry, insurance companies, manufacturers of medical technologies, and education curricula. Even though bipolar patients and medical professionals are not the only stakeholders whose roles have undergone important transformations, this article focuses on them given the centrality of their position in a field characterized by dynamism and versatility.

## Illness blogs

Since the emergence of surveillance medicine in the twentieth century (Armstrong, 1995), and particularly after the adoption of a consumerist culture in healthcare (Lupton, 1995), individuals have been encouraged to engage in self-surveillance practices and to actively manage their health by staying informed. The development of digital technologies has contributed to the diversi-

fication and intensification of these tendencies (Kopelson, 2009), but has also "promoted the individual expression of a personal experience of health" (Kivits, 2013: 222), as people have been increasingly exhorted not only to seek information but also to share personal insights. Thus, the internet has enabled not only patient groups, but also individuals to become influential by achieving high levels of visibility and by acquiring numerous readers. While most researchers have studied the changing identity and growing influence of patients as the result of collective actions, several academic works have highlighted the importance of particular individuals in shaping the character of patient organizations and of their interactions with medical professionals (Lerner, 2001; Klawiter, 1999). This study contributes to the literature by showing that some individual patients have become highly influential in mental health by taking advantage of some of the opportunities generated by the development of web 2.0 platforms in the context of growing tendencies to responsibilize individuals for their health (Nettleton, 2004).

Among the multiple forms of self-expression the internet has enabled, illness blogs represent a highly popular genre (De Boer and Slatman, 2014). According to Tremayne (2007 :vii), "[b]logs are distinguished from other websites in their dynamism, reverse chronological presentation and dominant use of the first person." Given their popularity, malleable architecture, and primarily individual character, blogs represent an excellent site to study the activities, knowledge practices, and alliances through which individuals achieve an influential position. Illness blogs are a specific type, as they "are used to express the experience of illness and to connect with readers via the Internet" (Heilferty, 2009: 1542). They differ based on their design, accessibility, and interactive character, and it is the more or less skillful combination of affordances related to these aspects that largely determines a blog's standing.

## Three bloggers on BP

On December 3, 2016, an online search using the keywords "bipolar blog" generated 12,600,000 results in Google, and 6,870,000 on Yahoo. Regardless of search engine used, the blogs of Natasha Tracy, Julie A. Fast, and Charlotte Walker are listed on the first page of results, either directly or mentioned under rubrics such as 'the best bipolar blogs of the year' on several health platforms. They are thus likely to come to the attention of many internet users. All three blogs can be accessed freely by readers.

Each of these three bloggers has been diagnosed with BP for about two decades. Tracy is a self-styled "social media strategist" and a writer on topics such as BP, depression, pharmacology, and other mental-health related issues. She has authored three blogs: *Breaking Bipolar*, *Bipolar Burble*, and *Bipolar Bites*. Her blogs attract large numbers of visitors, and many of her posts receive hundreds of comments. Fast introduces herself as "a world leading mental health expert on the topics of BP, depression, seasonal affective disorder, personality disorders and mood management". She claims that her site and blog together have been visited by one million visitors. Unlike Tracy, her personal blog, *Bipolar Happens!*, only gathers a very modest number of comments (< 10), but there is significantly more interaction on her blog on the bp Hope magazine website, *Fast Talk*. Fast also works as a "bipolar disorder management specialist" at Share.com, the website created by Oprah and Dr. Oz. Walker is the author of the blog entitled *purplepersuasion*, which on February 11, 2017 counted as many as 1,010, 281 hits. She has also been a guest blogger for online magazines and health platforms.

While internet users have been studied as health-related information seekers and/or producers, less attention has been paid to their potential as information mediators. Illness blogs are important mediation sites, as experiential knowledge is combined with medical, pharmaceutic, and socio-economic information. Through their activities, these three bloggers function as mediators in the Latourian sense. In explaining the main differences between the ways in which sociologists of the social and sociologists of association define the social and the means by which it is achieved, Latour (2005) distinguished between intermediaries and mediators. While intermediaries transport information without bringing any modification to it, mediators "transform, translate, distort, and modify" (Latour, 2005: 39) it. They do

so to adapt it to the opportunities and limitations of the medium and to the requirements of different audiences (Wathen et al., 2008). Importantly, the development of this new stakeholder category occurs in a context where patient experiences have come to be valued, elicited in various ways online, and, subsequently, commodified (Lupton, 2014; Adams, 2013; Mazanderani et al., 2012). I argue that through their practices and collaborations with different stakeholders, these bloggers move beyond the role bipolar patients generally have in the field of mental health, and turn themselves into a new type of stakeholder - the online expert mediator.

## Theoretical framework

Several concepts have been developed by medical sociologists and anthropologists that could be applied to study the knowledge of these bloggers. Borkman (1976) put forward the influential notion of experiential knowledge, denoting individual, concrete and situated insights acquired through one's personal experience with disease. Importantly, experiential knowledge can underpin one's claims to authority, while its cathetic dimension is conducive to trusting exchanges. Arksey (1994: 445) developed the notion of lay expertise, showing that people diagnosed can become knowledgeable enough "to reverse the usual doctor-patient relationship and instead stimulate a two-way learning process". Building upon this notion, Epstein (1995) argued that patients can develop sufficient scientific knowledge to shape medical research and to modify study design and methodology. As some scholars argued that specialized knowledge cannot be held by non-specialists (Prior, 2003), and finding experiential knowledge too vague for analytical purposes, Pols (2014) put forward the concept of patient knowledge. Defined as "practical knowledge that patients use to translate medical and technical knowledge into something useful to their daily life with disease" (Pols, 2014: 73), it can be made "useful and transportable to others" (Pols, 2014: 78). Patient knowledge focuses thus on the development and transmission of techniques for living with disease in good ways, but not on the patients' substantial engagement in medical research. While important, these notions are insufficient to analyze the diverse resources of these bloggers and the broad activities they engage in.

The online activities of the bloggers are analyzed instead using the concept of interactional expertise (Collins and Evans, 2002), which bridges the divide between practical, experiential and scientific knowledge. This notion is particularly useful, because it allows me to identify people endowed with substantial knowledge but missing official credentials, and provides an appropriate explanatory framework when studying phenomena "involving different expert communities" (Collins et al., 2017: 782). While contributory expertise denotes one's ability to contribute productively to a field (Collins and Evans, 2007), interactional expertise has been recently refined into "fluency in the spoken language associated with a practice" (Collins et al., 2017: 765). Importantly, "what distinguishes interactional expertise is the claim that, under the right social circumstances, fluency in a spoken language and a conceptual understanding of the domain to which it refers, can be acquired without experiencing the practice." (Collins et al., 2017: 765) Thus, people may acquire interactional expertise through immersion in a field, while following a different trajectory than contributory experts (Collins et al., 2006). Even though they lack accreditations, interactional experts hold specialist tacit knowledge and can reach such high levels of knowledge that contributory experts welcome conversations with them. Interactional expertise is also very specific: just like contributory experts in a field can contribute successfully only in some areas, interactional experts can be more competent about particular subdomains of a field. Furthermore, the acquisition of interactional expertise enables people to function as mediators between contributory experts in a field and the group(s) they represent.

While Collins & Evans (2015) have preferred to study interactional expertise through the Imitation Game and have, thus, resisted calls to expand their initial definition of this concept, in this study I follow the lead of scholars who have argued for a broadening of the way in which interactional expertise is understood (Goddiksen, 2014). I thus take up Plaisance and Kennedy's (2014) recom-

mendation to study interactional expertise by considering the 'fruitful' contributions people endowed with it can bring to a field due to "the various profiles that interactional experts can have as a result of who they are, why they've sought to acquire IE [interactional expertise], and how they make use of it" (Plaisance and Kennedy, 2014: 65). In so doing, I extend interactional expertise by considering the effects of taking seriously the medium through which it is displayed and I build upon several recommendations Collins and Evans made to show that its bi-directional character is more substantial and dynamic than they had envisaged.

Interactional expertise can play an important role in the relations between medical professionals and patients. Considering chronic illnesses, for instance, Collins and colleagues (2017) suggested that it would be worthwhile to study the level of expertise medical professionals have regarding their patients' lived experiences with particular conditions. While this is not the object of this study, their suggestion reveals that the experiential knowledge of patients is an area in which medical professionals might be interested to become competent and for which they require the assistance of their patients. This also means that while medical professionals are contributory and interactional experts in regard to (specific areas of) medical knowledge, they generally lack expertise regarding the lived experience of a condition. Unlike them, people diagnosed have contributory and interactional expertise regarding the latter aspect, but developing interactional expertise in the medical field is an accomplishment in which only some of them succeed. Thus, in this article I show that people endowed with interactional expertise can successfully influence the audience of bipolar patients and their families to whom they translate medical knowledge, and they can also collaborate with medical professionals. I argue that there are important differences between the activities people can engage in and the repertoire of tactics that they can choose from in order to display interactional expertise, depending on the medium they use.

## Methodology

In analyzing how the bloggers display interactional expertise, I take a mediated perspective, whereby I consider the content they produce not only as the result of their particular skills and intentions, but also as importantly shaped by the technology of blogs, which facilitates particular behaviors and practices, but constrains others (Kivits, 2009). I aimed to mimic the approach of regular users, and selected these bloggers using the Google index as a relevance indicator. Data were collected between July 2014 and February 2017 and initially consisted of: bloggers' posts about the treatment of BP and information provided under the "about" rubric of every blog. The blog references used in this article can be found in Appendix 1.The direct mentions and hyperlinks on their blogs allowed me to become aware of the medical professionals and public officials Tracy, Fast, Walker knew and of the institutions they had ties with. In order to acquire a better understanding of their standing, information on their other public activities and on the signs of recognition they had received was needed. Additional online queries were therefore subsequently conducted, using the bloggers' names as search terms in the search engine Google. The search 'Natasha Tracy' generated 19,600,000 results, while 'Julie A. Fast' 349 million. Since the query using 'Charlotte Walker' was confounded by hits concerning other public people, I refined the search terms to 'Charlotte Walker bipolar'. This query generated 979,000 results. Another search using 'Charlotte Walker purple persuasion' generated 668,000 results. The biographical and social data were collected from the first ten pages of results.

I performed thematic analysis of all the texts collected, including hyperlinks and images, by identifying important themes through repeated readings (Lupton, 1997). Given the bloggers' online standing, the initial coding process focused on (1) the type of information they made available about BP on their blogs, with the themes identified including: treatment, management of the condition, lived experiences of people diagnosed broadly understood, and (2) on their interactions with readers, which were roughly thematized into provision of (emotional) support, provision of additional information, reactions to

challenges, and reactions to positive feedback by the bloggers. Based on these preliminary findings and in consultation with the literature, the coding of the data was subsequently refined in line with the notion of interactional expertise. I operationalized interactional expertise based on Collins and colleagues (2006) into three main dimensions: linguistic fluency in the field of medical knowledge about BP; ability to evaluate and distinguish between medical professionals; ability to provide practical advice about relevant matters in the field. Given the aim of expanding the notion of interactional expertise by focusing on its bi-directional character and by considering the effects of the medium through which it is articulated, the following aspects were additionally focused upon using also the biographic data collected: how and when bloggers invoked and displayed medical knowledge; the bloggers' relations with medical professionals; the alliances they forged; elements conveying the bloggers' standing; the bloggers' use of online affordances. In the following sections, I show that these bloggers hold interactional expertise and that they have turned themselves into online expert mediators through a substantial use of its bi-directional character and by expanding their mediation work online and offline.

## Analysis

### *Linguistic prowess*

The display of linguistic fluency in a field is the main mark of people endowed with interactional expertise (Collins and Evans, 2002). While Tracy, Fast, and Walker are not medical professionals, nor did they study medicine, the many years since they have been diagnosed with BP, the multitude of treatments they have tried and the great variety of professionals they have consulted have provided them with ample opportunity to observe the practices of the medical community. Furthermore, their own pro-active attitudes have enabled them to deepen their medical knowledge about BP. These three bloggers display their linguistic prowess throughout their posts and interactions with commentators, as they explain medical phenomena using a more accessible vocabulary and providing examples, they give advice about the most appropriate therapeutic approaches depending on one's symptoms and/or life circumstances, and are aware of the latest developments in the field. The excerpt below is illustrative of such activities:

> Drug tolerance is also known to occur upon drug-discontinuation. In other words, someone who has previously responded well to lithium discontinues the drug, symptoms reemerge, the person goes back on lithium but does not find it effective. Again, we don't know why this occurs but it does appear to in a small percentage of patients. In one study, it occurred in 13.6 percent of people taking lithium. (...)
>
> Warning, this is a preclinical study and as such the implications from it may not be fully understood. Please make sure to make any medication changes only with doctor oversight. For more information please see the study Tolerance to the Prophylactic Effects of Carbamazepine and Related Mood Stabilizers in the Treatment of Bipolar Disorders [hyperlink provided]. (Tracy, Bipolar Bites, May 30, 2012)

This quote indicates Tracy's position as mediator between medical professionals and bipolar patients, position which I argue that is characteristic for this new type of stakeholder. While it may be that it refers to the level of knowledge available to the whole of humanity, the use of 'we' in a context where study results are discussed suggests that Tracy sees herself more as a member of the medical community. At the end of the post, however, she reclaims her subordinate position to medical professionals, while by sharing the source she used, Tracy reveals her awareness of the need to legitimize her claims.

Mediators importantly transform the meaning of the information they transmit and this is obvious in the posts authored by all three bloggers. While they convincingly use medical vocabulary, they do so in particular ways. For instance, Tracy puts forward her own reading of personalized medicine, as on numerous occasions she seems to believe that each person displays an individual mix of symptoms and reacts differently to treatment, as the quote below illustrates:

> And if 99 people say the med is bad, but 1 says it's good, what benefit is that? Should the patient not try it? Should the patient assume the med won't work or will have too many side effects? The 99:1 ration essentially means nothing because we're all different. (Tracy, Breaking Bipolar, June 30, 2011)

Furthermore, Tracy often uses statistics and results obtained through randomized controlled trials to support her claims. This shows that she makes strategic choices about the ways in which she refers to medical information, a tactic previously identified among patient organizations (Treichler, 1999). This rather complicated balancing act is necessary as it allows her not to alienate readers with experiences different from the ones she describes, while maintaining her authority. At the same time, it enables her not to stray too far from the prevailing medical consensus, thereby retaining her ties with the medical community.

The bloggers display their linguistic prowess also by distinguishing between different medical professionals in the field of BP, and they often criticize the prescription habits of general practitioners. As such views are expressed in posts where they provide the latest insights into a particular treatment, it would appear that these bloggers position themselves as more up-to-date than some medical professionals. Since Collins and Evans' (2002) conceptualization of expertise is based upon the idea that no contributory expert is equally competent in all areas pertaining to a particular domain, it remains open for debate whether such online contributions are meant to be understood as epistemic gaps which the bloggers seek to fill or whether they represent interventions through which they challenge the authority and standing of medical professionals who are lower positioned than specialists and scientists, for instance. This ambiguity is further exacerbated by the fact that such online comments are balanced by entries where Tracy, Fast, and Walker warn readers about their lack of medical credentials and take up a complementary function to medical professionals. They try, for instance, to prevent people from quitting their medication when scandals related to pharmaceutical companies emerge. Fast even depicts herself (and people diagnosed) as useful allies, helping doctors identify dishonest claims made by pharmaceutical companies through their experiential knowledge of the effects and side effects of medications (Fast, Bipolar Happens!, October 16, 2016). Furthermore, multiple entries (Tracy, Breaking Bipolar, July 5, 2012) show that through their immersion in the community of medical professionals, these bloggers have also become familiar with the political economy of the pharmaceutical industry.

Tracy, Fast, and Walker display their fluency in medical knowledge also by evaluating the merits of various studies and by distinguishing between medical information based on its source. Walker goes beyond the evaluation of statements and specialists in the field, and calls upon her online followers in order to verify results obtained by reputed researchers. Having read in the highly authoritative *The Lancet Psychiatry* a critical article about the quality of care provided by Home Treatment Teams (HTTs) in the U.K., she starts an online survey to find out if her readers, to whom she promises anonymity, confirm these findings:

> I threw the issue of HTTs/CRTs open to my Twitter feed. I'm not pretending this is in any way "research"; I simply asked people to share their experiences. (…) A sizeable minority found their HTT invaluable and were full of praise; others found parts of the system helpful .... (Walker, June 23, 2014).

Her decision to replicate the study online illustrates the major role the internet has played in expanding the repertoire of activities bipolar patients could take up, and how it has changed their position in relation to medical professionals. By sharing her findings, Walker presents her blog post and inquiry as replicates or alternatives to the processes undertaken by the team of medical professionals who authored the article.

Through their online posts, Tracy, Fast, and Walker show that they are endowed with sufficient medical knowledge (both substantive and methodological) to be able to distinguish between professionals based on their training and prescription habits, that they can correctly interpret the results of scientific studies, and can even seek to replicate them. Furthermore, they provide ample advice about the treatment and management of BP. These bloggers thus show that they have

become fluent in the language of medical professionals and have therefore successfully developed interactional expertise.

### *Bi-directionality*

Bi-directionality is an important aspect of interactional expertise, yet Collins and Evans do not sufficiently theorize this ability of people endowed with interactional expertise to function as mediators between others with the same kind of contributory expertise as they and with individuals who have contributory expertise in the field where they hold interactional expertise. For Collins and Evans (2002), interactional experts translate the scientific practices of contributory experts in one field for people with contributory expertise in another field, and shape the knowledge contributory experts produce by questioning some of their practices or by making them aware of other perspectives on an issue of interest. Thus, Collins and Evans see interactional experts as providing contributory experts with sources of inspiration. I argue, however, that people with interactional expertise can engage in more substantial exchanges, and that more attention should be paid to the type and quality of their interactions with contributory experts in different fields. The exchanges of the bloggers studied here are revelatory in this sense.

In their interactions with bipolar patients, Tracy, Fast, and Walker go beyond the mere provision and explanation of medical information, and often position themselves as complements or alternatives to medical professionals. The bloggers achieve this by combining knowledge with care, by expressing concern for the realities of their readers' lives. They try to locate for them institutions that might be of help, they explain how to apply for social provisions, and express empathy towards the difficult choices people face in relation with BP and its treatment. The bloggers also give practical advice, stemming from their experiential knowledge: "Freeze your fish oil pills! This makes them a lot easier to digest. I take mine right before bed." (Fast, September 22, 2008). Furthermore, they give suggestions on how to behave when interacting with medical professionals, on how to meditate, or prepare for stressful events, such as holidays or Christmas. Tracy, Fast, and Walker also mediate between people diagnosed and their loved ones, shedding light upon some of the former's behaviors and advocating for particular approaches in their interactions. The bloggers show thus their substantial knowledge while remaining relatable, and readers often express gratitude for the information they provide: "It is through your blog that I have learnt such a lot about the different bipolar drugs that are available because I have no real idea apart from the meds I take" (LucyG, purplepersuasion, July 9, 2016). Thus, many readers seek the counsel of this new type of stakeholder because they are convinced of their expertise and because they trust them. While the bloggers acknowledge the authority of mental health specialists and display substantial medical knowledge to render their views credible, they try to steer away from the controversy and suspicion which regularly surround the recommendations of medical professionals who receive honoraria from pharmaceutical companies. Such tactics are in line with those observed by scholars among 'A-list' political bloggers, who sought to increase their authority by professing their independence from the establishment, i.e. 'big media', while taking up some of their activities and professional values (Park, 2009).

One of the challenges encountered by researchers interested to collaborate with patients is to enable their contributions (Hewlett et al., 2006). This is another area where online expert mediators engage in mediation work, as they succeed to enhance the cathetic dimension Borkman (1976) referred to, and develop a space where their readers can articulate their experiences and negotiate how they position themselves in relation to their condition and the medical community. The bloggers educate people diagnosed about medical terminology and perspectives, so that they are better able to engage in collaborative projects with researchers. This is important, because not all bipolar patients may have the time and health condition necessary to grapple with medical terminology and research methodology. Moreover, Tracy, Fast, and Walker may provide people diagnosed with the confidence that the insights they have are relevant and valuable, thus enabling them to interact with medical professionals with the assurance and

determination necessary to move towards more equal exchanges. They may also help those interested in research participation to develop the patience and distance needed to accept results which may contradict their personal views.

Next to bipolar patients, the bloggers have constituted themselves into valuable allies for medical professionals who lack but need their insights derived from the lived experience with this condition for various aims. Thus, online expert mediators can assist medical professionals to acquire interactional expertise regarding the embodied experience of BP, and thus help them develop a broader perspective about this condition and novel research ideas. By positioning themselves as representatives of their bipolar readers, the bloggers provide medical professionals with important information regarding the research directions bipolar patients would find relevant. In a context where medical expertise continues to be challenged, online expert mediators further serve the interests of the medical community, by bestowing additional credibility upon the scientific approaches they champion.

The bloggers have also acquired sufficient medical knowledge and other relevant resources for medical professionals to want to collaborate with them. For instance, together with Prakash Masand, M.D., Tracy wrote an article published in 2014 in the medical journal *The Primary Care Companion for CNS Disorders*. Furthermore, in July 2016 she initiated a survey about patients' experiences concerning electroconvulsive therapy (ECT) on her personal blog:

> My name is Natasha Tracy and this ECT survey was my idea. I am running this survey with Dr. Prakash Masand [hyperlink provided], the psychiatrist behind the site Global Medical Education [hyperlink provided] which aims to educate others, particularly doctors, about medical issues such as those surrounding mental illness.
>
> For my part, I have BP and have had ECT for bipolar depression. This has made me passionate about the subject as I see the extreme debate that goes on about this treatment online. (Tracy, Bipolar Burble, July 3, 2016)

This quote emphasizes Tracy's claims to expertise -experiential but also informed by knowledge acquired online- and the complementary role she ascribes to medical professionals in the practices she takes up. While she is knowledgeable enough to come up with this idea and for an authoritative medical figure to collaborate with her, Tracy needs this partnership to legitimate her endeavor, since she lacks the apparently still necessary official accreditations. Tracy's position as an influential blogger enables her to collect quickly and cheaply data from many readers, which her medical collaborator can then use in order to produce further knowledge. Furthermore, Tracy's expertise about BP has been publicly acknowledged by medical professionals. For instance, Ronald Pies, M.D., wrote about her:

> As a specialist in bipolar disorders, I can say that Natasha's understanding of this illness is more accurate and sophisticated than that of many physicians I have encountered over the past 30 years. But more than that: she shows uncommon wisdom and deep compassion, when it comes to discussing psychiatrists and psychiatry. (Pies, Psychiatric Times, May 24, 2012).

Reputed medical professionals have also collaborated with Fast. For instance, she co-authored the books *Take Charge of Bipolar Disorder: A 4-Step Plan for You and Your Loved Ones to Manage the Illness and Create Lasting Stability* (2004), *Loving Someone With Bipolar Disorder* (2004) and *Get It Done When You're Depressed* (2008) together with Dr. John Preston. He is now professor emeritus with Alliant International University in Sacramento, the author of 21 books, and the recipient of the "President's Award" from the Mental Health Association and of "Distinguished Contributions to Psychology Award" from the California Psychological Association. Furthermore, Fast is claimed to "train pharmacists, psychiatric residents, social workers, alternative health care practitioners, general physicians, nurse practitioners, therapists and many more health care professionals on the topics of depression and bipolar disorder management" (Amazon, 2016). The bloggers represent this new type of stakeholder, since both they and medical professionals profit from forging alliances.

The power and legitimacy they acquire through collaboration with medical professionals are subsequently used by Tracy, Fast, and Walker to engage even more substantially in research practices. For instance, Fast ventured in the production of medically-relevant knowledge on her own, developing *The Health Cards Treatment System for Bipolar Disorder*, which "works with or without medications", as she claims (Bipolar Happens!, 2016). This system is meant both for bipolar patients and family members, and Fast states it is very successful: "I know that tens of thousands of my readers use the Health Cards daily… (…) Even my health care professionals use them!" (Fast, Bipolar Happens!, May 6, 2010). Apart from legitimating her invention, such claims show that there are areas where medical professionals can learn from her. While using Fast's cards attests to an awareness by medical professionals that bipolar patients and their families may have needs that traditional medical approaches insufficiently address, it may also be a means for them to retain monopoly over medical knowledge at a time when other professionals challenge it.

Walker was invited to work as a researcher under supervision on a study on medication use during pregnancy, as her being a woman diagnosed with BP was thought to make the interviewees feel more comfortable. Her recounting of the first meeting with the other research collaborators reveals the importance of her online resources for researchers:

> I listen to other service users' involvement in postgraduate work and wonder who I think I'm kidding. I waffle about being a mother with bipolar disorder and having a background in maternity services. Almost as an afterthought I add that I maintain a mental health blog and have a Twitter following of several thousand service users, carers, and health professionals. "Now that", says McPin's Research Director, Vanessa Pinfold, "could be very useful in recruitment and dissemination." (Walker, 2015:785)

These bloggers are thus more than interesting and inspiring conversation partners for medical professionals. They are stakeholders that researchers want to collaborate with substantially, as they can facilitate the enrolment of a high number of study participants, they can provide experiential knowledge and important insights into relevant areas for future research. The way for such partnerships has already been paved by patient organizations, but there have also been several substantial collaborations between researchers and particular individuals. Notable in this sense are the research activities of Portia Iversen (Iversen, 2007) and Sharon Terry (Terry and Boyd, 2001), who have directly contributed to the development of new therapeutic approaches for autism, and to the identification of the gene mutation causing Pseudoxanthoma Elasticum (PXE), respectively. Yet, whereas Iversen and Terry had at their disposal important resources as the leaders of two influential patient groups and were not themselves diagnosed with the conditions they studied, Tracy, Fast, and Walker are bipolar patients and have managed to acquire the resources mentioned above individually, through their skillful use of the internet.

### *Expanding mediation*

Tracy, Fast, and Walker have expanded their mediation work by developing close relations with mass media outlets, thereby further increasing their influential standing. Tracy has been often interviewed and participated in documentaries about BP. In 2008, Fast hosted a weekly radio program, *The Julie Fast Show*, on KTRO in Portland, during which she had a number of 'special guests', medical professionals or people diagnosed with various mental conditions, who often wrote about their experiences and participated in advocacy actions. She is regularly interviewed on diverse mental health issues, such as Britney Spears' nervous breakdown and Carrie Fisher's death, and writes on mental health in magazines such as *People* and *US Weekly*. Fast was also the original consultant for the character played by Claire Danes in the popular drama series *Homeland*. Walker is a close BBC collaborator, having given numerous interviews, and participated in various talkshows and documentaries. Fast and Tracy have also published books about their experiences with BP, thereby further extending their reach. In 2016, Tracy wrote *Lost Marbles: Insights Into My Life with Depression and Bipolar*. Fast is the author of five books, which have sold over 250,000 copies, four of which are "on the Amazon.com mood

disorder bestselling book list" (Fast, Bipolar Happens!, 2016). Through such activities, the bloggers also reach broader audiences than bipolar patients and their families, thereby contributing to how BP and other related conditions are understood by the general public. As they become more familiar with other media, these bloggers can use their skills for more political purposes, as they may generate public sympathy, emphasize the urgency of particular pieces of legislation or treatment provisions, or put forward more complex images of life with BP. In so doing, Tracy, Fast, and Walker expand their mediation work beyond the more immediately responsive online medium, translating, synthesizing, bringing together, and refining different types of knowledge about BP in formats in which interaction is more difficult, takes more time, and occurs more frequently away from the public. Yet, it is precisely through their ability to use different media and to retain a coherent image across them that these bloggers retain and further increase their influence and standing.

That their standing goes beyond that of the average blogger is indicated by the numerous awards Tracy, Fast, and Walker have received. Tracy received the Beatrice Stern Media Award and the #ErasingtheStigma Leadership Award, and has been listed as the fourth HealthMaker in the top ten online influencers in the area of mental health by Sharecare.com. She was also a speaker at the National Council on Mental Health and Addictions Conference and is hailed as one of the 'heroic' figures of people diagnosed with BP. Another indicator that her reach goes beyond the small circle of family and friends is the fact that she has been a contributor on health platforms and a subject matter expert on BP at Answers.com, all of which have millions of visitors. Fast received the Mental Health American Journalism award for the Best Mental Health Column in the U.S., while Walker's blog was selected by the UK *Mail on Sunday* as a top health blog. The blogs they authored have been voted many times among the best bipolar blogs.

### *Interactional expertise and the internet*

In their conceptualizations of interactional expertise, Collins and Evans do not consider the effects of the medium through which interactional expertise is displayed. I expand this notion by showing that the internet has importantly shaped how Tracy, Fast, and Walker have displayed their interactional expertise. This is all the more relevant, since "in the context of the digital shift, the demarcation between certified experts and lay people is blurring" (Dickel and Franzen, 2016 :3) An important step in this direction was taken by Shanahan (2010), who studied how scientific and personal expertise about health were expressed and discussed in the online comment section of a newspaper. Unlike Shanahan, I focus on specific individuals with a well-established public persona, who have to further demonstrate the interactional expertise displayed in their posts by (not) engaging with their readers' comments. While their audience may include contributory and interactional experts, an important difference from Shanahan is that such exchanges already take place in conditions of inequality, since as authors and owners, the bloggers speak to their readers. Her findings are nevertheless relevant, showing that online scientific expertise is not determined based on the invocation of credentials, but on one's ability to take up scientific practices, such as the provision of evidence and the citation of relevant sources, thereby revealing one's familiarity with the scientific norms and culture.

Such tactics were also adopted by Tracy, Fast, and Walker as means to articulate and reinforce their online standing. For instance, comments from readers are used as opportunities to display their expertise by giving additional medical information and by correctly identifying specific interventions. Since people with experiential expertise display growing tendencies towards scientisation in their contributions (Shanahan, 2010), these bloggers do not merely invoke scientific claims, but carefully select, apply, and interpret them. This is how Tracy reacts to a vague comment about a new test meant to determine the effectiveness of medical treatments for BP: "I believe you're talking about the cytochrome P450 (CYP450) tests which I know are offered at the Mayo Clinic. (Also used in cancer treatment)". (Tracy, Breaking Bipolar, November 5, 2012) Thus, apart from having sufficient knowledge to understand what the contributor is referring to, Tracy also contextualizes the test, linking it to other medical disciplines. The

bloggers further use their readers' comments as indicative of their informational needs and as sources of inspiration for some of their posts. From this perspective, comments help bloggers retain their popularity and influence by addressing topical issues.

Yet, the internet also poses challenges to the display of interactional expertise, as the information they provide is open to the scrutiny of people with different levels of education, different views, and at different moments in time. To become and remain credible mediators, Tracy, Fast, and Walker therefore need to show that the knowledge they share is authoritative while staying open to different perspectives. One way in which they manage such contradictory expectations is by using the internet's multiplicity, giving different nuances to their messages on different platforms. They further use the asynchronous and selective character of comment exchanges to respond advantageously to their readers' unexpected questions or reactions. Since Tracy, Fast, and Walker are at liberty to choose when they react to comments, they can take the time to acquire more information or to work on a reply until it has a satisfactory shape. In the meantime, other readers may come to their 'help', by sharing their knowledge and experiences. Their successful display of interactional expertise is also informed by the wise selection of instances when they interact with their readers. Thus, while they choose to intervene in situations where their knowledge, empathy, and relatability are emphasized, they remain silent in front of provocations which may alienate their audiences. Comments rules are another important instrument through which the bloggers may contain their readers' challenges and avoid controversy. For instance, initially Tracy did not allow commentators to provide the exact names and dosage combination of medicines. While this approach was meant to prevent readers from trying medicines without medical approval, it also weakened the epistemic claims and challenges they could bring against her.

The technology of blogs also enables Tracy, Fast, and Walker to display their interactional expertise using images and hyperlinks. Their blog entries are often accompanied by images which either illustrate the main message of the post or bring an additional dimension to the information provided in writing. Depending on the topic, the bloggers choose for different ratios between written material and images. For instance, when discussing alternative ways of ensuring mood stability, Fast only writes a few lines but provides numerous images depicting relaxing activities. When the effects of particular medications are discussed, however, the written text dominates. Hyperlinks reveal important alliances as well as power relations. All three bloggers use them in order to show that the information they provide is based on reliable sources. They refer mainly to articles available in medical databases such as PubMed and Medscape or to posts by medical professionals on platforms where they collaborate. Tracy, Fast, and Walker thus position themselves as trustworthy mediators between reliable sources of medical knowledge and interested audiences. Hyperlinks are also used by bloggers to emphasize their vast body of work. For instance, Tracy uses them to direct readers to her older posts. Interestingly, the bloggers generally refrain from using these affordances to share knowledge produced by other people lacking accreditations or to introduce their readers to projects initiated by 'citizen scientists'. This indicates that the high standing these bloggers enjoy is not due to a subversive use of the internet, but rather to their alliances with powerful stakeholders.

In general, all three bloggers adapt the combination of medical and experiential knowledge, so that it is in line with the type of platform they contribute on, they react to comments strategically, and are very careful in their use of hyperlinks. Thus, their display of interactional expertise is importantly shaped by their use of blog affordances.

## Discussion

The bloggers discussed here can be seen as a particular and highly successful form of entrepreneurial selves (Petersen and Lupton, 1996). This new type of stakeholder- online expert mediators- represents a move away from social movements, and a focus upon exceptional patient figures, who have been able to use various resources and the opportunities and limitations the internet has

made available to become highly influential. This stakeholder category emerges thus at the intersection between a (mental) health condition, the acquisition of particular types of knowledge, and the use of a specific medium. By combining personal experiences with medical knowledge, Tracy, Fast, and Walker have gone beyond the average illness blog, where one's personal experiences are conveyed in an intimate, diary-like fashion, and have come closer to issue-based blogs, where different types of information considered relevant about a particular topic are provided and discussed using arguments and multiple perspectives (O'Neil, 2005). The interactional expertise that they develop and articulate to various degrees has a strong bi-directionality, as they need to be fluent in the language of medical knowledge of BP as well as to retain their experiential knowledge in a format which allows them to relate to readers diagnosed with BP and their families. Thus, in their acquisition and articulation of interactional expertise, online expert mediators are reminiscent of journalists, who "develop different degrees of bipolar 'interactional expertise', specializing in interactions with their sources on the one hand and audiences on the other" (Reich, 2012: 339).

The rise of these stakeholders takes place in a context in which the informational and health imperatives require people to assume responsibility about their health (Kivits, 2013), yet the difficulties of living with a particular condition may prompt them to prefer to follow someone else's lead (Lemire et al., 2008). Since the expertise of medical professionals has been challenged over the last decades, many people diagnosed may seek to resolve this tension by following the advice of this new stakeholder type, by using such expert bloggers as arbiters. At the same time, the rise of this new stakeholder is also due to patients and their families requiring, apart from medical information, also encouragement and guidance. Nevertheless, these new stakeholders are also confronted with suspicion given the varying quality of the health information available online and the growing awareness that many public speakers and opinion-setters represent particular groups of interest. To be successful, online expert mediators therefore need to convince their readers to develop different types of trust: they must trust the bloggers; they must trust certain online spaces or platforms; they must trust (at least) the branches of science the bloggers themselves rely upon (Harris et al., 2011).

Importantly, this study has indicated that the medium plays an important role in how interactional expertise is displayed, thereby extending Collins and Evans conceptualization of this notion. In so doing, it has also brought into relief some problematic aspects concerning the development of this new stakeholder category. While interactional expertise is necessary for this new type of stakeholdership, a strong medium is also needed. Developing interactional expertise has enabled Tracy, Fast, and Walker to gain access and to develop close contacts with medical professionals, yet it is their online popularity which has provided them with the resources necessary to engage in substantial exchanges with the latter. The internet has therefore allowed them to convincingly position themselves in their relations with medical scientists as representatives of people with BP in a way which is reminiscent of the tactics of American AIDS activists described by Epstein (1996). Epstein problematized the position 'lay experts' occupy in relation to the 'lay lay', highlighting that the acquisition of competence into a new type of knowledge impacts on how one understands and relates to the other types of knowledge with which one is endowed as well as on one's relations to others. Thus, he argued that by "learning the language and culture of medical science" (Epstein, 1995: 417) people diagnosed risk distancing themselves from other people diagnosed with the same condition, from their views and interests. From this perspective, the close collaborations the bloggers develop with medical professionals may lead to a further obfuscation of the differences in experience as well as in interests, needs, and values existing between people diagnosed with BP (Rowland et al., 2012), who follow these bloggers online.

While blogs have been acknowledged as technologies with a democratizing potential (Huovila and Saikkonen, 2016), the findings presented here show that online expert mediators acquire such high standing by developing close ties with 'traditional' experts. Thus, rather than contributing to

opening the field of scientific knowledge production to more people who lack official credentials, online expert mediators might inadvertently contribute to the refinement of existing hierarchies in the relations between medical professionals and patients. From this perspective, it is regrettable that the interactions between these bloggers and medical professionals occur most of the time offline or through private communication, so that it is not possible to observe how they negotiate participation in various projects and support for various initiatives. Since the bloggers' interactional expertise is limited to particular areas of medical knowledge on BP and does not exclude personal preferences, online expert mediators also risk presenting their readers a skewed perspective on the use and effectiveness of the currently available forms of treatment. Another danger stems from the mediation work online expert mediators engage in between family members, as they may end up certifying particular symptoms and behaviors, with which they are acquainted, while casting doubt upon the authenticity of those they are not familiar with.

The online expert mediators studied here creatively combined their personal insights about BP with medical knowledge in their online contributions. In so doing, they not only selected and adapted the medical knowledge they were familiar with to best serve their purposes, but they also translated it into a more accessible vocabulary for people less familiar with medical terminology. By doing so, they may help bridge the digital divide when it comes to medical literacy by sharing medical knowledge in an accessible manner, by making people diagnosed and their families aware of the options at their disposal, and by helping them get in touch with support groups and other organizations. While some people diagnosed with other mental conditions, such as autism and schizophrenia, have used the internet to legitimate their claims by arguing that their personal experiences should be understood as different ways of being in the world rather than as pathological behaviors (Ringer and Holen, 2016; Crossley, 2006), the online expert mediators discussed here legitimated their claims using medical knowledge. Having achieved a highly influential position, in the future they might harness their creativity and various skills to contribute in novel ways to the proliferation and diversification of collaborations between people diagnosed and medical professionals.

The analysis of these bloggers' activities has also provided important insights regarding some of the conditions necessary to become such stakeholders. Thus, next to an official diagnosis, people's health needs to be stable enough for them to engage in various activities requiring a lot of time and energy. They also need to be able to communicate in ways which can capture and retain the interest of different stakeholders. Furthermore, those interested need either to financially afford giving up their jobs to dedicate themselves to the development of blogs or to be willing to accept sponsorship or another form of payment, thereby running the risk of losing their social benefits. More research is needed to understand the ways in which other kinds of knowledge and online skills shape the acquisition and articulation of interactional expertise, and into the differences and similarities concerning the mediation work undertaken by this new stakeholder category across different conditions. Fortunately, the internet waits to delight[1] in further interactions and new questions…

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## Appendix 1

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## Notes

1 The last sentence of this article is a paraphrase of a line from Charles Bukowski's poem "The laughing heart". *Betting on the Muse: Poems and Stories* (1996). Harper Collins e-books.

# **Learning to Become an FSC Auditor:** Objectivity, Interpretation, and Mastery

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## Abstract

This paper aims to open the black box of auditing for the Forest Stewardship Council (FSC) forest management standard. Specifically, we delve into the early steps of becoming an FSC auditor by examining two auditor training sessions in northern Europe.
Using a mix of participant observation and unstructured interviews, the paper subjects the trainings to a dramaturgical analysis that focuses on the ways in which objectivity was performed and on how it was taught to be performed.
Alongside being an exploratory piece on FSC auditor training, this article highlights how objectivity and subjectivity are co-supportive components. Instead of being something to shy away from, auditors are implicitly taught the values of auditing even if they compromise the objective claims of the auditing process. Furthermore, the paper establishes that both interpretive and objective aspects are necessary, and that to compromise either is to diminish the capacity of the audit process.

**Keywords**: FSC, auditing, dramaturgy

## Introduction

The first image of an auditor is that of an outsider, an interloper who swoops in to scrutinise and criticise. It is an image of ledgers, numbers, checklists, and cold, hard facts. It is also an image of faceless devotees busy ferreting away until the truth is finally revealed. These images are not so easily aligned with the daily practices of auditors as they try to make sense of the world; to reconcile what is observed empirically against the audit standards that they are required to apply. Faced with the interactions needed to compress the intricacies of life into easy-to-comprehend checklists for reporting in order to feed society's hunger for information, auditors face a daunting task.

An audit, according to Domingues et al. (2011: 1) is a "systematic, independent and documented process for obtaining… evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled". This meaning of auditing is becoming increasingly important in a wide range of practices including business management, public policy development and environmental governance activities. The rise of auditing can be seen as part of a wider trend of what has been called informational governance (Gupta and Mason, 2014; Mol, 2008). As captured by notions such as evidence-based policy or new public management, the legitimacy of policies, including certification schemes, is seen to depend on the systematic evaluation of effectiveness, which requires the systematic collection of standardized information (Turnhout et al., 2014). Simultaneously, demand for information *about how that information is produced* has also risen, leading to the so-called 'tyranny of transparency' (Strathern, 2000).

In the environmental arena, this need for information has manifested in the form of third party certification audits, which have borrowed practices and language from financial accounting (Konefal and Hatanaka, 2011; Power, 1997) The Forest Stewardship Council (FSC) is one of the most prominent examples. Its logo, the 'tick-tree', is near-ubiquitous and can be found on many paper or wood products. FSC has been studied extensively from multiple perspectives. Some authors have focused on the quantitative assessment of the impact of FSC (Auld et al., 2008; Ebeling and Yasué, 2009; Moore et al., 2012), resulting in descriptive accounts of how FSC is effectuating change globally. Other literature has focused on critical examination of the principles behind FSC and FSC auditing (McDermott, 2012; Auld and Bull, 2003; Arts and Buizer, 2009). Finally, a small group has looked directly at the practical implementation of the FSC system in the field (Eden, 2008; Maletz and Tysiachniouk, 2009).

This article draws inspiration from the final group in its focus on the contextualised practice of auditing. However, rather than auditing itself, our analysis addresses auditor training material and how auditors are trained. Analysing this aspect of auditing allows us not only to examine how underlying principles and standards are presented to new auditors, but also to better understand how prospective auditors are taught to apply these principles. As with all educational or training activities, examining underlying elements is an important part of understanding the process of becoming an expert. Particular attention is paid to the importance of objectivity in the repertoire of an auditor, and by extension, the role of what is considered subjective. In so doing, we follow along the lines of Power (2003) who, drawing on the work of Bourdieu, rejects the assertion that the seemingly well-formed concept of objectivity signifies anything at all. Instead, we conclude that while the explicitly trained and well-practiced aspects of auditing are important for the overt performance of objectivity, the ill-formed, ill-trained aspects of the FSC audit are equally important for creating meaningful audits and performing objectivity. It is important that this is recognized in view of the increasing siginificance attached to auditing as an indispensible part of legitimate and effective environmental governance. Furthermore, it is in the interest of improving audits for this to be recognized if the principles of audits and auditing are to be prioritized in society.

Power (2000) questioned the prominence of auditing in society outside of the UK, but one only needs to look at the state of FSC's certificates to see that it is a global phenomena. In 2017 there were more than 1500 valid FSC forest management certificate and 33000 valid FSC chain of custody certificates globally (FSC, 2017), each one representing a yearly surveilence audit and quinquennial recertification audit. These audits are perfomed by approximately 40 organizations (ASI, 2017) of varying sizes from a few individuals to major multi-national organizations. Considering the magnitude of FSC certification as an industry, and the importance of its values such as transparency, accountability, and objectivity in environmental governance (Gupta and Mason, 2014; Mol, 2008; Power, 1997), it is crucial to examine the explicit and implicit aspects of auditing as auditors themselves learn them.

By presenting an analysis of two FSC auditor trainings in 2013 and 2014, this article contributes

to the understanding of auditing as a practice. Before presenting our findings, we first provide an explanation of our methodological and conceptual approaches, followed by a more detailed introduction to the FSC auditing system.

## Expertise and the performance of objectivity

The definition of auditing offered earlier emphasizes the term 'objectively'. Objectivity indicates a rigid system by which auditors gather and analyse data. These data are subsequently confronted with the standards in order to determine whether they are evidence of conformity or non-conformity. However, as in other processes of knowledge production, there is a social dimension to auditing. Porter (1995: 35) explains "strict rules are almost indispensable unless those gathering the numbers are themselves very well socialized in the craft." This suggests that following rules is important for novices, while those with more experience are apparently able to transcend the intellectual pursuit of 'objective thinking' to the point of being intuitively a master of a craft (Yanow, 2015). Mastery of a craft means that expertise has reached a level where expert judgement no longer requires deliberation or justification. This is derived from Dreyfus and Dreyfus (2005: 779) who argue that "intuitive judgment is the hallmark of expertise". Applied to auditing, Pentland (1993) describes how seasoned financial auditors conclude their activities only after preforming the 'ritual' of becoming 'comfortable' with the numbers, which is far from an objective measure.

Collins and Evans (2007) characterise expertise, working their way through their 'periodic table of expertises' from those skills which all members of a group share (e.g. common language) to the highest level of expertise (e.g. competently doing the activity). In between these extremes is the production and acquisition of knowledge or facts without context or 'practical competence' (incidentally, this is precisely the outcome of the training we analyse, but this will become evident later). For this so-called *interactional expertise*, no amount of if-then statements can capture the knowledge necessary. It begins to transcend the common language, relying entirely on the language of the expert-group. Essentially, one can 'talk the talk' even if one cannot 'walk the walk'. These descriptions of expertise are subject to limitations when the knowledge is subjected to high-risk, low margin of error situations (Turner, 2010). Types of expertise that demand fast adjustments with little room (spatially or temporally) for error correction do not have the luxury to disguise the errors and must sometimes instead acknowledge their "interpretive flexibility" (Turner, 2010: 250). When there is a failure in the knowledge of the expertise, the expert is forced to improvise, drawing on the baser elements of Collins and Evans' periodic table. This includes non-deliberative, non-knowledge-based elements.

Kotzee's (2014) review of the literature of expertise criticized the 'fluency' narrative, which can be seen in the references to 'intuition' and baser skills in the texts above. The author's concern was that in-the-field experience is seen as the only real teacher of expertise. As such, teaching has become concerned with the performance of expertise rather than the outcome. The author also objected to the idea that the so-called tacit knowledge of expertise was tacit only because physical constraints prevent effective characterization of fast-paced or complex activities, and therefore no attempt is made to teach it. The author called for a 'social realism' perspective on expertise in which academics, educators, and experts themselves "see expertise as a real and objective ability to accomplish something in the world that enables the expert of give advice to others…" (Kotzee, 2014: 176). As such, it is important to keep in mind the "matter of how the expert… acts or… their own interpretations of their work." (Kotzee, 2014: 176). Kotzee (2014: 176) goes on to critique the training of experts resulting in a preoccupation with the appearance of being an expert, avoiding valuing "real and objective" abilities. Our article follows this line of reasoning to a point but draws on the understanding of expertise as both entirely socially constructed and also absolutely real it its effects (also see Eyal and Buchholz, 2010). This point is made in our concluding remarks.

Bal et al. (2002) offer further insight into how expertise, despite its constructedness, can assume authority and produce effects. They have outlined a central tension in the authority of science; science presents itself as authoritative and objective; however, it can only be so because behind the scenes the actors are able to effectively navigate and negotiate what it means to be authoritative and objective. Gilbert and Mulkay's (1984) analysis of scientists' discourse touches on a similar phenomenon. They show how scientists make use of two distinct repertoires to establish and justify their authority. The first repertoire is the empiricist repertoire. This repertoire is most common in the formal literature. It portrays scientific results or facts as objective, "as following unproblematically and inescapably from the empirical characteristics of an impersonal natural world" (Gilbert and Mulkay, 1984: 56). The second repertoire is the contingent repertoire and is common in informal talk among scientists. This repertoire is in opposition to the empiricist repertoire because it emphasizes the importance of context, personal inclination, and judgement. While there is an obvious tension between these two repertoires, scientists are apparently able to draw upon both repertoires. Examining this tension as it takes place in auditing will result in a better understanding of the cultural norms – both formal and informal – that are embedded in auditing (Power, 1995).

Thus, what we see emerging here is a paradox of expertise: on one hand, experts need to follow strict rules and they need to be objective, while on the other hand, expertise is about mastering a craft, which involves subjective feeling and intuition. Furthermore, there are times when pure, objective knowledge either does not suffice, or is not possible. Objectivity and subjectivity must be aligned through expertise. Conceptualizing the presentation of the trapping of expertise, authority and objectivity, as performance allows us to make sense of this paradox. Goffman (1959) presented the concept of performance as a way to explain how and why people behave in certain, largely consistent, ways when confronted with repeated or habitual, self-contained events. According to Goffman, people play specific roles, which encompass all the little details that are expected when the proper situation is presented. These roles are self-contained and rigid since breaking character causes a failure in the performance. To ensure a successful performance, the actors must be aware of, and control the 'frontstage' and 'backstage' of a performance. As we will show, the frontstage is the formal and public part of the activity. Here objectivity is emphasized as in Gilbert and Mulkay's (1984) empiricist repertoire. While in the backstage, behind the scenes, all kinds of activities and interactions take place which make the frontstage performance possible, but which in themselves are not part of, and may even seem incompatible with, that performance. It is here that the contingent repertoire abounds. Hilgartner (2000) expanded Goffman's dramaturgical perspective to include documents and reports, revealing how documents can obscure backstage elements, in particular the messiness of scientific processes, and either implicitly or explicitly bring authority-granting elements, such as claimed domains of expertise and partnered organisations, to the frontstage performance. Applied to the paradox of expertise identified earlier, this suggests that the successful frontstage performance of objectivity depends on the intuitions and values that are part of the mastery of the craft that needs to be kept backstage.

How then is objectivity performed in auditing? We draw on Douglas (2004) to further explore the different meanings that are associated with the notion of objectivity. Douglas argues that objectivity can be interpreted in three interrelated ways, which she calls 'modes of objectivity'.

1. Object-oriented objectivity: how knowledge-creating actors "get at" objects in the world.
2. Value-oriented objectivity: values that are upheld by observers in order to know something objectively, such as detachment, disinterestedness or neutrality.
3. Process-oriented objectivity: the methods and processes that are deemed necessary in order to produce objective knowledge.

We assert that each of these interrelated modes emphasizes the performative dimension of objectivity: in order to demonstrate objectivity,

actors must show that they have the right values and have followed appropriate procedures, and they must convince outsiders that in doing so, the knowledge produced refers to the object, not to the subject.

In most uses of the term, subjectivity is the opposite of objectivity: if knowledge is subjective, it cannot be objective. According to Douglas (2004), the negative connotation of subjectivity is misplaced. The knowing subject cannot be erased, but forms a component of the process of producing knowledge and objectivity. We have also seen this in our earlier discussion of mastering the craft and of the importance of the backstage for the successful performance of objectivity.

As Porter (1995) has shown, objectivity is evoked mostly in fields that face outside scrutiny. This explains why it is important in auditing practices. Auditing itself is a form of outside scrutiny, and in order to be authoritative both towards those who are scrutinized and those who do the scrutinizing, it must be held to the highest standards. Keeping in mind the paradox of expertise – the fact that backstage processes of subjective interpretation are vital for the successful frontstage performance of objectivity – how are prospective auditors trained to perform objective audits and become masters of the craft of auditing? How do they learn to navigate the paradox of auditing and 'do' objectivity as well as interpretation? The element of training adds an important dimension to this because the auditor training is itself a performance in which the teachers must convince their pupils that they are experts in their field while at the same time they must teach initiates how they do auditing. To use a well-known expression: they must not only convince the students to eat the sausage, but also show them how it is made.

## Analysing FSC audit practices

Our analysis is based on materials from two FSC auditor training courses, which took place in northern Europe in 2013 and 2014. Information was gathered via active participant observation by the first author who enrolled in the courses as a trainee. The participants were informed that the first author was there in an academic capacity and would be writing a paper based on the course contents and trainee actions and reactions, and they all consented verbally in the presence of the trainers. The trainings were held in a hotel conference room with a U-shaped arrangement of tables and chairs facing an open space that included a projector screen (it was the same location, setup, and content both years). The trainings were attended by an international group of 12 and 13 auditors-in-training. Over the course of the following days, the majority of the time was spent listening to and watching the trainers present slides, each reproduced faithfully in the training manual, while they responded to questions from the trainees. This was interrupted by exercises where the trainees were told to divide into smaller groups in order to practice the content that had been covered recently, or the entire group was asked to respond to items displayed on the projector. The courses culminated in a multiple-choice and open-response exam covering all the content. If successfully passed, the trainee received a certificate from the training organisation certifying successful completion of the course. The lead author of this article participated in all activities as well as in informal socialization during breaks and evenings.

During the training, the lead author's focus alternated between cataloguing and critiquing the substantive details of the training material, and observing the reactions, questions, and conversations of the trainers and trainees. Data was collected by means of note taking and audio recording when possible. The result was approximately 25 type-written pages of field notes per training course (divided into 'direct observations' and 'interpretations'), compiled daily and revised over the weeks following the courses. These notes included in-situ observations, as well as post-hoc interpretations of training manual contents (documents, PowerPoint slides, and images) and utterances during the training (both from notes and from transcribed audio recordings).

Analysing this data proved challenging due to its heterogeneous nature. Following Law's (2009) approach to iterative interpretive analysis of mixed content , interpretive analysis of the content was performed during the training, at night following each training day, and 'out of

the field' in the weeks and months following the course. By reading and re-reading the notes and training manual, it was possible to classify them according to emergent themes and patterns. Particular attention was paid to key buzzwords, including those referring to the modes of objectivity that were used, and the meanings associated with them. This was supported by considering the use of images that were paired with particular phrases, and the physical reactions of the trainers and trainees. Furthermore, due to the participative nature of data collection, the researcher served as the primary tool of measurement, and so personal reactions to the course content served as an input to understanding the training.

The findings presented below are the result of the iterative process described in this section, as informed by the theoretical perspective above. The first part of the findings is structured on the basis of the modes of objectivity in order to highlight the multiplicity of ways in which objectivity is performed during the training. The second part of the analysis focuses on how the trainers perform for their students that they are masters and teach them how to become the same. We end by discussing how the tension between performing objectivity and performing mastery is mitigated in the performance itself through auditing/auditor values.

## The Forest Stewardship Council

The basis for FSC's Forest Management certification system is its ten principles of responsible forest management. These are the same regardless of the location or type of forest to which they are applied and are established and revised periodically by FSC. These principles define what FSC regards as responsible forest management practices and are operationalized by a set of criteria and indicators. The criteria serve as the first-order test if the principle has been met, and are generic, applicable to most locations. Indicators, on the other hand, are country-specific and represent the specific management elements that must be monitored in order to determine if the criteria, and therefore the principles, are fulfilled.

The first year, and every fifth year thereafter, that a forest management entity wishes to be certified, a certification body (CB) is hired to perform an audit for all the principles, criteria, and indicators. In the interim years, surveillance audits focus on a selection of principles and criteria and associated indicators, purposefully limiting the scope of the audit. During the audit proceedings, auditors are expected to carefully examine the forest management procedures and processes to determine if they conform to the principles and criteria, or if they are non-conformant. In the case of non-conformance, the auditor determines if this is a major or a minor non-conformance and reports it as such. In the case of a major non-conformance, the managers have 6 months to respond satisfactorily to the findings, while a minor non-conformance has a year to respond. If the responses do not come, or if they are inadequate, the certificate is suspended.

Each audit results in a report, some of which is made available on the FSC International website, and some of which is not made public. The report details the nature of the management, what species are present, the history of the management, and the products produces (from round logs to finished goods to non-timber forest products), as well as a catalogue of non-conformance reports (NCRs).

Auditors are required to meet certain requirements before they can be accredited as FSC auditors. One such requirement is a minimum number of hours of training (FSC, 2016). The list of topics to be covered by training is extensive but not exhaustive, detailed while remaining vague. Individual auditing firms have their own training requirements that auditors must meet as well. To gain entry to the world of FSC auditors, one must be prepared to immerse oneself in training material.

## Performing objectivity

The trainers introduced the notion of objectivity early in the training. After an opening title slide featuring auditors talking to a man in a piece of forestry machinery, the trainers presented a slide titled "What is auditing?" in large, bold letters. Their definition, "Objective and independent evaluation of conformance to specified and agreed requirements", stood next to an image

of an evenly-balanced golden scale. Verbally, the instructor added that it is important to remember that the audit is against something specific, not what the auditors think is right or wrong. A second definition of auditing was presented shortly after the first. It was the International Organization for Standards (ISO) definition of an audit, characterising it as a "systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are… fulfilled". There was no discussion of what was meant by the elements of this definition, just nods and note-taking by the trainees.

The term objectivity appeared many times more during the first half of the training, being expressly named 13 times, but slowly disappeared as the training progressed. However, given its prominence in the opening definitions, it is of paramount importance to the role of an auditor. While it was never explicitly stated what is meant by 'objective', we can get a sense by noting the connotations associated with it. The image of a balanced scale connoted fairness, justice, and impartiality. It also suggests the removal of the human contextual element, replacing it with technology that has an expressly designed purpose of measuring accurately and precisely.

As its position is so important, many elements of the training explicitly or implicitly communicate how the role element of 'objectivity' should be performed. We examine the aspect of objectivity using Douglas' (2004) three-part frame of the term: Object-oriented objectivity, values-oriented objectivity, and procedurally-oriented objectivity. The details of the 'modes of objectivity' (Douglas, 2004) will be discussed in the following sections.

### *Object-oriented objectivity*

In order to "get at" the true, objective facts of the audit, the trainers put forward a model of action that, if followed, would lead auditors to be certain of what is observed. 'Triangulation' was named as the proper method for "gathering audit evidence". The trainees were told that if something is observed, an auditor must seek out "all" the evidence, either supporting or contrary, through documents and interviews. If pursuing a detail through multiple lines of inquiry leads to the same evidentiary result, the auditor can be sure this is the true, objective reality. Figure 1 reproduces how this principle was presented during the training.

The trainers went on to define "audit evidence" as "records, statements of fact, or other verifiable information". Therefore, in order for something to be considered evidence at all, it must be documented and possible to check it against something else. During the training, it was stated that it is preferable to check a possible piece of evidence against another *type* of evidence but checking against the same type of evidence is also acceptable if circumstances prevent cross-checking.

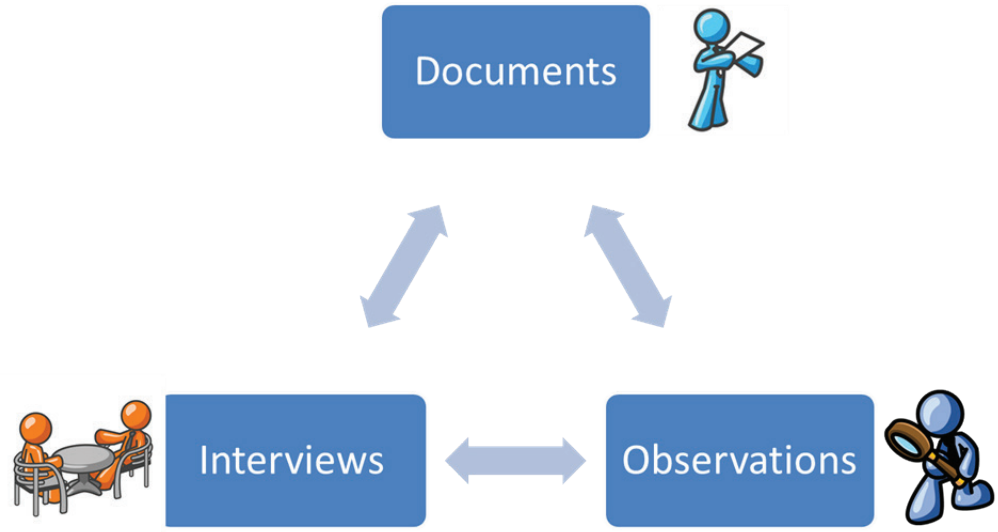


**Figure 1.** Proving something as objectively true involves triangulation, as reproduced above.

This form of objectivity served as the foundation for the whole training. Nothing could be stated without the express reference to multiple sources of evidence, or at least with the offhand comment that in a real audit, we auditors-to-be would look for something to support or refute our findings in other sources. The objects of the audit, therefore, are not necessarily the forests themselves, but rather the management artefacts around the forests. By ensuring multiple avenues of evidence, the foundational objectivity is supposedly ensured.

### *Value-oriented objectivity*

The trainers dedicated an entire section of the training and its manual to explicitly laying out the aspects of proper auditor behaviour and attitude. This was led by the assertion that the purpose of an audit is "to find **POSITIVE** evidence of conformance" (emphasis theirs). This means that rather than focusing on finding evidence of what was going wrong, we were told to focus on evidence of what was going right. In order to get "the *real*" evidence, auditors need to maintain an "open" frame of mind. The term 'open' was the second most repeated buzzword of the training, and usually referenced how an auditor or audit process should be. Valuing 'openness' ensures an auditor is willing to investigate all sources of possible evidence to "get all the information" (according to the method of triangulation) before deciding about conformance or non-conformance. Adhering to the value of openness allows auditors to focus on what is observable rather than on what is valued by the auditees; this allows the auditor to not be blinded to unpleasant or unexpected findings.

The trainers underlined this by showing an overarching communication flowchart juxtaposing "openness" with "criticism". Figure 2 shows how openness is inherently a virtue that leads to a positive outcome, while not being open inexorably leads down the path to withdrawal from communication. Thus, auditors should promote the value of openness because that ultimately leads to communication of information, which allows for triangulation regardless of the values influencing the situation.

The topic was complicated, however, by the idea of 'neutrality' which the trainers introduced later in the training. The trainees were instructed to "view without prejudice" the situations during the audit, but to nevertheless come to understand why we see what we see. Therefore, the value-laden aspect of human-managed systems is given weight, but supposedly not allowed to influence the findings of the auditor. Auditors should have the "ability to understand the… situation," although there is no need to take sides on the values at stake. Thus, an auditor can transcend these values by remaining neutral and thereby maintain the objectivity of the findings.

### *Process-oriented objectivity*

A large portion of the training was dedicated to the procedures of an audit; it focused on engag-

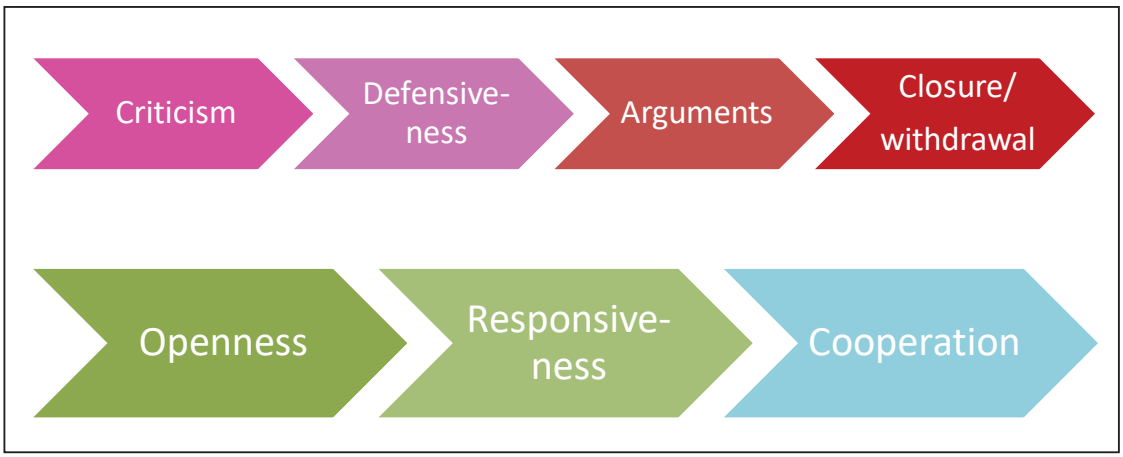


**Figure 2.** The inevitable link between openness and cooperation, and criticism and closure, as presented in the training.

ing the right processes to attain objectivity. These processes would ensure that, as summed up in an offhand comment by the trainer: "anybody would come to the same conclusion". In theory, if an audit were performed twice, and the same procedures followed, the same conclusions would be reached regardless of the auditors present. However, in the same breath, this situation was problematized when the trainers introduce the idea of the "unforeseen situation". At this point in the training, the trainers were vague about what such a situation may be, but we experienced simulated "unforeseen situations" in the exercises discussed later. The addendum of the unforeseen suggests that each audit is unique, and following standardized procedures is an attempt to control a chaotic system in order to claim a form of objectivity.

During the first day of the training, the trainers spent time describing the procedure of an audit, which included establishing the shared vocabulary of an audit. To someone unfamiliar with the audit process, terms like 'CB' would be meaningless, and indeed, most of the trainees seemed to know what it meant, as the lead author was the only one who felt the need to ask. Having, and effectively utilizing, a shared and codified vocabulary can serve two purposes: First, it identifies to others in the auditor role that you are also in the role of auditor, and it also eliminates imprecise, humanising language. Throughout the training, the trainers, and progressively the trainees, continued using terms like 'CB', 'surveillance audit', and 'NCR' (non-conformance report) consistently. By employing such codified, expert language, auditors can supposedly be more precise and can attempt to eliminate personal idiosyncrasies.

Due to the nature of the training, field observation procedures were not very well covered, as all material had to be presented to the trainees in a classroom setting. However, the topics of interviewing and communication had a well-defined set of recommendations, almost to the point of being a script. The value of openness identified earlier came strongly to the fore here. Specifically, it was considered important to avoid closed and aggressive forms of what they called "shoot and reload" communication. Rather, to promote open communication, the trainees were instructed to use "open questions" to promote "conversation" instead of "interrogation". This included a list of stock-phrases and questions to be used ("Tell me how…", "what is the procedure…", "why have you…").

Following this instruction, we performed an exercise to test our "interview skills". We were playing the role of auditors who had a short time to interview a health and safety officer and a chainsaw operator (played by the trainers). Based on the way the interview progressed, the trainers offered critique if we interrupted or did not ask sufficiently 'open' questions. The purpose of the exercise, it was explained, is to allow those being interviewed the chance to give you all the information so you can come the correct conclusion.

Alongside the information collecting, the trainers also addressed recording and reporting by introducing the NCRs. NCRs were described as the "mechanism for requiring the auditee to take action to meet the standard". It was previously established in the training that auditors should communicate non-conformities in an "objective and diplomatic way" and "be open for additional information". Therefore, even concluding that there is a non-conformance may change in the face of additional evidence. To present the NCR, the trainers showed an example NCR form with pre-determined fields for describing the non-conformance, "corrective action request" (or 'CAR'), and timeline for conformance among other fields. The result is an inflexible, but subjectively descriptive way to frame the observations made during the audit.

During the substantive teaching of the training, all three modes of objectivity emerged as being important to the success of an audit. No type of objectivity was given precedent over the others, as process-oriented objectivity mingled equally with statements on value- or object-oriented objectivity. Through this explicit or implicit discussion of objectivity, we can see how each type of objectivity is trained to be performed during an audit, and how they are co-supportive.

In the following section we examine how objectivity might be done in the chaos of the field. We discuss several exercises which served to simulate

the chaos of a "real audit". While the application of procedures described previously was encouraged, in the end, the trainees needed to step away from the cold application of knowledge to make it practical. As we will describe in the following section, trainees were expected to interpret the situation using heretofore undefined or poorly defined criteria.

## Performing interpretation

During the training, objectivity was actively named and encouraged as something to promote and aspire to. In the previous section we discussed the most prominent ways in which objectivity was invoked. There emerged another aspect of being an auditor that did not follow the zealous application of objectivity, and was, mostly implicitly, termed interpretation.

"Interpretation" was mentioned explicitly only once during the training. In the section regarding auditor behaviour (discussed previously), interpretation appears in a communication model explaining how auditors should strive to understand what is truly meant by the auditee and understand that the auditee must do the same. Figure 3 reproduces this image. In this context, interpretation is something that is actively done to decode encoded statements. The trainers fully acknowledged that despite having technical know-how and information about the management, it is still possible to not get at the real "reality" of the situation. However, previously, the trainers had stated that there is "no one reality", and that it is an auditor's job to discern which reality presented by various actors is most valid, or the really real reality.

The trainers identified this as the "ability to understand… the situation" but were not able to characterise it beyond the methods, procedures, and facts described in the previous section. In order to actually "understand… the situation", we were told to pay attention to auditee tone of voice, body language, and what was not said as much as what was said. The idiosyncratic nature of these elements meant that the trainers were only able to speak in broad terms, and it was up to the trainee to determine when there was "enough information" to judge the situation. For example, the trainers explained that if a worker seems reluctant to speak, failing to make eye contact or speaking softly, it is a good idea to speak to them on their own later as they might be hiding something. We asked about how to consistently interpret these elements, but the trainers were not able to give meaningful answers. The term "interpretation" was clearly not acceptable for this type of analytical work. Nevertheless, we were being asked to observe and interpret the actions and utterances of the auditees.

One set of exercises where interpretation was practiced was roleplaying exercises. We had access to mock forest management plans and were expected to effectively and efficiently divide the work to assess conformity. However, they also included "unforeseen situations". For example, a gregarious manager who wanted to have a celebratory drink, and a business partner who was quiet when in the presence of the other partner, but talkative alone. If we, the auditors, were not sufficiently strict with the former or did not interpret the downcast eyes of the latter properly, the trainers would critique our interpretive skills.

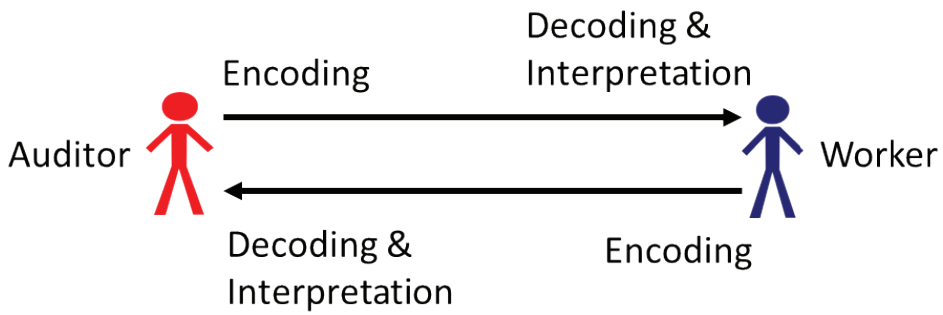


**Figure 3.** The only official use of the term "interpretation", presented in the training in a highly simplified communication model.

The trainers acknowledged that these situations were artificial and contrived in nature, but they were meant to simulate the chaos of a real audit. If we did not follow the proper interviewing guidelines, or failed to utilise the approved language properly, our interpretations were considered fallacious. In particular, the role of properly distinguishing between friendliness and deception, properly understanding body language, and tone of voice were practiced. Each team (3-4 people) was able to watch the others perform their interviews and offer their own critiques. These exercises still relied on executing the 'audit procedures' properly but required the trainees to interpret and react on their feet without the benefit of conscious, rational deliberation.

This was continued with a photo identification exercise. In the evening of the second day, the trainers presented a series of slides containing various scenes around a forest management unit. We were asked to look at each picture for a few seconds at a time and determine if there were any non-conformances. If there was a problem, we were expected to identify which part of the FSC standard was being violated. The results were mixed. Some non-conformances were missed, but more often, non-conformances were identified when in fact there were not any. The lead author made at least 4 incorrect identifications of non-conformances when, in fact, there were no problems. Following the exercise, there was discussion where trainees were asked to reveal their judgement of the photos, and to justify their findings. While some were definitively ruled as correct or incorrect by the trainers, more than once the trainer conceded that there was missing information or room for classifying it either minor or major non-conformances. When put in a situation that needed snap-decisions, we were expected to rapidly interpret the situation and come to a conclusion utilising the details learned during the course.

One of the trainers brought up a clear example of interpretation in a situation where a snap-decision was required. To illustrate the point of knowing how to "split auditors appropriately", dividing the audit team to cover more ground in an efficient manner, the trainer told an anecdote wherein, on a "hunch", he thought there was a need to investigate a certain area of the forest. There he found evidence that the managers were hiding evidence of all the injured workers from the auditors. When pressed on how he knew to look for this, the trainer gave a small hand wave, and an answer along the lines of "I just knew" based on all the glances, winks, nods, utterances, and silences he witnessed during the audit.

During the training, it became increasingly clear that interpretation is demanded of auditors in almost all aspects of their work: in assessing management plans, in exploring situations, in understanding the behaviour and responses of auditees and in making judgements about conformance or non-conformance. It was also clear that, despite the emphasis that was put on procedures, there can be no procedure for interpretation; it can only be based on experience and intuition in the moment.

The front staging of interpretation during the training, like in the example of auditors acting on a hunch, triggered two simultaneous responses. On one hand, it was seen as evidence of the authority of the trainers. At the same time though, it posed a problem for the trainees because they did not know how, nor could they be taught to do this themselves and maintain objectivity. The trainer was unable to communicate the imponderable details that led up to this insight; he could not provide an answer that could help the trainees learn how to do this themselves. Nevertheless, through the gesture of the shrug, he showed that he recognized the problem but that it did not bother him. Forgoing deliberation helped reinforce the necessity of becoming an authority and satisfying the audience.

This situation was echoed in another manner during the training. Over the course of the training, approximately six times when a trainee would ask a question or pose a hypothetical situation that would address a tension between the seemingly straightforward procedures for auditing and the need for interpretation, there would be a moment of pause, after which the trainers responded in a similar way as described above. They would try and offer an explanation and while the answer was relayed, a hand would be waved through the air. This gesture specifically became attached to the phrase "we all know how it is" when it was

repeated three times in short succession by two trainers and a trainee when describing hypothetical forest management practices.

As we will argue in the next section, these gestures are an important part of the trainers' performance. They are where objectivity and interpretation become entwined in the performance of mastery.

## Performing mastery

Utilising Douglas' (2004) modes of objectivity, we have demonstrated how FSC auditors are taught to perform objectivity in audits by trying to get at the object, following the right procedures, and adhering to the right values. In agreement with her analysis, we find that most forms of objectivity are encouraged, though not necessarily equally, in most situations. We have also seen that the subjective, in the guise of "interpretation", and the objective overlap in many cases. In fact, interpretation is necessary for the successful performance of objective audits. Thus, subjectivity is not the antithesis of objectivity, but rather a vital support of it.

In the training, they often belonged to different settings. Objectivity was most prominent in the more substantive parts of the training where content was taught explicitly. Interpretation, on the other hand, could not be taught in the same way as the elements of objectivity. It was taught as something done in the mind of the auditors, or within a team of auditors based on the information gathered while employing the modes of objectivity. It was highlighted in stories of the trainers and it was practiced in exercises. Trainers also assessed and critiqued the performance of the trainees in both aspects. They assessed our level of knowledge (for example, identifying the correct part of the standard to use), but also less tangible skills (for example, spending too much time complimenting good management or not asking sufficiently open questions).

Objectivity and interpretation did not clash but smoothly alternated and aligned for the most part of the training. Generally, interpretation was implicitly recognized as important and non-threatening. One way in which this was done was by taking the FSC standards and criteria as the immutable starting point of interpretation. While it has been said that standards are not in fact stable or immutable (Eden, 2008), this is not how they were presented during the training. By initially referencing something that neither the auditors nor the auditees had any hand in creating, something that cannot be changed by the involved parties, the auditors are able to claim objectivity. Therefore, it is never the auditor who is saying if a management practice is (in) sufficient, it is the standard saying it. Although interpretation is seen as part of process, specifically when the findings of the audit are tested against the standards, this interpretative part quickly disappears from view when the findings become objective evidence of conformance or non-conformance.

However, in some instances, interpretation could not be hidden or denied. In the example of the "hunch" leading to discovering hidden injuries, the trainer revealed how he had to make a judgement on whether to follow his interpretation of the situation (his "hunch"). He decided to "go with his gut" and this led him to certain results that after proper documentation could be used as objective evidence of non-conformance. While the judgement of non-conformance could be justified by referring to the evidence and their testing against the standards, it does not meet the expected burden of object-oriented objectivity of auditing. It would be entirely possible for another auditor to not make this decision and miss the evidence. When asked during the training, the trainer was unable to explain what exactly made him suspicious. In this story, and in other similar anecdotes that were shared during the training, the tension between objectivity and interpretation manifests itself on stage. While in most cases, interpretation can be kept hidden in the backstage, in the context of the training where interpretation is taught and put on stage, the trainers must find a way to mitigate or transcend this tension. This was not just a matter of flexibly, manoeuvring between contrasting repertoires as Gilbert and Mulkay (1984) suggest. Instead, this transcendence was accomplished in bodily performance; in the shrugs, nods and handwaves.

We suggest that these gestures, combined with phrase "we all know how it is" are central to

the performance of mastery. This performance of mastery illustrates Dreyfus and Dreyfus' (2005: 787) argument that the "proficient performer" has a "repertoire of situational discriminations" that allows for "immediate intuitive situational response[s]." It fulfils several functions. First, it bypasses cumbersome explanation. Thus, the successful performance of mastery is characterised by not needing to justify or explain the interpretative process. Second, it recognizes the trainer's inability to explicitly explain or justify while at the same time dismissing it as insignificant, as unthreatening to the objectivity of auditing. Third, it creates a sense of community among trainers and trainees. By shrugging or handwaving and communicating "we all know how it is", and by employing the same, codified language, the trainer conveys what Goffman (1959) calls a role secret. It signifies that trainers and trainees are all member of the auditing community while still maintaining process-oriented objectivity (Douglas, 2004). Trainees could respond, and many did by nodding understandingly, confirming their membership of the community. Finally, it serves a didactic purpose: regardless of whether trainers or the trainees do in fact "know how it is", the trainees get a sense of what it might entail to perform mastery without having to fully come to terms with what is needed to be a master. The attention paid to interview and interviewee affectations, as well as the importance of auditor language and behaviours can lead an auditor in training to be a master at adopting the mannerisms of a master with the assurance that true mastery will come through practice.

This aligns very closely with the notion of interactional expertise. By progressing from strictly knowing the content of an audit as a function of promoting objectivity, to accepting the role of interpretation, to mastering the meta-aspects of an audit performance, the lead author was inducted into the ranks of FSC auditors. In the following section, we discuss some key points from the analysis and conclude with broader implications for the field of forest certification auditing.

## Conclusion

Objectivity was considered fundamental to auditing during the trainings. Using Douglas' (2004) modes of objectivity, we highlighted how objectivity was promoted explicitly and implicitly during the training. According to the principles of the training, however, attempting to *do* objectivity in the field inevitably leads to a breakdown in objectivity. The knowing subject (the auditor or trainee) is forced to inject her/himself into the situation in order to properly interpret what is going on. From an outsider's perspective, the resulting paradox could be seen as problematic, as interpretation seems to be anathema to objectivity. However, the trainees are taught that by properly performing the audit, it is possible to simultaneously perform objectivity – establishing and maintaining an object separate from the subject – and perform interpretation. In *doing* the audit or *practicing* the doing of an audit, objectivity and interpretation become co-supportive or co-constituent. In the performance of mastery, the paradox of auditing is mitigated or transcended almost completely without conflict. While the current analysis is based on auditor trainings, where interpretation cannot be left in the backstage but must be put on stage for teaching purposes, the same co-constitutive relation between objectivity and subjectivity is expected to take place in auditing practices (Eden, 2008). Thus, our analysis has implications for our understanding of auditing and other practices of the construction of evidence in natural resource management and policy more generally.

While we should not overstate the possibility of extrapolation based on only two training sessions, there are two important factors to consider. First, the training organization is considered a preeminent external trainer on the topic of FSC. This implies that they will be the trend-setters and their training will be the entry point for many auditors globally, who will then go on to train others. Second, the training itself espoused that fundamental auditor and auditing characteristics are universal and absolute. Therefore, the insights generated by analysing auditor training will also be relevant for FSC auditing.

Our research showed that the 'fluency' model, identified by Kotzee (2014) is very much alive

and well in the world of FSC auditing. As noted, the trainers pointed out how the training cannot possibly replace real-world experience and that instinct and intuition is what often gets auditors through rather than deliberation. The result is that the leg-work of the audit is hidden in the end, making it look like a charlatan's magic trick (Fuller, 2006, cited in Kotzee, 2014). For example, the trainees were instructed to "find positive evidence of conformance". This suggests that it is not the goal or purpose of an audit and auditor to find what is wrong with the management of a forest. Furthermore, it is not considered sufficient to simply not find any evidence of wrongdoing. Auditors are expected to find evidence of right-doing, even though in the official reports there is no space for these findings. Thus, an activity with the goal to reveal and increase transparency may, in the end also conceal and increase opacity instead, as noted by Strathern (2000).

In this paper we focused on, and are critical of, the tension between objectivity and interpretation during the training course, but it is important to note how each aspect *needs* the other in order to function meaningfully. Eyal and Buchholz (2010) noted this in their literature review as the issue of 'interstitial domains', where technical and non-technical (or political and apolitical) collide outside of well-defined domains or disciplines. The job of these auditors is, ultimately to make a recommendation as to whether, in sum, the auditee does or does not meet the standards set by FSC. In the end, this cannot be done without the auditors making a judgement call, although they are averse to the very idea of 'judgement'. During the training, the notion of coming to a conclusion was predicated first upon having *all* the information, but later upon having *enough* information to pass a judgement. However, there is no clear point at which enough is enough, and obviously, it is unlikely that one can ever possess *all* information on a given topic. Thus, except in artificially simplified cases, eventually it comes down to the auditor and his team saying, 'in sum, I think they are/aren't in compliance'. This exemplifies how the process in which observations are tested against a set of criteria and standards and become evidence involves a creative and interpretative leap that cannot be justified completely with reference to the objectivity of the observations or the standards (Turnhout et al., 2016).

Our analysis of learning to become an auditor has its foundations in the values present in the learning process. While the training itself goes to great lengths to characterise auditing and auditors as objective, and the trainers presented the values an auditor should possess to *do* auditing well, there was no attempt to identify them as actually value-laden, and therefore subject to the influence of the morals of the times. These values include the explicit, such as objectivity and assumed conformance, as well as the implicit, including both ontological relativism ("there is no one reality") and ontological realism (finding "the real" evidence). It seems that auditor trainings could become much more salient and instructive if the dilemmas associated with these values (how do you prove that something is positively true, how do you get to the truth while at the same time taking all representations of reality seriously) were openly discussed and deliberated, perhaps resulting in ultimately more effective audits and auditors. The more crucial point, however, is that none of these values are inherently bad or wrong, regardless of the implied or explicit position that is taught on the topic of personal values. In fact, they serve auditors in overcoming the paradox auditors face between objectivity and subjectivity.

Along these lines, Collins and Evans (2007) argued that the study of experts and expertise had become too concerned with how expertise is attributed. Kotzee (2014: 176) expanded this critique to include the trainers of experts and experts themselves: the education of experts was concerned only with the appearance or procedures of being an expert, focusing only on their own interpretations, while avoiding "real and objective" abilities to accomplish their tasks. While we agree that such navel-gazing should be avoided, it seems this critique has little value. The training of FSC auditors seems to surpass the point entirely, as it included the performance of being an auditor (values and procedures), and the impact of being an auditor (monitoring and reporting). By examining the learned values of auditors, as suggested by Collins and Evans (2007), we can see that the tension between

expertise as performance and expertise as reality does not exist in the field of forest management certification auditing.

This lies close to the heart of a larger issue. Rather than dismissing audits for being subjective, apparently failing to meet the standards of objectivity, we follow Bourdieu's suggestion as presented by Power (2003) that it is time to get passed this way of thinking altogether. Why does something so seemingly trivial, that the construction of evidence is a human endeavour, often become so problematic? The value of objectivity permeates decision making regarding environmental management, and yet if that were the sole goal of such activities, we would entrust this work to purely computational systems. Instead, context, skill and personal experience play a vital role and auditors are, inevitably, interpreting, thinking, reflecting subjects. Our criticism of objectivity does not, however, imply that we abandon objectivity as an unattainable ideal and celebrate subjectivity and interpretation (also see Cook et al., 2016). Rather we suggest that it is time to recognize that this is how objectivity is done: by interpreting subjects. Pointing to the role of subjectivity, values, and interpretation in audits in that way does not diminish audits' objectivity but gives important insight into objectivity's production in practice, as hinted at by Power's 1995 work. It follows that auditor trainings can be more open about the values to which auditing adheres to fulfil not only Kotzee's (2014) call to be more explicit in characterizing expertise types, but also Eyal and Buchholz's (2010) problem of 'interstitial domains'. As Douglas (2009) argues, being value free in the production of knowledge is not only impossible, it is also undesirable. Rather, objectivity can in fact entail the open reflection on what would constitute the right, ultimately subjective, values to guide the production of knowledge. On an even broader level, this supports the growing demand for information on environmental governance, and furthermore, information on the information about environmental governance (Mol, 2008). This is the opportunity for auditors to lead the charge on providing grounded information for environmental governance at a time when the call for such has never been greater.

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# **Sensory Science in Tension:** How Environmental Odour Sensing Involves Skills, Affects and Ethics

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## Abstract

For the last 15 years, sensory science has frequently been recommended to industrial actors to monitor odours, assess the quality of the environment and improve their factories' functioning. Resident "sniffing teams" have been put in place in different contexts to assess odorous pollution. These teams are groups of local residents living in the neighbourhoods of industrial facilities, who have been trained to report pollution emissions. This article describes these teams as sensory devices and argues that their functioning relies on the consent of the residents to allow themselves to "be affected differently" by smells – from annoyance to interest and curiosity about odour recognition and reporting activity. This consent, which is based on an 'ethic' of sensing, centered on the sniffers' own feelings, is delicate, tense and reversible, given the emotionally-loaded contexts of odorous pollution.

**Keywords**: olfaction, sniffing team, odour management, sensory science, citizen science

## Introduction

Over the past 15 years in France, measuring odours has become a requirement for any industrial plant whose activities generate foul-smelling emanations likely to strongly disturb the neighbourhood. Because of the absence of epidemiological surveys investigating the long term impact of gas emission on the health of local residents, the focus on smell has become a major factor in the social acceptance of industrial facilities. In view of the "discomfort" caused by these emanations, setting up 'resident sniffing teams' has been one of the managerial tools to comply with the odour-neutral standards (Charvolin et al., 2015; Rémy and Estades, 2007). These teams are groups of local residents living in the neighbourhood of industrial facilities, who have been trained to report odorous pollution emissions. Their increasing use in environmental management corresponds, to a large extent, to the return of the sensorial in the monitoring of air pollution (Charvolin et al., 2015). Sniffing teams are appealing to managers and policy-makers not only because the measurement of odours is considered to be inseparable from individual perceptions, but also because they provide a participatory tool, in line with contemporary modes of public policy making (Blondiaux and Sintomer, 2002; Jasanoff, 2003; Lengwiler, 2008). Citizen participation in the observation of environmental realities is not a new idea[1]. In many domains, environmental data cannot be limited to technical instrumentation and modelling. Empiricism involves observations that scientists themselves cannot always make; it involves "lay" knowledge from the field, informed by realities

of proximity, that cannot be observed by more conventional measurement instruments. As Collins and Evans (2002) point out, studying this "lay" knowledge means emphasizing the experience of non-experts, in other words, the forms of "expertise" they have developed through their proximity to things, and the irreducible nature of their sensory experience of these things. In many fields, interest in these forms of knowledge has led to a streamlining of volunteers' sensorial activity within environmental data collection organizations. These bodies represent a collective sensorial activity insofar as they organize, structure and streamline a surveillance across a territory. This vigilance is understood not only as the ability to capture the particular territory's abnormalities, but also as a form of presence, an attention to the world, able to detect changes and transformations likely to affect the more or less negotiated modalities of collective living (Chateauraynaud, 1997). In that respect, these bodies correspond to organized sets of sensorial perceptions that identify the "relevant properties of the environment", ensure "the shift from sensations to qualifications", and provide "common affordances" for the phenomena (Bessy and Chateauraynaud, 1995: 292-306).

Recently some sociological and historical academic works have been published on the workings of sensory sciences involving olfaction and taste (Howes, 2015; Lahne, 2016; Muniesa and Trébuchet-Breitwiller, 2010; Phillips, 2016; Shapin, 2016; Teil, 1998). Despite the frequent association of olfaction with forms of "animality" or "savagery" (Classen et al., 1994), olfactory sensing remain an important cognitive social practice in modern societies. The sciences of sensory evaluation have commonly been used in the food industry, wine business or perfumery to assess the quality of food, objectify the value of wines or discern the composition of fragrances. They are often established in laboratory-type environments, where the conditions of sensing are controlled by the authority who manages the conditions of sensing. Most academic works have highlighted the delicate perceptual, cognitive and performative processes involved in these collective sensing activities; they can be highly relevant and useful to analyse how resident sniffing teams work in context. However, the particular affective situations in which these resident panels operate do address some very specific questions. Contrary to 'classical' sensory sciences, which are usually meant to address marketing concerns within relatively confined, context-free and de-personalized environments, resident sniffing teams are directly linked to the conflictual situation of nuisance and its regulation. The "open air" character of these sensory sciences therefore raises questions about the way in which this collective expertise is set up and develops over time, in regards to the emotional context of its emergence. Most of the panel members, who are daily asked to sense air quality, are indeed also affected by the nuisance. Neither the participant's cognitive involvement in this sensorial activity, nor the overall technical and affective conditions of knowledge production, are trivial.

This article is an attempt to understand the social, technical and emotional processes of collective sensory sciences in the context of odorous pollution management. It builds on the affective turn in the social study of science that has recently highlighted the necessity to pay closer attention to the affects in the making of the social in general (Thrift, 2008; Wetherell, 2012) and the science in particular (de la Bellacasa, 2011; Kerr and Garforth, 2016; Latour, 2004a; Lorimer, 2008; Myers, 2008). The building of scientific knowledge does involve care, emotional interactions and affective practices, whether these practices are taking place in the lab (Kerr and Garforth, 2016; Myers, 2008) or on the field (Lorimer, 2008). This article first begins with a reflection on sniffing teams as environmental management instruments, addressing the issue of open air sensory science. The second part of this article gives a detailed analysis of sniffing teams in action, by focusing successively on the construction of the collective, the setting up of the olfactory language, the dynamics of odour reporting and the operativity of this sensory science. The final section of the article discusses the specificities of this field science and reflects on its potential contribution to a dialogue of affects.

## Sniffing teams as sensory science

### *Sniffing teams to monitor environmental nuisances*

The increasing recourse to resident sniffing teams to monitor environmental pollution is partly due to the fact that measuring bad smells – and the discomfort that they bring into being – still remains problematic for industrial plants and for their neighbours who are dealing with atmospheric pollution. When objectifying odours, on the one hand, chemical analysis proves to be limited, since the complexity of odorous cocktails makes the analysis uncertain and unreliable. On the other hand, relying only on the neighbours "subjective" judgments is reckoned to be barely usable to organize a sincere dialogue between the two parties. Though the participation of people is increasingly promoted as a social norm, their assessments are constantly delegitimised and disqualified in conflictual situations. The idea of involving people living in the neighbourhood of industrial facilities in resident sniffing teams partly solves this issue of measuring smell. It takes into account the need to assess the quality of the odours (and the discomfort that they produce in the vicinity of industrial facilities) without disconnecting them from the sensorial entities from which the judgements originate. It provides a sensorial device, able to transform a set of subjective judgements into stronger objective statements (Shapin, 2012). This environmental management instrument has therefore little by little gained success within the industrial world. It has particularly seduced environmental experts who see in this device a collective, operational and controlled sensorial assessment tool capable of objectifying environmental annoyance. Different methods have been proposed to establish the team, describe the nature of odors and evaluate the degree of discomfort. Some scientists have proposed a method to estimate the level of annoyance felt by the members of the panel by developing a hedonic scale (Köster et al., 1985). Others have focused on the elaboration of an appropriate technique to depict the type of odors encountered in the environment and discern their origin (Jaubert et al., 1995; Suffet and Rosenfeld, 2007). These attempts to elaborate methodologies have influenced the local implementation of sniffing panels; more broadly, they have participated in the development of an already existing sensory science that goes far beyond the domain of nuisance management. Let's now focus on the workings of these sensory sciences in action.

### *Olfactory science and its affective background*

The academic works dealing with these sciences of sensory evaluation have revealed different aspects of the workings of sensory sciences in practice. First, the search for objectivity produces a need for sensorial languages so as to link each odour property with a commonly accepted qualification. The development of wine sensory evaluation in California in the mid-20th century, is an example of such olfactory language. It supposed the complex elaboration of a whole set of descriptors that hint at a genuine sensation, enable communication and represent an inner wine characteristic (Shapin, 2016). According to its conceivers, the invention of such language was a necessary step to countervail romantic and fanciful talk about wine. The same process of language building occurred in France with the elaboration of the *'Field of odours'* olfactory language. This language (which has been used in very different domains including environmental pollution) has been analysed as an attempt to associate actual sensations with well identified molecular components that allow learning, comparability and communication among the "experts" (see Rémy and Estades, 2007; Teil, 1998). Second, the development of sensory devices also relies on managerial systems that aggregate and format the data. That is what Latour (1987) calls a 'center of calculation' that allows the manipulation of big numbers. In order to reach an acceptable level of "objectivity", the observations are compiled and processed. The individual sensorial statements are subjected to statistical treatments so as to guarantee the significant character of the sample, minimize aberrant observations and put aside highly specific cases. The recourse to statistics helps "make the subjective objective" (Phillips, 2016: 471) so to speak. Third, the sensory device also entails, for the participants, the building of a perceptual capacity that not only consists in learning the language,

but also requires a genuine exposure to the smell, a real experiencing of the odour and an actual sensorial involvement. As Muniesa and Trébuchet-Bretwiller (2010: 334) posed it, regarding the perfume consumer testing groups: "This is not exactly about acting 'as a consumer'. It is rather about getting actively involved in the operation of making oneself fit for measurement", in other words "becoming a measuring instrument" (Muniesa and Trébuchet-Breitwiller, 2010: 334). However, learning to be "affected" doesn't only involve lining up for battle, and putting oneself in the skin of a cold operating measurement tool, like a robot. It involves being moved, put into motion, emotionally engaged in the process of learning, ready to engage emotionally with other entities[2] (Despret, 2004; Latour, 2004a). Taking the case of becoming a flavor expert in France, Genevieve Teil (1998) showed that olfactory recognition requires very intense bodily and emotional engagement and the ability to be fully stimulated by a new sensorial reality. It implies learning to become sensitive by developing a marked interest in exploratory work, likely to lead to new types of attachment to the world (Teil, 1998). In this process of attachment, the mind and the body are closely "articulated" (Latour, 2004a), and the practice of discriminating odours is enacted through the development of close relationships with techniques and artefacts of odour recognition.

### *Sensing the odorous pollution as 'open air' sensory science*

If these attachment processes have been already described in the literature, one can distinguish differences in postures of affective engagement. Up until now, works on sensory devices have mainly underscored accounts of 'positive emotions,' in rather confined and controlled environments. Most sensory sciences have been developed within quasi-laboratories where the participants are expected to sensorially test objects and products. The participants are used as 'proxy' for consumer behaviour within confined and semi-controlled environments, where all the preparative work of the managers is to organize context-free settings and de-personalize as much as possible the conditions of sensing. According to Muniesa and Trébuchet-Bretwiller's (2010) analysis, using the Deleuze's concept of 'simulacrum' (1990), these arrangements correspond less to the creation of fake truths, and are rather an attempt to foster a particular reality: that of the consumers not merely grasping the tastes, but also performing the preferences (Muniesa and Trébuchet-Breitwiller, 2010; Teil and Hennion, 2004). In these environments, the practical work of learning is driven by either a passion for odorous expertise and smell recognition virtuosity, or a basic involvement in a low remunerated activity of panel testing. It can provide the participant with an opening into a new aesthetic sense of olfactory reality, or a latent feeling of disenchantment provoked by the repetitiveness of the task.

As opposed to these quasi-lab simulacrums meant to understand, perform and shape consumers behaviours, resident sniffing teams encompass a different sensorial project. They derive from a 'field' or 'open air' (Callon, 2009) sensory science where reporting activity relies on a highly context-loaded environment. The sniffing panels are generally set up in areas where industrial actors receive recurrent complaints about pollution and sniffing teams are directly involved in the conflictual contexts for which they have been set up. Odour recordings are sent to the plant manager (or to an external consultant on behalf of the manager) who compiles the data, which is then presented publically in deliberative arenas. This proximity between the political-managerial context and the perceptual device has two implications on the sensory activity. First, the conflictual situation, as a specific affective context, can obviously impact the shape of the sensory device. Since most of the volunteers are also residents caught in a situation of conflict and dealing with the nuisances in their day-to-day lives, the way they relate to sensorial involvement can be problematic. They must not only technically identify a smell, but also contribute to identifying a reproved entity and the sense of disgust experienced when faced with this intrusion. In other words, their involvement in a sniffing team could appear to be counter-intuitive, as it means learning to become sensitive to variations that one would likely prefer to ignore or to denounce. Second, the sensory devices can also affect (or perform) the conflictual context. Resident sniffing

teams are explicitly geared towards enabling cohabitation between an industrial actor and its neighbours. They almost instantly position the "experiences of non-experts" within the timeframe of participatory political decisions. Sniffing teams can therefore have direct consequences on public decision making: they are directly operational in a management context; they equip public policy and structure local dialogue and decision-making processes.

The practical singularities of resident sniffing teams address the issue of the affective workings of this sensory science in context. Although some authors have already underlined the dynamics of knowledge and know-how acquisition specific to sniffing team devices in nuisance management contexts (Charvolin et al., 2015; Rémy and Estades, 2007), less attention has been paid to the specific affective dimensions of these processes[3]. How do the volunteers get involved in the sensorial and cognitive process? How do they work backwards to reverse their emotional perspective from disgust to interest in variations, and from somatic rejection to sensorial curiosity? How do they cope with a cognitive process whose results are likely to affect the direct outcome of the conflictual situation? What are the effects of these environmental monitoring tools on the evolution of the conflictual situations? The rest of this article will shed some light on the above mentioned dimensions.

### *Method*

In order to fully grasp the specific nature of the sniffers' collective perceptual activity, I chose to investigate sniffing teams at work. By 'resident sniffing teams' I mean ad hoc organizations set up to monitor the impact of an industrial plant on the immediate neighbours' environment[4]. The analysis focuses on two devices put in place in response to domestic waste treatment biogas production plants being opened in urban areas in France. One of the cases took place in Saint Barthélémy d'Anjou and the other, in Montpellier. In both cases, the plants were set up by local authorities and specialized private operators ensured their day-to-day operation. They both caused odorous nuisance from the outset. Due to the regulatory obligations regarding the monitoring of odours pollution, odour observation devices, including resident participation, were put in place. Third-party actors specialized in olfactory pollution management and/or resident consultation were involved in setting up these teams[5]. Ten to fifteen people were recruited in each case and were asked for weekly reports of nuisance episodes.

This study is mainly based on a series of interviews held in 2013 with the main actors concerned with the creation of these sniffing teams. A total of nine members of the resident sniffing teams were interviewed during the survey. The objective was to highlight the process of "enskilment" (Ingold, 2000) specific to odour identification, the "embodied practices" of the members regarding the smell recognition and their day-to-day activity of reporting. A pragmatic approach to "affective practices" was adopted so as to describe emotional subjectivities and mundane affects (Kerr and Garforth, 2016; Wetherell, 2012) involved in the sensory device. The experts that provided all or part of the methods (odour recognition training) were also interviewed so as to better highlight the learning process behind the acquisition of smell recognition skills, and more specifically the cognitive and managerial framework they implemented. At last, some additional interviews were conducted among a variety of local actors to understand the influence of the affective context on the sniffing team, and the effects of the reporting practices on the conflictual situation. Interviews were held with the authorities organizing public services to manage domestic waste[6], the companies running the plants, the resident associations opposing the plants, the organizations responsible for the mediation process[7], and the governmental services in charge of applying regulations to industrial facilities[8]. By comparing the testimonies provided during this study, I was able to retrace the central logic underlying the construction and functioning of these organizations. The analysis of the two case studies, presented below, draws on the results of this research. It focuses on the process underpinning the construction of the resident sniffing collective, the dynamics of establishing olfactory language, the daily work to report odours, and the impact of this olfactory monitoring on the political and technical context in which the plants were

launched. In this article, as I sought to highlight the processes common to both cases, I opted for a joint presentation of the results.

## Sniffing teams in context

### *Building up the collective*

The story of the creation of these teams begins with the recruitment of their members. The construction of the sniffing collective cannot be grasped without taking into consideration the conflictual context in which the plant was set up. In both cases studied, residents were made aware of the sniffing team project via word of mouth and at informational meetings. Most participants were inhabitants of the residential areas around the plant. The underlying rationale behind their volunteering was closely linked to their position as affected residents. Yet this involvement was in no way a straightforward choice. Some residents, though affected by the nuisance, preferred not to get involved, due to a lack of time or availability. Others sometimes showed resistance or even categorically refused to participate. In conflictual contexts like these, prior incidents can produce defiance among actors, and attempts to reopen dialogue can prove to be laborious. Some residents, described as "implacable" by the consultants or organizers, simply refused to take part in this "masquerade", in their eyes a senseless effort to measure something that was obvious. These individuals felt affected by the nuisance but resisted any possibility of cooperation and dialogue with those responsible for their misfortune. They preferred ironic detachment to participation (Barbier, 2005).

The direct link with the nuisance suffered was not the only reason residents became involved. Recruitment was also informed by different actors' desires to control the composition of the collective. For the associations of residents affected by the nuisance, mobilizing their members was a way to extend their action and local protest. Those that wished to be represented, therefore, naturally shared the invitation to join the sniffing teams with other members and sympathizers. For public authorities concerned with the long-term implications of this type of device, the significance of soliciting residents was very different. The authorities were both anxious about the media impact of the measurement device (the risk that the nuisance might spread beyond the restricted circle of the actors of the conflict) and about the consequences of recruitment exclusively focusing on the residents "concerned" (problems regarding the "reliability" of the individuals recruited by local resident associations, suspected of "falsifying" reports). In Montpellier, the authorities chose to remedy these uncertainties both by limiting the size of the sniffing team, and by broadening active recruitment to residents who were not necessarily involved in the resident associative movement. The aim was to control the relative uncertainty surrounding the supposedly "subjective" nature of individual statements. The composition of the team thus gave rise to underground work to mobilize "allies", people "of trust" whose objectivity "was not doubted". This was the case of the following participant who, out of solidarity with the local branch of his political party, agreed to get involved in the initiative.

> And in terms of what you're interested in, I guess the reason I found myself responding to this study that was carried out, is simply that I gradually became involved in political life […]. And the branch secretary, who was a town councillor, asked me if I would agree to take part in this study. Because I supposed he had been asked about people he knew… but he'd obviously been asked about people who lived very close to the neighbourhood, in other words not too far from that area. […] And he asked at least five or six of us and I think we almost all agreed. (Resident)

### *Setting up the olfactory language*

Once the sniffing team members had been recruited, odours had to be qualified and consensus reached on individuals' sensory experiences. Qualifying smell and discomfort involved setting up a shared frame of reference, a real "olfactory language" for all members of the team to be able to agree on individual experiences. This language was proposed to the sniffers during site visits and half day training sessions. In these sessions volunteers were presented with odorous flasks, true boundary objects allowing for the different actors to describe smells collectively. These were identified, named and differentiated. Members

of the team tested, validated and learned the correspondence between odorous composites and qualifiers. The different categories of smells identified were mapped onto the reporting frameworks, with their levels of intensity (very mild, mild, average, strong, and very strong) and discomfort (no discomfort, a little discomfort, discomfort, extreme discomfort). The monitoring not only examined odours, but also individual experiences, in other words, the emotional discharges caused by each odorous episode. The organizers proposed objectivizing both the object-odour and the subject-mood.

The qualifiers used to describe sets of odours were relatively simple for the most part, borrowed from common language: smell of fresh refuse, of fermented bins, of compost, of slurry, of manure, etc. These categories coexisted with more technical expressions: smell of BRS[9], of alcohol fermentation, of biogas, of biofilter, etc. Some of the qualifiers used came from the residents themselves or were derived from local names and designations. The correspondence system between odorous composites and qualifiers could thus be tailored to the local context based on vernacular descriptors.

> Locally, we adapted to the context... Personally I'm very attentive to the way people describe smells. Because there are several words for a smell. Take rank for example. One can say that it smells rank, but one could also say it smells like vomit. Here for example at one point someone described a kind of sweet smell as a smell of cheap wine. I don't know whether I wrote down cheap wine or not but I like using people's local descriptors. (Consultant)

These localized olfactory language had the advantage of being directly and rapidly operational. They required relatively little cognitive investment. Training time was very short and descriptors were unsophisticated[10]. Involvement in the training ideally brought about a shift in a team member's state of mind: from discomfort to curiosity about odours, from disgust to interest in variations, from defiance to participation. They had to consent to be affected differently by the smell. This shift was not a foregone conclusion. The cognitive dynamics could still be disrupted. First, the training was not systematically attended by all members of the teams. Some team members lacked the time and availability to participate, while others did not see the point. Although team members had agreed to join the sniffing teams, some saw odour recognition more as an exercise in style than as a real necessity. Distinguishing between fetid smells was not a priority. What mattered for them, rather, was the discomfort suffered, irrespective of the type of smell identified. As one participant pointed out: "When it stinks, it stinks!" For these sniffers, the sophistication of identification methods was incidental ; they thought it useless[11]. For them, learning smells was something intuitive and natural that came with experience and did not require specific training. As one of the sniffing team members put it, "the nose trains itself". Moreover, the learning itself was not infallible. Sniffers needed to learn to integrate the smells and their correspondences. For some of them, however, odours remained difficult to distinguish, and confusion was still possible. They needed to be able to retrieve the olfactory experience from their training, achieved with the odorous flasks and the odours smelled during the visit, and to associate these sensorial memories with immediate feelings in situations of discomfort. Some residents doubted their memory's capacity to make that association, and to repeat it over time, for it to become automatic.

> I can smell the compost clearly, but with BRS and biogas, those are two different smells and I mix them up a little. […] Compost has quite a particular smell. For me it's not a sickening smell. But smells are […] a bit like driving a car. When you go one or two months without a car, suddenly there's … it's not long but it's a bit less automatic than when you drive your car every day. It's kind of the same for smells I think. There are automatic reflexes. (Resident)

Memory erosion can gradually weaken this automatism. After a lapse in exposure, some sniffers could lose their precision, and the description, as it had been formulated during the training sessions, no longer seemed so clear. It thus became necessary for participants to maintain their olfactory capacities, to "put [the smells] back in [their] noses", as one resident put it. Some extra-training sessions or site visits were organized for the panel

members to review the correspondences and refresh their olfactory memory.

### *Reporting the odours*

The next step consisted in the daily work of noting episodes of odours and reporting them. The work carried out by resident sniffers to report smells, their intensity and the level of discomfort caused, was integrated into forms of routine that rendered reporting operational in everyday life. The members of the sniffing teams made organizational efforts to facilitate reporting: buying IT equipment, having a summary sheet easily accessible, sharing reports with a family member in charge of transmitting them to the plant, etc. All these arrangements within households made the framework ergonomic in everyday life. The sniffing team members' motivation was based on their ability to integrate reporting in these micro-organizations. These organizations nevertheless remained fragile and could potentially be challenged. First, the individual sensitivity considerably impacted the act of reporting. Although the team members' olfactory capacities were operational, as they had been tested and validated, the sniffers themselves acknowledged a significant disparity in this respect. Some team members were identified as rather insensitive sniffers who never reported odours, while others, on the contrary, were seen as unfailing. This wide difference in sensitivity was characterized not only by variations in terms of individual olfactory reactions (mentioned by the individuals themselves), but also by differences in the emotional reactions (repulsion, stress) triggered by the appearance of the smell. As explained by one of the protagonists, reporting is highly dependent on the odour "tolerance threshold"; it occurs not necessarily when the smell is perceived, but rather when it "hits".

> In any case it's always the same. When it doesn't smell, you don't realise it. You don't think about it. You don't know that it's there. It's when it hits you and that it happens in a negative way, that's when you think "wow it's true, that's what it is". And that's when you tick the box. […] for example, some people say: "I can stand it [the smell]" and I tell them: "but I can't". They can stand it. At the end of the day, the tolerance threshold is like with pain, we're not equal. (Resident)

These dynamics considerably challenged the common representation of reporting, that is, the supposed relatively linear appearance-reporting mechanism (the smell triggers reporting). While it is the emotion felt that is reported, its trigger has to be disconnected from this emotion (particularly to be able to identify odour episodes that cause little discomfort). In practice, this stimulus-response perspective was challenged by the individual "sensitivities" of the team members.

Second, the routines in place could also be easily disrupted when obstacles arose. For example, in the case of Saint Barthélémy, the text message reporting system was almost stopped when the members of the team realized that they were paying a surcharge to send their reports via text message. More generally, the long-term participation in the devices was a real challenge. It could easily be lived as a source of irritation, with the constant attention to the odours as an additional "nuisance". Not only did sniffer team members have to suffer from the plant, but they also had to cope with this constraining exercise of counting and reporting, forcing them to pay daily attention to some disturbing elements that some would otherwise rather have tried to ignore. The feeling of being disturbed is a circular, self-generative process in which attention plays a role (Colon, 2012). In this process, by artificially maintaining their attention, team members could magnify feelings of irritation or provoke weariness, negligence, or sometimes withdrawal. Thus the sniffer's decisions to report relied on a delicate balance between engagement, routines, irritation, and self defence mechanisms. The level of assiduity among the members of the panel was subject to variations in accordance with the local context; peaks of odour episodes were often observed after new developments in the conflict between inhabitants and industrial facilities. For example, the release of a report indicating a significant reduction of odorous emissions often revived sniffers' attention. In most cases, however, the managers in charge of collecting the reports were facing problems of constancy and assiduity. They relentlessly sent reminders to the sniffers to make sure that they were continuously alert, and to maintain the actual affective involvement of the panel members. This reminding activity worked as genuine emotional labor (Hochschild, 1979).

### *The device's ambivalent operativity*

As I have just shown, sniffing teams as sensory science increase their objectivity with different cognitive, social and affective practices. These include i) orienting the recruitment process to guarantee an affectively 'balanced' panel composition, ii) sensitizing, testing and training the sniffers' olfactory organs to make the olfactory language effective, and iii) maintaining the constant attachment to the device by encouraging assiduity. The analysis of this process of making the subjective objective also shows that the workings of this sensory device deal with many areas of uncertainty: the participant's olfactory memory is likely to erode; the routine, underpinning the acts of reporting, can fluctuate in space and time; and the long-term existence of the panel can thus be challenged by phenomenon of weariness and disengagement. Despite these uncertainties, the sniffing team devices prove their operativity in the field. In both cases studied, the tool was unanimously recognized by all the actors involved. The nuisance was mapped, recorded over time and politicized, insofar as the results of the odour diagnosis were seen by the different actors, presented in local consultation bodies, and used as a reference during discussions[12]. The results also had some technical implications since the experts could trace the types of odorous emissions back to specific components of the technological process. The device is, in this sense, "performative", as it gives odours a technical, institutional and political existence, and lends "visibility" to the discomfort, beyond the restricted circle of local protest. This performative process is not just a minor issue. In both cases, considerable additional resources were allocated to contain the smells[13].

However, the device itself does not unavoidably reduce tensions between the industrial polluting plants and its unhappy neighbours. In the two situations I studied in 2013, despite the frequent drop in the appearance of odours (measured by the sniffers), the level of discontent (measured during the interviews) was still as high among the most affected residents. In the two cases, local resident organizations (which had both come into being after the first odorous episodes) remained very unsatisfied with the odorous situation. As one such resident bitterly pointed out: "they [the organizers] are happy with themselves because they say that people complain less. […] There was total self-satisfaction at the meeting before last because there were [allegedly] no more complaints." This tense situation reveals a different way of assessing the odorous state of the site and of interpreting the data produced by the team. On the one hand, the plant actors (i.e. the local authorities in charge of the waste management public service and the private companies running the plants) considered the odorous situation to be considerably improved after several years of odorous monitoring. They based their judgements on the "objective" measurements (mainly focused on describing trends in discomfort indexes based on the frequency of appearance) that seemed to deliver an absolute verdict on a site's odorous state. The situation was said to be satisfactory if the frequencies of odour appearance did not exceed the thresholds set out by French regulations[14]. On the other hand, local resident organizations saw this frequency measurement as over-simplified and unsatisfactory. The statistics and numbers presented during the different concertation meetings were not regarded as reflecting the discomfort that they deeply felt. The discomfort was experienced as being just as present even if the frequencies had dropped; all nauseating intrusions were considered intolerable.

Due to these divergences, tensions could very quickly shift to the field of the device itself. It could then be discredited when the results of the diagnosis did not correspond to expectation. The different actors each tried to attribute the nuisance evaluation, deemed unsatisfactory, to imprecisions and uncertainties in the device. Both sides were critical: with one side emphasising the risk of reporting over-estimation, while the other side denounced the eventual phenomenon of under-estimation. The plant actors mainly underlined the peaks of odour reporting after a special event took place, thereby artificially inflating the numbers. They implicitly distrusted the integrity of the panel members who they suspected insincerely boosted their reporting. The resident organizations, for their part, emphasised the many potential sources of discomfort under-evaluation. Differences in sensitivity between the members of the team were denounced as an unjustified

source of uncertainty and variability. The erosion of olfactory memory was also identified as a source of imprecise reporting, and therefore as the device's operative flaw. The sniffers' lack of assiduity, suspected of affecting the statistics, was also denounced as it could also result in an under-evaluation of the nuisance. And finally, the targeted recruitment was challenged, described as "non-objective" and suspected of biasing the reports. These various criticisms, and attempts to disqualify its reliability, put a serious strain on the device. The persistence of the discomfort, or simply growing weariness, eventually eroded some sniffers' involvement.

## A sensory science in tension

As this article shows, sniffing teams present the characteristics of a fully-fledged citizen field science. They are comprised of: volunteer sniffers who perform regular recordings, the true kingpin of collection work; a set of codes and conventions to harmonize reports; managerial supervision, the computation centre gathering all the observations and formatting the information; and boundary objects, the odorous flasks, the mobilizing entities around which all the actors coordinate themselves to evaluate the inconvenience experienced. They experience uncertainties, imperfections and critiques, while coping with strong affects that deeply impact the counting and calculating processes. Several lessons can be learned from this survey.

### *The consent to be affected differently*

First of all, the enskilment process is a delicate one. It obviously requires a direct sensorial contact with the odours since written descriptions alone are insufficient to acquire the keys of smell recognition; olfactive knowledge and know-how are based on sensorial practices and shared experiences (Candau, 2000, 2004; Candau and Jeanjean, 2006). But the additional difficulty regarding this learning process is that the members of the sniffing teams have to radically change their mind set. This change means a total re-aligning of their body and olfactive skills with those of odour experts, a greater inclination to care for variations and nuances, and to build up an encyclopedic knowledge of smells and tastes (Teil, 1998). This disposition depends upon an affective shift, that is the 'consent to be affected differently'. Despite the discomfort, anxiety and anger that the sniffers might experience as residents, they have to leave these emotions behind for a while to entirely step into the learning process. This is not an easy step to take. Resident sniffing teams display mitigated forms of volunteer involvement in the device. Where sensory sciences draw mostly on the figure of the virtuosity of the amateur, the character of resident sniffers' engagement is entirely different. Most of the members don't sign up for their own personal enjoyment. They do it with the hope that the situation will improve, that the quality of their living environment will get better. When residents do agree to participate, their involvement is associated primarily with necessity, with a will to extend denunciation or to express solidarity with either one of the actors of the conflict. For this reason, sniffers' choice of cognitive engagement is not self-evident. Some participants stay away from the device by not attending training sessions, while others challenge the system of olfactory descriptors, which they see as disproportionately sophisticated and refined. Given these uncertain forms of cognitive engagement, the olfactory languages put in place are tailored locally and remain relatively simple to use. Their elaboration, based on local 'lay' categories, differs from the common representation of slowly built sensorial devices specific to sensory sciences. Certainly, the construction of these sensory sciences languages does involve volunteers and civil society actors, but it ultimately leads to a relatively centralized and universal normative framework. By contrast, for operational reasons, in practice the resident sniffing team recognition patterns remain highly tailored to local nuisance contexts. Because of the rather delicate affective context, the consent to learn a more sophisticated language remains problematic – despite some experts' efforts to institute a more complex universal olfactory language[15].

### *The interplay of the emotional context*

Emotions not only inhabite the enskilment process, they also colonise the day-to-day functioning of the device, the daily recording work *per se*

in particular. The data collection activity (odour reporting) is challenged by differences in sensitivity among participants. Sensorial capacities are often the main reason claimed to explain differences of reporting. This survey shows however that the logics of reporting are also embedded with emotions. First, individuals can be affected differently by smells, and the logics of odour reporting can be much more shaped by a 'tolerance threshold' being crossed, than by a continuous and demanding attention to odours. The individual ethic of field science is, for some sniffers, overpowered by their negative emotions in context. Their reporting dynamics are influenced by their affective releases. This phenomenon shows the difficulty for the sniffers to maintain a constant attention to an unpleasant element of their living environment. Not only do they suffer from the nuisance, but they are also compelled to report it. They can't employ a simple, ordinary defensive mechanism, and merely ignore the odours. The lack of constancy and assiduousness probably has a lot to do with this long-term demanding attention. Second, the micro decisions to report can strongly be influenced by the evolution of the local context (conflictual events which revive sniffers' attention, collective reminders to report more frequently…). Flows of odour reports also follow the developments of local "affective communities" (Rosenwein, 2006) which, in turn, shape the actual dynamic of reporting.

The strong interplay of affects on the ethics of participation considerably challenges the sniffing teams. The participatory device is constantly questioned regarding uncertainties, incompleteness, objectivity and neutrality. The anticipation of affective bias can consequently push some actors to meticulously negotiate the implementation of the sniffing team so as to control the cognitive process. That is what occurred in Montpellier. The process of setting up sniffing teams shows very clearly that one of the issues for the actors of the conflict was maintaining control over the composition of the collective – particularly through targeted recruitment and the search for potential allies willing to become involved in the device. This dynamic reveals a strategic process intrinsically linked to the conflictual context, whereby the actors see objectivity as the result of a search for a "balanced" team composition. It fundamentally differs from a more traditional perspective which sees the composition of the collective as driven more by issues surrounding participants' geographical distribution or the statistical significance of the number of observers involved. In the case of sniffing teams, it is the symmetrical nature of the "representation" of the different stakeholders within the collective – in the political sense of the term – that matters.

### *Inscribing affects in a territory*

Despite all these apparent approximations, imprecisions and lacks of transparency in their implementation, the sniffing teams do leave their mark within their specific contexts. They succeed in inscribing odours and affects in the local technical, social and political processes. They do convert perceptions and emotions into textual and numbered references. Although their olfactory language is simplistic, unsophisticated, even limited, it proves to be adapted to these local situations. Sniffing teams "perform" the realities of nuisance by giving the odours an existence in the local political and institutional arenas. However, this ontology of smells experiences rather challenging issues. First, the inscriptions produced by the sniffing teams need to be "translated",– according to Callon (1986) – into affects so that the local community of actors do deeply feel the extent of the affects. To that end, sniffers' inscriptions sometimes fail to put enough emphasis on the actual state of the experienced emotional landscape. This brings to light the difficulty of representing affect intensity in written forms (Thrift, 2000, 2008) or standards. Second, volunteers can easily withdraw their involvement, which is implicitly determined by the improvement of the nuisance situation in the (relatively) short term. The issue of disengagement here is therefore not solely linked to the routine nature of observation work, the disenchantment brought on by streamlining records and the associated loss of meaning. It is also due to the irritating artificial maintenance of attention on the nuisance, which, over time, can demotivate the participants. Third, the device is likely to be readily criticized and discredited. In case of disagreement, the constructed objectivity of the device and the legitimacy of the figures

can be challenged by the volunteers themselves. The maintenance of perceptual activity over time is therefore highly dependent on the evolution of both the nuisance and the conflictual context. This type of field science device relies on a very fragile balance.

### *Towards a dialogue of affects*

To conclude, I would like to underline the role of affects in sensory science. This article hopes to contribute to a better understanding of the role of emotions/affects in the making of sensory expertise. Emotions matter in the making of scientific knowledge, especially in the context of an 'open air' science that requires the full corporal and sensorial involvement of lay participants (Lorimer, 2008). This is even more true when, as in the case of sniffing teams, the pursuit of knowledge relies on the senses of these participants. The participants need to develop an 'ethic' of sensing, centered on the sniffers' own feeling rather than an ethical sensibility oriented towards environmental non-human beings[16]. This ethic brings to the fore the affective inner states of the sniffers (and of those that they 'represent', that is, the residents who don't participate in the sniffing team). This process is not one of, as Deleuze and Guattari[17] (1987) propose, 'becoming-animal', but rather a process of 'becoming-aware-of-oneself', of being observant not only of the odorous qualities of the environment, but also of one's own reactions and emotions. Despite critiques, uncertainties, and other issues regarding 'objectivity', the development of this sensibility does produce a local affective ontology. Sniffing teams allow the nuisance to exist within the institutional procedures; thereby contributing to intersubjective interactions, emotional interplay, a 'dialogue of affects' between the plant actors, the public decision-makers and the local residents.

This ideal of inter-affective communication extends the issue of democratizing technology and science, already described by several authors (Callon, 2009; Latour, 2004b), to the domain of emotions and affects. From the origin of industrial development, science and technology have created noise, visual or odorous pollution, eliciting the affects of people (Bonneuil and Fressoz, 2016; Corbin, 1986). The public expressions of these affects were mostly achieved by means of official complaints that sometimes resulted in *ad hoc* discussions between the different parties, discussions whose outcomes often favoured an industrial *laisser-faire* (Bonnaud and Martinais, 2005; Massard-Guilbaud, 1999). Expressing these emotions by means of participatory tools such as resident sniffing teams is a new step in this dialogue of affects. It embodies a managerial 'promise' through which the development of cities, industries and infrastructures not only takes into consideration potential consequences on the environment and health of people, but further takes into account their sensorial and affective living environments. This project of democratizing sensibilities relies on human participation because it allows a direct access to their subjectivities. Moreover, it produces a usable, 'objective' knowledge which can envision a more sensorial manner to organize the future sociotechnical assemblages. However, this promise remains a challenge for policy-makers, managers, industries. As this article has shown, sniffing teams are facing real tensions in their creation, workings and perpetuation through time. In particular, the social, corporal, sensorial engagement of residents remains fragile and reversible. The constant, regular and demanding attention underlying the development of an ethical, corporal, self-centered sensibility, can also – and paradoxically – become an additional source of disturbance for them.

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## Notes

1 It is found, in particular, in the construction of ecological knowledge, which for many years has used field volunteers to produce data on the animal and plant species present in an area. With the rapid increase of environmental management policies, sciences involving citizen participation have become widespread. Some record biodiversity (Alphandéry and Fortier, 2011; Charvolin et al., 2007; Ellis and Waterton, 2004; Law and Lynch, 1988; Lawrence, 2006, 2010; Lawrence and Turnhout, 2010), others identify phenological changes (Lawrence, 2009), monitor climate trends (Capel, 2009), or track all types of pollution (Charvolin et al., 2015; Chateauraynaud and Debaz, 2013; Yearley, 2006). In all cases, recourse to these "participatory" or "citizen" sciences (Irwin, 1995) is tending to prevail as a key form of collective expertise on the environment.

2 As Latour stressed, "If you are not engaged in this learning you become insensitive, dumb, you drop dead" (Latour, 2004a: 205)

3 The field of research opened by Rémy and Estades (2007) is far from being exhausted. First, their work on sniffing teams concerns a method that draws on a highly elaborate olfactory language (the Field of Odours method) which is actually not very widespread in the field of nuisance management. Second, this method does not take into account the measurement of "discomfort", unlike the other methods encountered.

4 They differ from observation networks that have a much broader monitoring area, such as the volunteer sniffing networks that have been set up in Lyon for instance (Charvolin et al., 2015; Roussel and Schmitt, 2004).

5 In the case of Saint Barthélémy d'Anjou, a consultancy specialized in environmental mediation was tasked with organizing the public's participation; a monitoring group called "sentinel" was put together to report any odorous episode via text message. A different consultancy specialized in olfactory nuisance management was then appointed to set up a digital reporting interface. In Montpellier, the organization of the resident sniffing team was entrusted to an *Association Agréée de Surveillance de la Qualité de l'Air* (AASQA, air quality monitoring association).

6 In reality, due to the conflictual nature of the industrial situations studied, only one of the two local authorities supporting the project agreed to meet me (in Saint Barthélémy d'Anjou).

7 These are the consultancies specialized in environmental mediation, and the AASQA, which also prescribes methods.

8 These are the *directions régionales de l'environnement, de l'aménagement et du logement* (DREAL, regional environmental, urban planning and housing directorate).

9 "BRS" accounts for "Stabilizing bioreactor". It is a cylindrical container in which domestic waste is prepared for a few days before going into a digester that produces biogas.

10 As a comparison, the Field of Odors method, the implementation of which has been studied by Teil (1998) and Rémy and Estades (2007), involves learning some 40 "odorous notes", requiring a little over 70 hours of training.

11 The same phenomenon was observed among the sewer workers of Montpellier. While professionnalisation discourses tend to introduce new ways to talk about smells from 1990s onwards, the sewer workers refused to use these technical denominations that acted as euphemisms for their own particularly difficult daily labour conditions. They preferred using their own vocabulary, crude and direct, to talk about the violence of the smells, the disgust that it produced in their bodies, and the ordinary stupor that they had to cope with while working with excrements (Jeanjean, 1999).

12 In this case, it was the *Commission de Suivi de Site*, local arenas where the results are published for the public.

13 In Saint Barthélémy d'Anjou, the plant was even closed in 2015. One of the reasons contributing to its closure was a strong odour persistence, particularly inside the plant.

14 In line with French regulations regarding such waste treatment plants, odorous episodes must not exceed 175 hours per year (about 2% of the time). In Montpellier, this level was reduced to 44 hours per year (close to 0.5% of the time), due to the almost immediate proximity with the inhabitants of the area.

15 The invention of the Field of Odours is an attempt to create such a universal olfactory language (Jaubert et al., 1995). But since the training process is very demanding, many experts consider the method not to be suited to the management of conflictual situations.

16 In the case of research in molecular biology, Myers for instance describes a feeling that the scientists have for the molecules to describe their attachment to their object of research (quoted in de la Bellacasa, 2011; Myers, 2008)

17 The learning and acquisition of recognition skills has been described by Deleuze and Guattari (1987) as an emotional process binding together human and non-human entities, a process of "becoming-animal".

# Affect and Effect in Interdisciplinary Research Collaboration

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## Abstract

Research across disciplines is described as beset with problems of epistemological hierarchies and incommensurable categories. Having worked in two large interdisciplinary research projects on obesity and cholesterol lowering medicine in Denmark, we recognize such tensions. We explore the practice and outcome of interdisciplinary research, however, with a starting point in a different kind of tension that is affective. Based on analysis of four interdisciplinary situations, we suggest that embodied experiences of amusement, boredom or doubt are signposts of both differences *and* connections between people and concerns. Drawing on Haraway's (1997) notion of 'response-ability' and Verran's (2001) concept of 'generative critique' we propose that attention to affective tensions can be generative of effects not only on modes of collaboration, but also on the knowledge we contribute, and the ways we engage the world as researchers. The article contributes to ongoing discussions within science and technology studies, about affect in scientific knowledge production.

**Keywords:** interdisciplinarity, affect, response-able, cholesterol, obesity, Denmark

## Introduction

Interdisciplinary research is high on the political agenda in Denmark and internationally. Large funding schemes that finance interdisciplinary projects have proliferated since the 1990s[1] because interdisciplinarity is increasingly seen as necessary for tackling today's major societal challenges. Interdisciplinarity has even been coined "the natural crisis response" (Strathern, 2004). This shift towards interdisciplinarity has happened simultaneously with a change in the way

research is funded and evaluated. Today, a greater proportion of funding goes to earmarked purposes, and to new ways of evaluating research that focus more on societal benefits and (financial) accountability than was previously the case (Gibbons, 1994; Strathern, 2004). Whereas both Gibbons and colleagues (1994) and Nowotny and colleagues (2001) have characterized this development as a move from basic research to problem-driven research, others, e.g. Jasanoff (2004), have described the same agenda as politically enforced emphasizing the mixing of politics and science in these research grants.

These changes have led to a practice of research collaboration in which knowledge production has brought new and more institutions and disciplines together. New research fields, such as synthetic biology, social neurobiology, epigenetics, and many more, engage disciplines in new ways and challenge previous classifications and disciplinary taxonomies (Pedersen et al., 2015). The trend not only implies that some scientific issues and societal challenges, such as obesity or cholesterol treatment, are considered a matter of biological and social entanglement (Rose, 2013; Meloni, 2014). It also calls upon the social sciences and humanities in a general turn to culture as a source of explanations and solutions (Suchman, 2013; Jespersen et al. 2012; Elgaard Jensen 2012). In interdisciplinary research programs, the social sciences and humanities are often considered able to handle so called "complex problems" and "human factors" (e.g. University of Copenhagen, 2012), which emphasize the need for expertise in how culture, sociality and values play a role in such complex problems.

The university-funded interdisciplinary research projects that we report from were part of this general political push for interdisciplinary collaboration. In 2013, the University of Copenhagen launched the "Excellence Programme for Interdisciplinary Research" and awarded 18 interdisciplinary research projects spanning all faculties a total amount of € 66m. The projects that received funding involved topics such as climate change, big data, genetic engineering and ageing, as well as obesity, and high levels of cholesterol in the blood, which were the two themes we became involved in. In the development of our argument here, we draw upon our experience as relatively new collaborators in this kind of interdisciplinary research.

We were aware of the many examples of how social scientists experience being recruited into interdisciplinary research projects without having their knowledge and experience acknowledged on their own terms (Rabinow and Bennett, 2012; Callard and Fitzgerald, 2015). This can lead to a sense of putting one's professional integrity and ambition at stake (Prainsack et al., 2010) or to difficulties in collaboration because of a historically rooted hierarchy between the natural and the social sciences (Albert et al., 2009). Historically, research collaboration has been fraught with questions of epistemological difference and disciplinary hierarchies, which have often afforded the qualitative, humanistic side a secondary position (see, for example, Albert et al., 2008; Prainsack et al., 2010). In the 1990s, the 'ELSI model' emerged as particular formalisation of interdisciplinary collaboration between the natural and the social sciences and humanities, in which the latter two were assigned the tasks of addressing the Ethical, Legal and Social Implications of any given problem (Strathern, 2004). The ELSI model thus entails certain expectations of how the social sciences can contribute, and of how this knowledge may be relevant as an addendum to problems defined by natural sciences (Rip, 2009).

There are indeed political and epistemological issues in taking up an interdisciplinary approach. Similarly, there are structural explanations for why involvement in interdisciplinarity means that researchers must navigate very different standards, obligations and requirements for their research. At the same time, interdisciplinarity has become an indisputable and important contemporary context for scientific knowledge production. We welcome this movement towards engaging the world together with other disciplines, but are wary of celebrating interdisciplinarity as a path that will automatically lead to innovation or better solutions to societal problems. Instead, we consider what happens to what we think of as our disciplinary expertise, and to our research objects, when we collaborate with other disciplines on an already named societal problem. We have paid attention to what happens

in practice, in the actual doing of interdisciplinary research projects, and to what comes out of collaboration in practice.

Instead of dwelling on incommensurabilities between disciplines in collaboration, we explore disciplinary differences by addressing the affective tensions that develop in these collaborations. We unfold the kinds of affective tensions that arise in concrete situations where we are not able to follow the arguments and interests of others, and where we begin to share doubts about how to approach the problems that we try to address together with other scientists or the public. Our contribution to debates about how post-ELSI interdisciplinary collaboration might work (Balmer et al., 2016) is to explore the effects of keeping open to unruly emotions as suggested by Jerak-Zuiderent (2014) and to explore what differences that such affective tensions might point to. We propose to regard the excitement, awkwardness or bewilderment of travelling new territories as starting points, which are not only interesting in themselves as more or less tacit effects (Fitzgerald et al., 2014), but also as important catalysts for cultivating attention and sensitivity to meaningful differences (Haraway, 1997). Sensitivity to differences may be prompted by scholarly disagreements that are made legitimate by the conventions of intellectual arguments, but these tensions may also make themselves known in less verbalised ways. In our experience, difference is indeed often first felt or experienced as an affective tension in particular situations, as excitement, bewilderment, doubt, resignation, etc., rather than as an explicated, verbalised understanding. Sensitivity to (disciplinary) differences may lead to other ways of addressing a research object and ultimately a societal problem that do not simply reproduce a focus on barriers between disciplines. The article thus contributes to ongoing discussions within science and technology studies inspired by the strand of research that has centered on emotions and affects in the practices of science.

By analysing four situations of interdisciplinary collaboration, we will show how affective tensions carry the potential to become generative of effects on both interdisciplinary research processes and their outcomes. The questions we explore in this article are: How can attention to affect open new avenues of enquiry and pathways for the practice of interdisciplinarity? How can we acknowledge what affect does and what it means for the ways that we engage the world through interdisciplinary collaboration?

Sensitivity to difference, as when sharing doubts with projects colleagues about how to approach a research problem, is a promising starting point for pursuing a generative critique (Verran, 2001). A generative critique, we shall propose, opens for effects of interdisciplinarity that are quite different from the visions of 'robust' solutions demanded and proposed by common discourses about interdisciplinarity in late-modern knowledge societies.

## Our positions in the Governing Obesity [2] and Lifestat projects [3]

A large part of the literature dealing specifically with interdisciplinarity is aimed at identifying and categorizing forms of interdisciplinarity through taxonomies and levels of integration between disciplines (Klein, 2010; Repko and Szostak, 2017; Frodeman et al., 2010; Zierhofer and Burger, 2007) [4]. The concept of interdisciplinarity in our projects, however, was not settled upon beforehand or easily defined (cf. Moran, 2010; Barry and Born, 2013). As a consequence of the political drive towards finding solutions through interdisciplinary collaboration, and the funding criteria that follow from this development, there can be a risk that interdisciplinary research teams are formed on the basis of intentions rather than on collective reflections about how to organise and practice interdisciplinarity. In the beginning of our projects, interdisciplinarity as a framework and topic figured mostly at a strategic level and in external presentations. Internally in the projects, the way forward was more diffuse. In practice, we began working with our colleagues from other disciplines without any clear definition or road map of interdisciplinary collaboration (cf. Lindvig and Hillersdal). Thus, we took part in making interdisciplinarity from scratch and in what follows we explore the pragmatics and situated concern of our own practices and collaborations.

The two interdisciplinary collaborations that we were part of demonstrated an asymmetry

between the disciplines involved, both in terms of the distribution of financial resources, and in terms of the general inclination to prioritize a natural scientific understanding of evidence. While this was obvious for all from the beginning of the projects, it did not determine forms of collaboration and their outcomes, as we will demonstrate below. With regard to our own role in defining the projects, we were all involved at different levels in the planning and development of the two large projects, and we share responsibility for the ways that collaboration developed in practice. Here, we briefly present the two interdisciplinary research projects that we were engaged in, and explain how we came to write this article.

Two of the authors (Hillersdal), and (Jespersen) were based in a center for health research in the humanities, and involved in the Governing Obesity (GO) project, which was a large interdisciplinary project that sought new ways to understand, prevent and treat the 'problem of obesity'. The basic premise of the project was that obesity is a problem, and that the prevalence of obesity is increasing in most parts of the world[5]. The project was structured around five interdisciplinary work packages, each comprising a cross-faculty team of researchers from the University of Copenhagen. Each of these work packages examined different aspects of the problem of obesity; defining the causes of childhood obesity, optimization of prevention strategies, success criteria for surgical treatment of obesity, government regulation, and obesity in interdisciplinary research. Hillersdal's role was to investigate how interdisciplinarity was enacted in practice, and how 'the problem of obesity' co-configured in specific collaborations. She had been involved in the development of the project design, and worked with many of the involved researchers in an earlier project on obesity surgery (Hillersdal et al., 2015, 2016). Jespersen was part of the steering committee of GO and involved in two of the work packages as a PI of the work package focusing on interdisciplinary work practices and co-PI in a work package centered around a clinical trial investigating the health effects on physical activity (Larsen et al., 2017).

The two other authors of this article (Oxlund) and (Bruun) were part of the interdisciplinary project "Living with statins - LIFESTAT" and based at the department of Anthropology at the University of Copenhagen. LIFESTAT's main objective was to study various effects of cholesterol-lowering drugs. The problem that framed the project was that every sixth, otherwise heart-healthy, Danes over the age of 50 take cholesterol-lowering drugs daily to prevent the onset of cardiovascular disease. Internationally, there is disagreement among specialists about the evidence to justify mass treatment of healthy people, who may experience side effects, such as muscle soreness, from the treatment. Given this disagreement, the LIFESTAT project examined the effects of cholesterol-lowering drugs in people's bodies, the social effects of the polarized media coverage on cholesterol-lowering drugs, and the societal impact of the practice of treating statistical risk with medicine. Project funds and employees were split between the Department of Anthropology, the Department of Media and Communication, and between three departments at the Faculty of Medicine. Oxlund was part of the original team of researchers who drafted the LIFESTAT project and became co-PI in charge of the anthropological component of the overall interdisciplinary undertaking (Christensen et al., 2016). Initially, Bruun's role in the project was to study research participants' experiences of laboratory tests at the Department of Biomedical Sciences. These tests included a measure of muscle soreness that appeared quite one-dimensional, so the author proposed to supplement the measure with other methods. In this way, the author became involved in research at the lab and in interdisciplinary collaboration in practice.

Early on in both our projects, the authors met at a social event, shared field work stories and immediately recognized each other's observations. We then began to meet regularly across the two projects to share detailed accounts of particular fieldwork situations and the roles we could shift between in the collaboration (cf. Balmer et al., 2015; Morris and Hebden, 2008). In the beginning, we reflected upon the challenges and the confusion, and the awkwardness and silences that accompanied them; but our attention to the affective tensions of collaboration gradually became more analytical, and we

tried to explore them as primary openings for insights into the everyday experience of interdisciplinary collaboration; and into how we collaborated with other disciplines. In the same move, our attention switched from our own roles in collaboration to what happened to our research objects in collaboration. Soon, the idea to work through our observations in writing across the two projects emerged. Our analyses build on empirical material collected via ethnographic methods across the two projects (Hammersley and Atkinson, 1995; Marcus, 1995). In this article, we draw on interviews and focus group interviews with our interlocutors. We include field notes from participatory observations as well as notes from our personal research logs[6]. In addition to this, we draw on analyses of documents, and written communication from the research projects. Based on our individual fieldwork and our continuous shared reflections this article is one attempt to work through the connections between affect and knowledge production in collaboration across disciplines.

The results and insights of these collaborations were presented at seminars and annual meetings in both projects. Part of the ambition with these meetings was to contribute to the overall research aim of the projects and to share ongoing analyses from all the subprojects, which was a commitment from all project partners from the beginning of the research. However, despite good intentions – as we shall show – working with and extending on the findings from colleagues was not so straightforward and the intended results not so easily produced. Not that collaboration was not productive – it was indeed – but in a different and more subtle way than project applications promised.

## Affect and effect of collaboration

To date only few studies of the mundane experience of interdisciplinarity and its effects on collaboration and outcomes of research have been published (Barry and Born, 2013; Callard and Fitzgerald, 2015). Callard and Fitzgerald (2015) reflect on how the interdisciplinary research projects they were part of were both messy and confusing. They emphasize the importance of emotions in collaboration and describe how their own ambivalent feelings of reservation and criticism are part of, and even enhance interdisciplinary cooperation. They propose an ambiguous ethics, to convey how they, as project collaborators, developed an awareness of what is inconvenient, and that which is best left unsaid in cooperation. Their description of a way to be - and remain - in interdisciplinary projects involved a situated habitus of dealing with ambivalence which has been inspirational for our understanding of the projects we were part of (Callard and Fitzgerald, 2015). Attention to connections between emotion and knowledge adds to the growing body of studies of the role of affect in scientific knowledge production.

We find that attention to affect opens up a salient theoretical space to consider the practices of scientific knowledge-making. We draw from a particular branch of this literature, which describes scientific knowledge making as a "choreography of affect" (Kerr and Garforth, 2016). These studies analyse researchers' embodiment, care and interaction with their intellectual projects as 'affective practices' through which routines of scientific knowledge-making is accomplished (Myers, 2008, 2006; Parker and Hackett, 2012; Jespersen et al., 2013). However, our focus is on the often spontaneous affective tensions we experienced that arose in collaborative situations and negotiational arenas involving different norms and paradigms of knowledge production. Hence, we are not primarily preoccupied with emotions as they are experienced by individuals, but rather with affect as "forces of encounters" among all kinds of human and nonhuman bodies (Gregg and Seigworth, 2010: 2). This distinction between emotion and affect is drawn from affect studies that conceptualise affect as relational and not belonging to particular individuals or representing private emotions. Instead, affect is understood as the effects of situated practices of social bodies (Bennett, 2009; Blackman and Venn, 2010; Seyfert, 2012; Gregg and Seigworth, 2010).

We contribute to current discussions about the affective turn in science studies by exploring affect in knowledge production as generative of new avenues for inquiry. We are inspired by Verran's (1999) example from a Nigerian classroom on sharing differences in approach to the scientific

practice of quantifying. Verran analyses her own and her interlocutors' spontaneous laughter as key. She makes us aware of how we immediately experience bodily responses when we meet and experience different ways of enacting the world, hence: "The sort of laughter that grows from seeing a certainty disrupted to become a different sort of certainty: a certainty that sees itself" (Verran, 1999: 141). By pointing to this situated reflexivity of an affective tension, she reminds us of the way affect may direct us to otherwise overlooked differences that have a disturbing effect or lead to a sense of "disconcertment." Verran's (1999) point is that this fleeting sense of disconcertment may open new avenues for understanding. As she states: "Keeping the disconcertment is important, it alerts us that here is an occasion for telling stories, which might generate new possibilities for answering moral questions of how to live" (Verran, 1999: 136).

Moving one step further from noticing difference through the experience of embodied affect to exploring this experience of difference more thoroughly, we draw on Haraway's (1997: 71) concept of 'response-ability'. Response-ability denotes the capability to work with sensitivity to difference. The concept covers how, in a collaboration, the ability to act in relation to the other's interests, which one does not necessarily share, requires a particular kind of sensitivity. Applied to our observations, the concept allows us to nuance our understanding of what happens when researchers from different disciplines try to bring together their different perspectives on a given problem.

We find this sensitivity to difference implicated in moments of collaboration when e.g. the solving of a problem becomes an unsettled question to all parties and thus opens a potentially inclusive/democratic space for the reconfiguration of that problem, and thereby for the production of new knowledge and approaches to solutions. Finally, we draw on Verran's (2001: 20) term 'generative critique' to suggest affective tensions in collaborative work as a possible entry point for imagining new ways to engage the world. Generative critique does not offer alternative solutions to problems, but the concept points to an ability to develop other ways of 'seeing and doing' problems. In our analysis, we want to reconsider and revalue what we find to be effects of engaging in interdisciplinary collaboration. We want to expand the notion of effect to not only cover an already defined outcome, but also the ability to recognize the many subtle and constantly emerging differences *and* connections between concerns and researchers (as they make themselves known through affective tensions).

In the following sections, we present four situations, two from each of our two research projects. All four situations describe interdisciplinary meetings and negotiations and what came out of them. In the first two examples, we focus on the way affect plays a role in interdisciplinary exploration of problems, and the next two situations demonstrate how affect have effects by reconfiguring what we find to be the actual products or promises of interdisciplinary research collaboration.

## Affect as markers of differences in interdisciplinary collaboration

The first situation we describe shows a process in which the author and her colleagues in the LIFESTAT project grapple with different ideas about how to describe muscle soreness. Whereas this first situation concerns spontaneous negotiations and the affect that emerged with them, the subsequent situation from GO project shows the deliberate exploration of difference in terms of multiple, concurrent or coexisting analyses of an object - in this case a meal.

### *Soreness logbook in the LIFESTAT project on cholesterol-lowering medication*

One commonly reported side effect of cholesterol-lowering drugs is varying degrees of muscle soreness and discomfort. One hypothesis is that the coenzyme Q10 can counteract the muscle soreness, and this was tested in the LIFESTAT project by following a number of study participants who take a supplement of Q10 or placebo for eight weeks. Various physical examinations were conducted before and after the eight weeks, and subjects were also asked to mark on a continuum scale how intensely they experienced any muscle discomfort before and after the eight weeks of

treatment. This continuum scale, the VAS instrument (Visual Analogue Scale), is based on a one-dimensional conception of pain as a matter of intensity located within an individual body.

"Many anthropologists see pain as relational," Bruun remarked to one of the researchers from the *wet* side of the LIFESTAT project. "We observe how the experience of pain is formed in relation to others". The researchers sat in a group during the first joint seminar in the project. The discussion partner's attention to what she had said seemed unchanged, but his silence, and the way he leaned back in his chair, pulled in his chin and raised his eyebrows while still looking at her also testified to something else. Then a break in the group work interrupted the conversation, and she did not manage to follow up on the quite "disconcerting" moment when it became apparent for the researchers how different their views of pain actually were. Still, this moment spurred the idea of developing a logbook for study participants to register muscle soreness, discomfort and pain that could take account of pain in more than one way.

The researchers from "the wet side" of the project were not entirely satisfied with the VAS score that they used. Many of them perceived the instrument as a rather inaccurate measure, because what one person would rate a "two" on the scale, another person might rate a "three", so using it as they did as a summative measure was flawed. However, there was no better alternative, and they hoped that including qualitative data might "offer something" as they said. Together, the researchers developed a logbook for study participants to fill in. The idea was to expand on the amount and type of data representing muscle pain and soreness in the context of daily life and participation in the LIFESTAT project.

Several versions of the logbook were developed before the human physiologists; the doctors and the anthropologist were satisfied with the result. The final version was divided into four sections - one for each day to be recorded. Each section began with a VAS score, followed by a space to indicate what kinds of physical activity they had carried out on that particular day, and with what intensity. This space was intended to test a hypothesis about the relationship between physical activity and intensity of muscle discomfort. Furthermore, the logbook contained a blank page for the participants to describe his or her muscle pains and well-being during their day. Finally, each logbook was followed up by an interview with each of the study participants in their homes, based on their entries in the logbook. The logbook enabled very different representations of muscle soreness as measurable, localized and comparable; as a result of physical activity; as something that was related to their wider sense of well-being on the recorded day; and as communicated to Bruun in the subsequent interview.

During the joint development of the logbook differences between the researchers' ways of thinking about the body and of participants' knowledge of soreness became apparent. In an earlier version Bruun's suggestion to use a picture of a walking croquis doll for the study participants to mark where they were sore was challenged by the biochemists in the team, and instead two drawings of a human body, one from the front and the other from the back, were proposed. Each of the large muscle groups on the drawings had a number that participants should refer to in the logbook.

At this stage in the process, differences between the researchers' views of bodies and what images they thought would resonate best with study participants were first expressed in the anthropologist teasing the biomedical researchers with their image of bodies as machines, whereas Bruun at some point was accused of applying aura-reading as her main method. These jokes worked to delineate disciplinary territories and to hold up stereotypes at the same time as they blurred and softened them by making us laugh at ourselves and each other. Here, it is relevant to note that the joking took place between researchers occupying fairly equal positions in terms of rank, and at a time when the group of researchers had spent a considerable amount of time together already, which greatly influenced the way this joking worked. Joking was an affective expression of both unease with difference and a readiness to explore it. The joking then turned into more concrete negotiations based on explications of rationalities. For example, the replacement of the image of a three-dimensional body in movement with a flat, enumerated and divided body was agreed on

because aesthetic appeal was given less weight than some researchers' need to identify and count exactly which muscle areas in the body the participants identified as sore.

The researchers agreed to gather data through the logbook, although its final form was not seen as ideal from any mono-disciplinary point of view. Although the logbook led to a significant increase in the number of VAS measurements for each participant in the study, the degree of statistical power was still relatively low. In fact, the increase in measurements may have made the limitations of the VAS as a tool even more apparent. One team member from the lab found this uncertainty unacceptable, so an extra meeting was called for in the team to address doubts and to re-confirm everybody's commitment to applying the log-book in spite of its shortcomings.

The logbook can be seen as a boundary object, which is indistinct enough to be used for quite different purposes by different parties, but robust enough to be recognized as the same object across the sites where it is activated (Star and Griesemer, 1989). Boundary objects may emerge when social worlds that are based on potentially conflicting concepts work together. The point here is not to describe the logbook as a boundary object. Rather it is to show how affects (scepticism, unease, laughter, a sense of sharing risk) worked in, and sometimes catalysed, the conception, development and use of the logbook in an interdisciplinary team that was able to explicate and negotiate different connections to body, soreness, quantity and quality, and make them materialize into the logbook. In other words, the key point here is that members of diverse social worlds were aware of their mutual diversity and came to work explicitly with it.

The process in which the logbook was developed elicited various explications of what muscle soreness is and how it can best be captured. Thereby, a space for negotiation was created where the object, i.e., soreness, was discussed and studied in its multiple meanings. With all these conditions and reservations, the logbook became regarded as a shared and exploratory methodological experiment, in which all project participants were willing to make connections between their own and other disciplines' ideas about body and soreness. The process of making these connections across differences, making the researchers doubt their own ideas of how to capture pain, is perhaps just as important a contribution to the project as the results of analysing the study participants' entries in the logbooks.

### *Researchers' dialogue on the appetite day in the GO project on obesity*

A nutritional physiologist and Hillersdal had been project colleagues for more than a year. He was interested in how appetite is influenced by physical exercise. The goal of his research was to be able to recommend how much we should exercise for optimal appetite regulation. Hillersdal conducted field work during meal tests in the test lab and followed volunteers and staff during test days to investigate what eating in the laboratory is.

In order to explore their different approaches to appetite as a research object, she initiated a dialogic experiment[7] with a focus on knowledge production and analysis as co-creation (Hastrup, 2014). The dialogic experiment focused on three shared issues: What is appetite for us? How do we investigate appetite? And why do we study appetite? The researchers shared an interest in finding ways to describe their knowledge of appetite, eating, hunger and satiety that might convey their different perspectives and interpretations to each other.

The dialogic experiment took up examples from visits to the Lab. The first topic that the researchers discussed was the morning meal prepared for the test participants. Hillersdal had noticed that her colleague clipped off the top of the bun he served to a research participant with a pair of scissors. The reason was that today's trial participant was a woman, and women, according to nutritional science, need fewer calories than men. This spurred a discussion on how a standardised test meal is already gendered. The study participant, who had arrived for the test day was a woman in her thirties, a mother of two children aged three and seven years. She spoke with a slight accent, and told them that she worked in accounting. She had been about to drop out of the study, but after massive encouragement from the researchers, she came back to finish the last day of testing in the

laboratory. "It's appetite day and she is not interested in this test, because she does not like the test meal. She does not eat pasta with meat sauce, which is what the standardized test meal is", he explained. The test participant herself suggested rice and curry. This was not possible and for good reasons. The meal served in the lab was as "a constant", which made it possible to compare the results with those of other similar studies around the world.

In the lab, participants would lie in a hospital bed for a full day. The room was packed with equipment, a giant treadmill, and polystyrene boxes, which led to a discussion about what influences appetite and the context of appetite. Hillersdal and the nutritional physiologist talked about eating and meals as something fundamentally social, and linked to identity and communities; to everyday life in a family; or to the role of the provider. They talked about how eating in the lab was an unfamiliar experience and how that might affect the test person's appetite. On the one hand, appetite was a contextual 'confounder' in an experimental setting, which at the same time made it hard to relate to everyday lives and family meals. Imagining the lab as a living room with draped curtains and flowerpots in the windows was one metaphor they explored together jokingly. They could both agree that eating was social, but it was not an aspect he, in the role as a nutritional physiologist, could include in his analysis, though the interaction in the daily work of test-takers demanded that he took the social and cultural significance of the food into account.

The aim of the dialogic experiment was to find ways to talk about appetite by unfolding what appetite might be in their different perspectives and methodologies, which at the same time allowed their understandings to coexist. In the process, they became able to analyse appetite together by making comparisons to a new shared object, which emerged from the conversation. During their talk, they often felt like going in circles, and it was hard for them to express what might be a valid connection between their perspectives on appetite. Hillersdal's first impulse was to recognize when her colleague talked about appetite as, e.g., an expression of a hormone response, but the challenge was to link his particular version of appetite to her analysis of appetite as embedded in a social context. Staying with the affective tensions of circling around a shared object exploring associations and concepts made them both confused in terms of the implicit closure of analysis that they found themselves searching for. The outcome of the talk was a realisation that they shared a complex understanding of appetite, but it was the dialogic experiment that made this visible through the affective tensions that unfolded diverse concepts and experiences in a conversation, which they both were able to connect to. The process itself became the shared object in a joint analysis of an ambiguous object.

The two cases above describe meetings between disciplines regarding two objects or problems, muscle soreness and appetite, respectively. Whereas we, as scholars, are well aware of ambiguities in our research objects (which may be dealt with by defining them away, or by making them a point in themselves, etc.), we experienced this ambiguity anew and most poignantly through affect-laden exchanges with others. Instead of withdrawing from the complexity brought on by meeting other disciplines' ways of capturing our shared problem, we explicitly explored the connections between the elements that formed our objects together.

The logbook of muscle soreness raised questions about how to capture soreness; muscle soreness was allowed to remain suspended between being quantifiable and not, neither one nor the other. The logbook collation of qualitative and quantitative approaches to muscle soreness meant that habitual categories were open for new interpretations. This opened for doubts and in this case a willingness to share doubts about what muscle soreness really is and for jokes about how to capture it, and ultimately know it.

The appetite conversation was an attempt to share each others' analyses in an explicit way using the affective tensions arising from experiencing and sharing difference. Acknowledging disconcerting differences from the start of the conversation - and taking them as a basis for the conversation - the researchers shared a curiosity for appetite and a search for connections between the very different elements that formed their object of research. In this way the appetite

conversation shows the same joint analysis as the one that emerged in the work with the soreness logbook, although it was constructed as a much more deliberate reflexive experiment. In this sense, our analysis draws out how affect in negotiating collaboration can do "ontological work" (Marres, 2009), by creating connections between otherwise separate categories.

Connections between disciplines, people and concerns experienced as affect challenge our perceptions of what we are investigating. The on-going conceptualisation of appetite and soreness in the projects continuously shifted and displaced our objects. In practice, delineated disciplinary fields and asymmetries gave way to a fluid movement between views on the object, so that we, at times were able to engage in several analyses simultaneously. Haraway describes our ability to recognize differences between our own and other people's knowledge about a field, as a capacity for being 'response-able' (Haraway, 1997: 71). When we spend time with others whom we want to understand, we also gain a better sense of their interests and their arguments, which offers a different position or starting point for analysis of what the problem is, and what questions it raises.

In the following, we analyse two further situations. We examine two meetings in the projects, and study how affective tensions in them can point to new and emerging connections. We show how affective moments may point to other ways of framing questions and seeing a shared object of research, which thereby carry the potential for effects in terms of engaging with the world with new knowledge.

## Affect as entry point to explore connections in interdisciplinary collaboration

### *The "free choice" debate in the project*

All work packages in the GO project met twice a year. At one of the annual meetings colleges from the Department of Philosophy were responsible for a shared session, and they introduced a discussion of whether or not people have a free will with respect to responsibility of one's own health. The core of the issue they raised referred to the way health has become a goal in itself (Lupton, 1995). The question they wanted us to respond to was whether people have the freedom to decide for themselves, and thus if they can exercise a right not to be driven by contemporary norms about health and how to perform their body, and basically live as they like.

A researcher from one of the other work packages was discussion partner to the philosopher's presentation, but instead of commenting on the presentation, he said in a lighthearted and humorous tone that now he would settle for the facts, namely, how little exercise it takes to become healthy. After his presentation of the health effects of different intensities of exercise, the stage was set for a joint discussion.

Subsequently, there was general silence in the whole assembly. An invited professor from Canada researching the correlation between obesity and physical activity was visibly provoked by the question posed by the philosophers, and saw it as a mistake not to help people with obesity. Should we as scientists just leave people to their own behaviour? It developed into a discussion about the right to choose one's own lifestyle in a society with a strong focus on health versus a society with a lack of regulation and social security. Could we, researchers dealing with Danish subjects, in other words allow ourselves to insist on the existence of a choice because Denmark is a welfare state? A social science researcher, also provoked, asked whether *they,* the subjects of the scholarly discussions, were someone anybody had met and implied that many assumptions were made on behalf of "the fat" or the not-so–health-motivated.

From then on, no one really picked up the invitation to debate. Many in the large group let their attention stray and started checking mails. Others looked to the floor, or out of the windows, it seemed, to avoid eye contact with the conveners. This had happened before, so it was not just a matter of discussions being initiated by a philosopher. But why did arguments not materialize and why was the meeting saturated with a sense of lack of commitment, even boredom? One reason might be that the premise of the debate was unclear or the question too broad. What was interesting at the meeting was how the common problem, namely the individual responsibility for health, emerged as something

that no experts could ultimately define nor help achieve. Everyone could, in some way, offer their own version, or interpretation, and thus it was difficult to be called upon as an expert. The philosophers raised a critique of the idea of the free choice that was naturalized for them, but in the response and discussion that arose no one could be experts. At first everyone spoke from professional positions, but in the particular context, all of these statements also at once assimilated, and thus it was difficult to establish direction, and to select or define the problem. This resulted in a tense atmosphere, a disconcerting moment, but instead of interpreting it as an expression of something unresolved, it conveyed a shared experience of a problem in terms of indignation from both the Canadian intervention researcher and from the social scientist, leading to frustration and discomfort in the whole group about who we were talking about, what should be done and in relation to whom.

The immediate result of the discussion was the realization that raising the question of personal responsibility for one's own health did not by itself point to a self-evident problem or a well-defined solution. It revealed what is often hidden, namely the fact that health is never neutral or just a technical standard to be worked on. The tensions represented health as negotiation of moral and human values, rather than as established facts, which raised the question of who had called upon us as experts to act on anyone's behalf in the first place.

### *Participants' meeting in the LIFESTAT project*

At some point in the LIFESTAT project, the idea of a meeting for study participants came up in response to the on-going informal conversations among project researchers and study participants about the medical dispute over whether more or fewer heart-healthy people should be taking cholesterol-lowering drugs. This, quite polarized, scientific disagreement means that many users of the medication are uncertain about whether to take it or not. Since the uncertain effects of cholesterol-lowering statins often came up in conversations in the project researchers found themselves reflecting on the project's position in the debate about the effect of treatment. Project researchers had different takes on what they, as experts, should respond when study participants asked. Bruun had encountered this same doubt about what it would be best to say in her interviews with study participants. Coming across this both pragmatic and deeply ethical question among both researchers and subjects led to the idea of organizing a meeting between study participants and researchers in the LIFESTAT project.

The idea was welcomed in the project steering committee meeting where Bruun and her anthropology and public health colleagues presented the proposal. After the meeting, one of the doctors, however, hesitantly expressed doubts about the purpose of "inviting participants in" in this way. What could come out of such a meeting and what it would contribute to? Bruun and her colleague made it clear to project colleagues that the intention was to both share research insights with study participants and to examine how the debate between researchers and participants would take shape. The research participant meeting would produce data for all involved parties at the same time, since all involved parties would be research objects in the context of the meeting.

During the meeting, researchers from five different disciplines, incl. anthropology, presented the preliminary results of their research. All presentations concluded with more or less the same observation that no definite answer could be offered in response to the question that most of the participants were preoccupied with: whether they should continue to take their statins or not. Whereas many of the presenting researchers found this lack of an answer unsatisfactory, most participants remained surprisingly resigned to the fact that they would have to continue deciding for themselves what to do.

A subsequent evaluation of the meeting found that most participants and researchers had found the meeting very fruitful, which was quite surprising. First, because volunteers and researchers shared their doubts about the solution to high cholesterol levels. There were different views of the basis for statins having become such a widespread preventive treatment, and the juxtaposition of these views destabilized

our knowledge. We were all in doubt, both experts and users. Secondly, because users seemed to accept that even the experts could not give exact answers. This acceptance is at odds with the third and final aspect here: the meeting not only comprised scholars with different ways of seeing the problem of high cholesterol, but also users who came to the meeting in the hope of gaining new insight.

The meeting turned into a space for the sharing of doubts. Simultaneously, it created resignation and opportunity for critically assessing the treatment practice that apply today. As a result of the meeting, an interdisciplinary group of researchers in the project are now focusing on a new object, i.e. the resigned acceptance that characterizes many participants vis-à-vis their responsibility to make their own decisions regarding their treatment. By establishing a patient panel, the LIFESTAT project has followed up on this sense of resignation by developing a tool for dialogue between patients and doctors when they discuss statin therapy. The dialogue tool will not provide answers that traditional risk assessment tools based on epidemiological data do, but lead patients and doctors through a shared reflection that can end in several possible treatment decisions.

Both meetings turned away from a one-dimensional approach to the question of responsibility for one's own health. As such it makes sense to say that, for a moment at least, the causalities between the problems and their solutions were suspended. It was not possible to assign the right to define who should frame a problem and thus a spontaneous democratic situation emerged, in which none of the participants were convinced that they could provide a solution. The consequences were felt as affective states of doubt and awkwardness, rather than as new arguments. The focus was thus turned away from an implicit expectation that all project colleagues and meeting participants were interested in the same solution, and turned instead to a shared analysis of what the problem could possibly be. The affective tensions in these situations, we suggest, can be characterized as enacting a 'response-ability' that allow for a significant moment of sharing difference.

In this regard, Verrans concept of 'generative critique' is useful to point to the ways that doubt and awkwardness could be productive or have effects. Generative critique is a practical potential. To be generatively critical is to make connections and to engage each other and the world. Verran (2001) points out that it takes practice to see the relationship between differences without necessarily implying that they can be compared. This is what Verran elsewhere describes as "the complex politics of 'doing difference together'" (Verran, 2011:422). In the concrete collaborations discussed in this article, these connections came to the fore through sensitivity to difference as new questions and responsibilities arising out of the collaboration: What and how could one advise people to choose with regard to statin use and how to connect obesity and health?

## Discussion: Generative response and participation in interdisciplinary collaboration

Interdisciplinary collaboration sets a specific framework for professional commitment through the meetings and the connections created between differences in practice. For many years, analyses of interdisciplinary research have shown how such differences could be contained within boundary objects that allowed researchers from different disciplines and other involved parties to continue pursuing their own disparate interests, largely unaffected by the participation of others. Based on our experience in two interdisciplinary research projects we have tried to examine what exactly goes on in day-to-day interdisciplinary research collaboration. We have taken note of the way difference often registers as affective tensions in various meetings, which carry with them a potentiality of signposting when one idea becomes consequential for another. We have tried to show how interdisciplinary engagement can open for new forms of response and participation through attention to the affective tensions that may signpost meetings between differences and the forging of other or new connections between people and problems.

We have also argued that the potential of interdisciplinary research, which has been celebrated

as a robust solution, perhaps lie in the deliberate exploration of contested grounds, i.e. in identifying and defining what action should be taken. In this process, interdisciplinary collaboration has the potential to become a more reflexive mode of knowledge production.

The situations analysed here show how collaborators' ways of approaching and relating to each other and at the same time constituting the shared project is not something that happened by itself. Making connections between differences involves more than disciplinary expertise, and more than the sociality of meeting others in a joint project. Staying in the encounters where disconcerting moments allow new knowledge to unfold benefits from attention to affect.

We think of affect in knowledge production as a marker of an on-going, but not necessarily explicit process of re-connecting and re-negotiation of problems, aims and expectations. This work, which we might think of as interdisciplinary expertise, is rarely reported in the overall reports of interdisciplinary projects, but it has the potential, in terms of the meeting of ideas that this work sets in motion, to advance agendas in a subtle and also more fundamental way than what we typically see in interdisciplinary research projects.

Our shared experience of meeting difference and becoming "response-able" of more or less explicitly addressed connections between such differences may be seen as one among several possible effects of interdisciplinary collaboration and as a generative response that can indicate how a problem may be examined in ways that destabilize politically strategic agendas, expertise, and evidence hierarchies. By applying the concept of 'response-ability' we have analysed the work of affect in collaboration and unfolded the knowledge production inherent in the concrete processes of doing connections between disciplines, people and problems, and hence interdisciplinary projects' potential for social change.

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## Notes

1. https://innovayt.eu/horizon-2020/
2. See www.go.ku.dk
3. See www.lifestat.ku.dk
4. Many forms and degrees of collaboration between disciplines are described with the terms inter-, trans-, multi-, etc. in the literature classifying how disciplines may work together (Klein, 2010, Barry and Born, 2013). We are not so concerned with particular definitions of cross-scientific forms, but we use the concept interdisciplinarity as a common term for collaboration with other disciplines. Our examples relate specifically to cooperation across the natural and social sciences.
5. Accepting the premise and concept of obesity did not imply that those among us not being biomedical researchers in the project accepted the biomedical term of obesity as the right characterisation of the problem. Instead, one of the research objectives was to ethnographically follow the configuration of 'the obesity problem' among diverse groups of mainly biomedical researchers. Furthermore, the sharing of different conceptualizations and articulations was central in concrete project meetings, and particularly in the dialogic experiment on appetite analysed here.
6. The ethnographic studies that we report from were approved as part of the larger research projects by the local ethics committee, Frederiksberg, Copenhagen and the Danish Data Protection Agency. All materials and narratives were anonymized before sharing. Besides, we have continuously presented findings and conclusions from our work and have been able to discuss it with our project colleagues.
7. Thanks to Jonas Winther, ethnologist and doctoral student in the GO project, for contributing to the development and testing of this concept.

# **Realizing the Basic Income:** Competing Claims to Expertise in Transformative Social Innovation

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## Abstract

Current social innovation initiatives towards societal transformations bring forward new ways of doing and organizing, but new ways of knowing as well. Their efforts towards realizing those are important sites for the investigation of contemporary tensions of expertise. The promotion of new, transformative ways of knowing typically involves a large bandwidth of claims to expertise. The attendant contestation is unfolded through the exemplar case of the Basic Income in which the historically evolved forms of academic political advocacy are increasingly accompanied by a new wave of activism. Crowd-funding initiatives, internet activists, citizen labs, petitions and referenda seek to realize the BI through different claims to expertise than previous attempts. Observing both the tensions between diverse claims to expertise and the overall co-production process through which the Basic Income is realized, this contribution concludes with reflections on the politics of expertise involved in transformative social innovation.

**Keywords:** expertise, basic income, social innovation, contestation, co-production

## Introduction: Transformative Social Innovation through new ways of knowing

> That Basic Income, you see, in the end you just run into people's basic assumptions about human behaviour and about society. And then it's no longer a matter of arguments, but of beliefs: "I don't believe that that'll work out", "I believe that it'll make people lazy"…And you just don't get past that point. People who do not believe in something, you cannot convince them. Then you can only show them, well, we did that, then and there…this is what we saw – now is this still what you're believing? (RM, 4)

As prevailing institutional structures are widely seen to fall short regarding persistent societal challenges such as sustainable development, social inclusion and well-being, a broad variety of initiatives can be witnessed that pursue societal transformations through social innovation (Moulaert et al., 2013; Klein et al. 2016; Avelino et al., 2017). Transformative social innovation (TSI) involves the promotion of radically new ways of

doing, organizing, framing and knowing, thereby challenging, altering or replacing dominant institutions (Haxeltine et al., 2017). Such TSI is often undertaken in the form of concrete and locally-based alternative socio-material practices such as ecovillages, hackerspaces or time banks. However, even though concrete tinkering with alternative doing and organizing is typical for the repertoires of these initiatives, the dissemination of new ways of knowing and counter-hegemonic ideas is a no less important dimension of such transformative agency (Riddell and Moore, 2015; Westley et al., 2017). This becomes evident through the considerable efforts that these collectives invest in the construction of persuasive narratives of change (e.g. 'Slow Food', the 'Sharing Economy') to enroll others into their proposals for new social relations (Wittmayer et al., 2015).

This contribution uses a case study on Basic Income (BI) advocacy to unfold how TSI practices, and the associated promotion of new ways of knowing, are sites of research at which contemporary tensions of expertise manifest particularly strongly. As expressed insightfully by the BI activist in the introductory quote, many arguments and underpinnings can be provided in its favour, yet these run up against deeply entrenched convictions that 'one should earn one's income'. Moreover, for lack of full-fledged implementation, it is as yet not possible to demonstrate the suggested societal and individual benefits of a BI arrangement. Commonly defined as an unconditional, individual, universal and more or less sufficient income entitlement to all citizens (Van Parijs, 1997), the BI has gained some traction as a scientifically elaborated model for social security. BI advocacy exemplifies the difficulty to gain acceptance of alternative ways of knowing, which typically shake the fences between established and 'lay' expertise (Wynne, 1996). As emergent not-yet realities, TSI processes tend to elude truth claims by established expertise (Michael, 2016).

Our analysis of the BI and its various advocates unfolds how TSI involves a large bandwidth of different claims to expertise, changing along with their political discursive contexts. The case is particularly insightful as tensions in expertise construction are becoming more manifest in recent years. Questioning the effectiveness of abstract argumentation, the introductory quote from a BI experimenter indicates a turn away from the long-sustained attempts at 'speaking truth to power' (Wildavsky, 1979). As will be shown, a strong 'evidence-based activism' tradition has long focused on the solidity and contents of the BI concepts and arguments – on the 'intrinsic', substantive (Evans and Collins, 2008) expertise. Evidence from recent Dutch, German, Swiss, Canadian and transnational BI activism suggests that new approaches are coming up, however, involving new and alternative ways of constructing expertise, communicating and convincing. Whilst largely agreeing with the kinds of welfare system transformations proposed by earlier-generation BI advocates, the various crowd-funding initiatives, internet activists, citizen labs and civic petitions seem to break with earlier understandings of how to realize and gain acceptance for a BI. Our empirical analysis is, therefore, guided by the following questions: *What turns in BI advocacy can be distinguished and how to understand the related shifts in claims to expertise? What is their broader relevance for TSI and utopian politics?*

Our analysis proceeds as follows. After a brief exposition of the BI as a utopian concept, we invoke co-productionist insights on the 'realization' of policy ideals to examine apparent shifts in BI advocacy in terms of expertise constructions. A brief methodological section accounts for the empirical data, case study design and analysis procedures underlying our account of different waves in BI advocacy. The empirical analysis reconstructs shifting claims to expertise along the historical waves of social critique, scientific underpinning and political entrepreneurship, highlighting the newly emerging fourth wave of activism. We conclude by eliciting the tensions, continuities and co-productive feedbacks between these 'realization' waves, also considering broader implications for transformative social innovation.

## The Basic Income, a counter-intuitive way of knowing 'income'

As introduced, BI advocacy exemplifies how TSI tends to involve the promotion of alternative ways of knowing. As a rather counter-intuitive way of

understanding 'income', this utopian concept is particularly difficult to propagate. The BI amounts to a state-provided entitlement of all citizens to an unconditional income that more or less covers subsistence. The concept, which counts amongst its eminent advocates Charles Fourier, John Stuart Mill, Martin Luther King Jr., Bertrand Russell, Friedrich Hayek and Milton Friedman, dates back at least to Thomas More's 'Utopia' published in 1516. Two centuries later, the pamphlet 'Agrarian Justice' by Thomas Paine in 1796 further developed the idea of unconditional payments as 'a right and not a charity' to everyone. Numerous variations, including a minimum income, negative income tax, social divident, 'demo-grants' and conditional social benefits, have been proposed since (Cf. Ackerman et al., 2006; Blaschke, 2012). The most elaborate exposition of the BI concept has been provided by the Belgian political theorist Philippe Van Parijs. In 'Real Freedom for All', he argues in detail how a BI arrangement would outperform existing institutional models on key principles of social justice (Van Parijs, 1997). Crucially, it would afford 'real', substantive freedom, supporting individuals in shaping their lives in accordance with their own ambitions and talents.

Elegantly simply defined as unconditional, universal, individual and sufficient and *prima facie* acceptable as maximizing self-determination, the BI way of knowing 'income' may appear like common sense. Moreover, its promises of a simplified welfare system and of multiple positive societal externalities (income security generally allowing for more responsible, well-considered and altruistic behaviours) do not seem far-fetched. The simplicity of the BI is deceiving, however. The proposal has many forms and implications (de Wispelaere and Stirton, 2004), and each of the four defining features has evoked contestations: the universality induces debates on citizenship and inclusiveness, the individual entitlement meets with communitarian concerns about the family as societal cornerstone, and the notion of a 'sufficient' BI invites clashes between self-determination and social justice considerations. Still, the element that most clearly marks the transformative character of the concept, frontally aiming for a replacement of dominant institutions (Haxeltine et al., 2017), is the principle of *unconditional* income. Ideologically, it is rather counter-intuitive as it violates the well-established moral principle that one should 'earn one's income'. It challenges several well-institutionalized social relations: between benefits claimants and their principals, between unemployed and employed, between employer and employee, and between (breadwinning and care-giving) individuals in households. Furthermore, the counter-intuitive, heterodox nature of this recasting of 'income' also speaks from its conceptual linkages with economic 'de-growth' (Schneider et al., 2010).

Evidently, any reasonably 'universal' implementation of this counter-intuitive understanding of income entitlements would imply wide-ranging administrative reforms. One major challenge alone will be the phasing out of the bureaucratic apparatuses currently devoted to means-testing, employability programs and compliance control. Moreover, the reforms would also have far-reaching ramifications for the various welfare schemes targeting specific social groups and for the taxation system. Meanwhile, the labour market would transform in various ways: The gained income security would empower individuals to reconsider their work-care balance, their needs for additional income, and the kinds of jobs they would be willing to accept. For the above reasons, Elster (1986) saw little future for the BI. Not only would the consequences of the ensuing major transformation process remain impossible to predict - the principled justification of unconditionality would never catch on for its counter-intuitive understanding of income entitlements.

Commonsensical but also counter-intuitive, the BI has been both dismissed and embraced as a utopia. Still, arguing that it is "more than a Pipe Dream", Van Parijs (2013: 175) has pointed to the Alaska Permanent Fund and the Iranian cash benefits based on oil revenues. The Brazilian 'Bolsa Família' is another well-known BI-inspired policy scheme. Furthermore, various BI experiments (Widerquist, 2006; Forget, 2011) and elaborate policy proposals (Groot and van der Veen, 2001; Häni and Kovce, 2015; Standing, 2014) testify to some advances in political agenda-setting. More generally, a dense discursive maze has developed on the viability of the counter-intuitive concept. Other than the TSI initiatives towards of time

banks, ecovillages, seed exchange networks or science shops, BI promoters cannot rely on small-scale experimentation and self-organized action. As their commitment to a *universal* BI entitlement requires state intervention for it to become real, they engage in what they call 'real utopianism' (Wright, 2013; Van Parijs, 2013): Next to bringing forth persuasive moral appeals and critical interrogations of hegemonic societal structures, many BI advocates consider *expertise* as the key working substance of their activism.

## 'Realizing' the BI: claims to scientific and political authority

Seeking to promote the BI concept by constructing relevant expertise, BI advocates show the relational and performative dimensions of expertise (Evans and Collins 2008, 609/610). However strong their commitments to sound arguments and however impressive the *substantive* expertise developed, their claims to expertise crucially need acknowledgement from others for their utopian ideas to be appraised as 'realistic' policy options. Recent developments suggest that a new generation of BI advocates is wondering how expertise could ever be constructed on such an unknowable social innovation.

A first key to understanding the (contested) claims to expertise at hand resides in the two different kinds of acknowledgement sought. To make the proposed arrangement appear sound and desirable, BI advocates seek both scientific as well as political authority. Their expertise constructions are efforts towards BI 'realization', a term coined by Voß (2014: 318-319) to describe how policy concepts can become real through processes of 'mutually reinforcing scientific and political authority'. This concept clarifies how BI advocacy involves 'evidence-based activism', as also found in the case of patient organizations (Epstein, 1995; Rabeharisoa et al., 2014). BI advocates are similarly critical outsiders that aspire to roles as constructive experts who act 'from within'. In doing so, they may rely on some forms of 'lay expertise' (Wynne, 1996). As a 'real-utopian' project, BI advocacy mainly bets on the construction of 'hard' counter-expertise, however - wholeheartedly joining into the game of expertocracy and perpetuating the associated "over-reliance on science in decision-making" (Evans and Collins, 2008: 611). Yet while 'evidence-based activism' may aptly describe the high aspirations towards scientific authority, the 'realization' concept highlights that BI advocacy is aimed at gaining *political* authority as well. Other than a natural-scientific phenomenon, the BI is an institutional design. It is what Voß & Freeman (2016: 2) called a 'knowing of governance', a set of "representations of desirable social relations and renewed modes of governance". The key claim to expertise is, thus, not only that an unconditional basic income can work (in the macro-economic sense), but also that it is (ethically-politically) fair. Importantly, the 'realization' concept serves as reminder that the authority of a counter-intuitive, anarchistic concept such as BI cannot solely rest on its unavoidably shaky scientific authority. Just like the scientifically well-argued TSI proposals of the anti-psychiatry movement (Crossley, 1999) or the anarchistic approach to traffic of Shared Space (Pel, 2016), this governance proposal for release of control needs not only be 'proven' to work but also trusted and believed.

A second useful insight afforded by the 'realization' concept is that it situates BI promotion within highly distributed processes of expertise construction. In line with insights on the co-production of science and social order (Jasanoff, 2004) and the reproduction of governmentalities (Rose et al., 2006), the scientific and political authority of the BI is considered to result from continuous interactions between a broad variety of interested parties. Beyond the misleading but still common picture in which expertise is held by 'incumbents' to control the lives of subaltern actors (Prince, 2010: 875) such as BI advocates, the 'realization' lens highlights how BI discourse is not only a product of researchers and politicians. Instead, the BI is also 'co-performed' (Callon, 2009) by other actors like planning bureaus, advisory boards, NGOs and journalists, and through crystallized forms of knowledge such as documents, metaphors, classification systems, metrics, accounting systems and macro-economic calculations (Voß, 2014: 323).

Third, the 'realization' framework provides a *dynamic* perspective on BI advocacy. It gives attention to the feedbacks, stepping stones, inter-

mediate results and 'boundary objects' (Star and Griesemer, 1989) through which scientific and political authority inform and possibly reinforce each other. As the typical culmination point in such reinforcing intertwinement of research prioritizations and political agenda-setting, Voß (2014) mentions the currently frequently held 'real-world experiments' as sites for practically relevant research and for prudent and informed policy-making.

Fourth, and following its focus on the dynamics of expertise construction, the 'realization' framework is also attentive to the relevance of changing communication infrastructures. Since the inception of BIEN in 1986, the internet as 'knowledge infrastructure' has become a pervasive shaper of social interactions: re-configuring scientific and transdisciplinary collaboration (Gläser, 2003), blurring the boundaries between knowledge and information (Dagiral and Peerbaye, 2016), empowering the marginalised (Jalbert, 2016) and democratising scientific controversy and knowledge production (Wyatt et al., 2016). As pointed out by Ezrahi (2004), the material-communicative conditions for claims to expertise have undergone a transition from information to 'out-formation'. This rise of fast, de-contextualised and immediate 'out-formation' communications provides a specification of the 'realization' framework that is particularly relevant to the apparent most recent 'turn' in BI advocacy: Whilst the changing information landscape may erode the ground for science-informed, evidence-based activism, it also opens up expert-dominated societal debates for other claims to expertise.

## Methodology: Reconstructing a 'fourth wave' of Basic Income realization

Other than presenting an account of the justifications, underpinnings, theorized impacts or other substantive elements of the BI concept itself, this contribution focuses on its advocacy. More specially, we construct an exemplar case study (Flyvbjerg, 2006) on the recently occurring 'turn' in BI advocacy, which is illuminating for the tensions in expertise in TSI processes more generally. Highlighting the 'realization' strategies of BI advocates whilst downplaying other aspects of their activities, our deliberate 'casing' (Ragin and Becker, 1992) and 'enacting' (Michael, 2016) of BI advocacy is of course not an innocent representation. Our account draws on a study that formed part of a set of 20 case studies, conducted within the framework of a project on Transformative Social Innovation (TRANSIT, 2017; Haxeltine et al., 2017). Approaching the BI as a transformation of social relations, we compared it with TSI cases as diverse as time banks, Slow Food, Ecovillages and Co-housing. The case analysis presented has been informed by two crucial comparative insights: First, the BIEN/BI case diverged from the typical experimenting with and showcasing of new ways of doing and organizing, revolving rather around the construction of persuasive claims to expertise. Second, the apparent 'turn' in BI advocacy displayed tensions in expertise that seemed relevant for TSI practices more generally, even if surfacing less prominently in the parallel case studies.

We have studied BI advocacy along the generic methodological guidelines developed for our case studies (Wittmayer et al., 2015) and for the subsequent study of 'critical turning points' in the history of TSI initiatives (Pel et al., 2017a). This involved empirical investigation of the kinds of socially innovative ways of doing, organizing, framing and knowing promoted, of the structure of the social innovation networks promoting them, and of relevant societal context developments. Working with embedded units of analysis (Yin, 2003) and a networked understanding of innovation, we have focused on the transnational Basic Income Earth Network (BIEN) and some of its 'local manifestations' in Germany, the Netherlands, Switzerland and Canada as key protagonists. Reconstructing their interactions with and strategies towards dominant institutions, we relied partly on discourse analysis and partly on actor-network theory modes of inquiry that follow the shaping of innovation networks (Latour, 2005; Pel et al., 2017b). Altogether, the case study relies on 31 semi-structured interviews with various BI advocates, a modest amount of (participant) observation at meetings and congresses, consultation of BI-related websites, and a selective review of the substantial scientific literature and policy documents available on the BI (Cf. Backhaus

and Pel, 2017 for a detailed account). Particularly important for the presented analysis has been the choice to investigate not only BIEN affiliates, but also various individuals and initiatives who promote and translate the BI through different claims to expertise.

Finally, the crucial methodological element of studying TSI is the process approach (Pettigrew, 1997). All cases within the overarching research project investigated the ways in which the social innovation and the initiatives promoting it have changed over time. This approach alerted us early on in our empirical work to the oscillating acceptance of the BI concept – with situations of high unemployment acting temporarily as fertile grounds for its endorsement. Moreover, the process approach has made us attentive to changes in BI advocacy as well. Following earlier analyses as well as various interviewees' remarks about different generations and approaches in BI advocacy, our process understanding has converged on the stated emergence of a recent fourth wave in BI 'realization'. Of course, this stylized scheme merits critical interrogation as such. Remembering Jasanoff (2003), the former three waves are indeed setting the stage for the suggested fourth one. They are neither irrelevant 'straw men' nor artificially constructed preparatory phases. Analyzing whether and in which respects new 'realization' strategies are emerging, we will also address the continuities and co-production between different approaches to BI realization.

### *Three waves of BI realization*

The emphasis of our analysis of BI realization lies on the recent emergence of a 'fourth wave'. Before extensively discussing that fourth wave in the next section, this section describes the three first waves of social critique, scientific underpinning and policy entrepreneurship. As mentioned in our methodology account, the identification of these three waves builds on personal accounts of BI advocates but also on earlier BI scholarship. Crucial is the self-understanding, widely shared amongst BI advocates, of being engaged in a 'real utopia' project:

> The idea of real utopias embraces this tension between dreams and practice: 'utopia' implies developing visions of alternatives to dominant institutions that embody our deepest aspirations for a world in which all people have access to the conditions to live flourishing lives; 'real' means proposing alternatives attentive to problems of unintended consequences, self-destructive dynamics, and difficult dilemmas of normative trade-offs. (Wright, 2013: 3)

Importantly, Wright (2013) sketches a 'journey' from imagination to robust claims to expertise that resonates with the logic of our 'realization' waves. Particularly insightful substantiation of this identification of waves has been provided by Groot and van der Veen (2001). In their analysis of the Dutch BI discussion between 1975 and 2001, they identified three largely consecutive phases that can be appreciated as moves from social critique towards more solid constructions of scientific and political authority.

In our account of these three waves in BI advocacy, we focus on the real utopianism as organized through a pivotal collective actor, the Basic Income European Network (BIEN). After several BI experiments in Northern America in the 1960 and 70s, political interest on that side of the Atlantic dwindled – only to re-kindle in Europe less than a decade later in 1986. At the first international BI congress in Louvain-la-Neuve (Belgium), various researchers and activists decided to consolidate and continue their networking through founding BIEN, featuring a regular newsletter and congresses. In 2004, acknowledging the growing group of supporters in non-European countries, BIEN was renamed into the Basic Income *Earth* Network. Currently, this network-of-networks comprises national BI associations in 23 countries, and has just decided to have yearly rather than biennial conferences. Since 2006, the academic, peer-reviewed journal Basic Income Studies publishes two issues per year. Furthermore, an elaborate website supports BIEN in its operations as an international discussion platform, advocacy network and archive of BI insights (BIEN, 2017; Backhaus and Pel, 2017).

### *First wave: Social critiques*

This first wave of claims to expertise started already with Thomas More's seminal 'Utopia'. This book exemplifies the typical expertise construction through counterfactual reasoning: The imaginary society with income security realized for all individuals is used to challenge prevailing societal structures characterized by social exclusion, inequality, alienation, and lack of freedom. Especially in the context of later 20th century Welfare states, BI-inspired critiques typically challenged the broad political consensus on the need for 'workfare' policies, as control-oriented modes of governance to ensure individuals' active participation in society and economic production. In the 1970s and the 1980s, BI advocacy was firmly embedded in radical Left discourses. Their critical claim was that the insistence on full employment, and not the BI, was increasingly becoming unrealistic. According to a founding BIEN member and former MP for the Dutch radical Left, BI advocacy was a very principled matter then, quite different from the nowadays rather pragmatic approach. For example, the critical-principled 'first wave' even involved civic disobedience:

> The unemployment was that high and so without prospects in the early eighties, that people started saying, 'I simply consider my unemployment allowance as a basic income – and I will do with it as I please.' (AdR, 3)

Well beyond this resistance against the strongly *conditional* income ('workfare') however, the 'first wave' has brought forward a much broader range of critical claims to expertise. Notable examples of the often very articulate accounts are the critiques of meritocracy (with the claim that BI acknowledges how current productivity accrues largely from common-pool resources and earlier generations' wealth creation), of gender inequality (with the claim that the BI, as individual income entitlement, helps to dissolve the institutional structures favouring the male breadwinner model), and of the 'productivist' imperative towards economic growth (with the claim that the BI empowers individuals to move away from consumerism). Some of these 'first wave' claims may have receded along with the demise of some of the counter-cultural political movements that they were carried by. The following slogan expresses the currently less antagonizing approach: 'the BI is neither Left nor Right, but Forward'. Still, the critical claims of the 'first wave' continue to be an important dimension of BI advocacy. A particularly telling recent example of those is provided by one of the lead initiators of the Swiss BI popular vote in 2017. To him, the BI is not just an institutional arrangement, it is a 'cultural impulse':

> The Basic Income raises two questions, namely 'What would I do if there was a Basic Income?' and the other question, which is of course the much more important one and moreover the one that shows why we do not have it yet, is 'Am I ready for this? For abstaining from deciding what others have to do? Am I ready to grant this to others?' And this question has been answered … also in the popular vote. (DH, 2)

### *Second wave: Scientific underpinning*

Different from the politicians, members of unions or NGOs, and social movement activists that were prominent drivers of the 'first wave', the 'second wave' is driven mainly by experts. The BIEN network was founded by a group consisting mainly of academic philosophers, sociologists and economists, and some individuals with a background in politics. Standard bearer Van Parijs (2013: 173) is particularly outspoken on the need for scientific ammunition, distinguishing their 'real-utopian' project from wishful thinking and moral appeals:

> Utopian thinking requires answers to many factual questions about likely effects, about compatibility, about sustainability. It is perfectly legitimate for the choice of these factual questions to be guided by value judgments, but it is essential that the answers to these questions be shielded from the interference of both our interests and our values. (Van Parijs, 2013: 173)

Crucially, this second wave involved a move from general critique by relative outsiders towards the evidence-based activism by academics as relative insiders. Specifying the moral principles, associated evaluation criteria and evidence supporting alternative institutional arrangements for social security and taxation, the experts joining this

wave strengthened the scientific authority of the BI – which they deemed essential for gaining political credibility.

The claims to expertise of the 'second wave' were accordingly less directed towards the general public, and more towards the governmental planning bureaus and advisory councils, as crucial gatekeepers in evidence-based policymaking. This commitment to scientific underpinning and expertise has materialized in an academic BI journal, and in various reports providing calculations, scenarios and empirical data on key bones of contention such as labor market effects, macro-economic ramifications, implications for taxation, and safeguarding of the minimum income. Especially in the last two decades towards 2000, BIEN members' activities towards scientific underpinning resonated well with similar activities of governmental bureaus for economic forecasting and policy analysis. As a Dutch longstanding BIEN member pointed out, the BI discussion in the Netherlands actually received a sudden major impulse through a report by the Scientific Advisory Council in 1985.

> So then they suddenly came with that idea that that BI could be achieving what its academic advocates had always been saying it would: the neutralizing of the poverty trap, the simplification of social security, and the inclusion of the people at the lower end of the labour market…Well, all that, but, they also came up with the idea to have that BI only partially, so that it could possibly be acceptable to those who weren't very enthusiastic about the uncoupling of labour and income. Moreover, they managed to package all of that such that it would allow for an abolishment of the minimum wage, and act as a stimulus for the lowering of labour costs …which for the politicians was a very prominent theme. (RV, 4)

The report taught this BIEN member valuable lessons. He learnt about the crucial authority conferred by this governmental advisory board, about the scope for developing tailored BI policy packages, about the importance of connecting proposals to highly actual political issues and about the political vulnerability of policy proposals containing a multitude of controversy-evoking elements. The most important lesson of all, however, was that the report had failed to gain political authority for the BI for lacking calculations. Since then, the Dutch BI advocates focused on developing those, and sought to engage in discussions with the key actor in this regard, the Central Planning Bureau. This proved to be an insurmountable passage point. The prevailing macro-economic models typically did not account well for the long-term system feedbacks on which the BI justifications rest:

> Well, it came down to, basically, that we said 'your models, a number of things that we find important they are not taking into account', and, 'your models are most probably not very reliable, because you're investigating something that is dependent on very large institutional changes – whilst micro-economic models can deal with small changes and their direction, but not with the big ones.' And that is something they admitted. (RV, 6)

For these apparent limits to their evidence-based activism, the 'second wave' has also explored the scope for BI 'realization' through experiments. This involved various 'pilot' projects as undertaken in countries such as Namibia, Canada, and India, but also reflection on appropriate methodologies (Forget, 2008; Terwitte, 2009; Standing, 2012, 2013). The scientific and political value of the experiments is contested, however. As BI researcher Groot (2006: 2) argued, they are crucial as demonstration: "I think a radical idea such as a BI needs to be shown to work in order to get it on the political agenda". On the other hand, he also pointed out the still broadly shared objections that they are inherently too bounded, non-representative, and short-lived to testify to the soundness of BI as a policy option (Groot, 2006: 3-4). Contestations over the experimentation byroad are recently gaining in importance, as governments worldwide are announcing further experimentation initiatives. In this regard the 'second wave' insistence on solid scientific underpinning was reinstated by BIEN leading figure van Parijs at the 2017 BIEN conference in Lisbon, Portugal:

> Sometimes it's admissible to justify a good idea with bad arguments. However, in general it is better to support a good idea with good arguments.

### *Third wave: Policy entrepreneurship*

This third wave can be considered an antithesis to the prevailing strong emphasis on scientific authority. It was led by the conviction that the force of moral appeal and rational argument should be supported by a sense of political relevance. After all, even scientifically very sophisticated accounts could turn into political shipwrecks. The idealized view of politics in BI advocacy has been criticized from both within and outside of BIEN circles. Elster (1986: 714) reproaches BI proponents for neglecting the political issues arising along the transitional process. Also Wright (2013: 3) indicates that 'real-utopian' projects require a theory of transformation and attention to the fragility of societal acceptance, the intricacies of implementation processes and the erratic dynamics of political decision making. Arguing for a 'mature' and less principled BI debate, De Wispelaere and Stirton (2004: 272) thus sought to attune BI expertise to practices of 'fuzzy' policy design.

BIEN, established to foster informed debate on the BI and to push for its implementation, indeed moved more towards the latter. There was an increase in voices arguing for practical and feasible policy proposals, in particular at the 2002 Congress in Geneva, hosted by the ILO. A BIEN founding member describes his inclination towards reasonable and *realizable* policy proposals as follows:

> …there are different systems of thinking about basic income. My own view is that for practical, political reasons we have to think about moving in the direction of basic income. I don't think that the idea that some people have of "overnight we should have a full basic income …"… I don't think that that is practical or politically feasible in the near future. I believe that we should start with a small amount and gradually build it up… I also think it should be done from local to national level and not be a matter for grandiose thinking about regional, international level. I think that it must be built up within countries according to their standard of living, according to their financial capabilities. (GS)

These impulses towards activism and policy entrepreneurship have materialized in various ways. First, the agenda and identity of the BIEN network became shaped more strongly by the political lobbying of amongst others Guy Standing (at first while heading the ILO's socio-economic security program and later through his engagement in Indian BI experiments) and Brazilian Senator Eduardo Suplicy (helping to introduce the 'Bolsa Família' program for poor families with school-aged children, as part of a series of BI-inspired policies). Second, various individual BI advocates and national BIEN affiliates seem to have oriented their 'realization' efforts more towards actual political developments in their countries. Likewise, the organization of BIEN conferences became a matter of policy entrepreneurship: The hosting of them became allocated to countries where they could give a timely impulse to just emergent political authority for the BI. Third, there have been strategic-theoretical responses to the altogether increased awareness of the political taboos and vulnerabilities surrounding the BI. Notable examples are the exploration of various implementation scenarios (Cf. Groot and van der Veen, 2001), such as stepwise (steadily increasing a partial BI arrangement), or 'by stealth' (implementing institutional changes such as tax reforms that amount to BI arrangements, yet without bearing that controversial heading).

Ironically, a part of the 'third wave' of policy entrepreneurship has been the increased awareness of the limits to BI 'realization'. Several early-hour BI advocates expressed how the requisite 'windows of opportunity' seemed to have closed around the millennium turn - once the unemployment issue ceased to create legitimacy for the proposed drastic transformative measures. Political parties thus dropped the BI project in favour of more 'realizable' proposals, and some individuals reconsidered their activist efforts. Looking back, one of the founders of the BIEN network expressed both his admiration and slight bemusement over staunch BI advocates' sustained repetition of the gospel:

> Personally I have to say that I was not really interested in what happened in BIEN because I had the feeling that it was really very repetitive. We have more and more people saying "I am in favour of basic income for this and this reason", but I have already heard this reason a hundred times and I don't want to waste time. I'm very

> admiring of Philippe Van Parijs, who has a capacity to repeat himself for 30, 40 years, repeating the same argumentation and convincing people. Really extraordinary. (...) But of course, if you want to be effective you have to be like Philippe Van Parijs. He is really capable to do that and to stay, obstinate, stubborn ... again and again. I really admire it, but I'm totally incapable of doing that myself. I get bored. (PB)

He also explained how the repetitions-of-argument became particularly difficult to sustain as the political interest in the BI collapsed around the millennium turn. By contrast, a brighter account of these modest transformative impacts and the oscillating political relevance is conveyed by a metaphor raised by several respondents. They describe BI realization tellingly as a 'peat fire' – largely remaining below the surface and apparently extinct in certain political episodes, yet never dying out completely and regularly flaring up again in political life. Regarding the 'third wave' it then appears that more of this policy entrepreneurship is needed to ignite political authority, for which the continuously burning torch of scientific authority has proven important but insufficient. As indicated by De Wispelaere and Stirton (2016), the political entrepreneurship has recently become only more important, as the BI is gaining political authority. In the next section we will show how a 'fourth wave' has emerged that can be appreciated as a revitalization of the third.

## Competing claims to expertise: A fourth wave in BI realization

Following the 'social critique', 'scientific underpinning' and 'policy entrepreneurship' claims to expertise, a fourth wave in BI realization is emerging. In this fourth wave, the objectivist focus on 'scientific underpinning' by the BIEN network is complemented with an altogether different, rather subjectivist discourse: "What would you do with a BI?" is the typical question raised in this move towards a democratization of BI expertise. In the following it will become clear how some fourth wave initiatives deliberately devise strategies of 'out-formation' (Ezrahi, 2004), as they feel that the information landscape for BI realization has changed. We describe subsequently the crowd-funding initiatives and their attempts to create experiential knowledge on BI, the internet activism that makes the BI ubiquitous and therewith more real, the petitions and referenda that work on political authority, and finally the experimentation initiatives that reflect commitments to evidence-based policy but also innovation in governance.

### *Crowd-funding: experiencing the BI*

At a distance from the BIEN network, some initiatives in Germany, the Netherlands and the USA diverge from the traditional realization strategies. Their crowd-funding initiatives aim to develop *experiential* expertise.

The small Dutch collective MIES ('Enterprise for Innovation in Economy & Society') is an example of this. As curious individuals with various entrepreneurial, activist and academic backgrounds they shared a certain enthusiasm about the BI, but also agreed that the societal debate on it had become hopelessly stuck in adversarial, repetitive, and entrenched exchanges of arguments. "Let's just stop talking about that BI", one of them had blogged provocatively. As he explains:

> That Basic Income, you see, in the end you just run into people's basic assumptions about human behavior and about society. And then it's no longer a matter of arguments, but of beliefs: "I don't believe that that'll work out", "I believe that it'll make people lazy"…And you just don't get past that point. People who do not believe in something, you cannot convince them. Then you can only show them, well, we did that, then and there… this is what we saw – now is this still what you're believing? (RM, 4)

MIES sought to move beyond traditional BI advocacy. However eloquently formulated, none of the moral arguments and scientific reasoning had allowed the public to see, feel, and experience how a BI would change life and society.

'Let's just do it', MIES therefore decided in 2014. Inspired by the German pioneer 'Mein Grundeinkommen' whom they found through the internet, they started a crowd-funding initiative that would finance one individual's BI of 1000 EUR/month for one year. The first selected recipient was a local activist. His urban horticulture,

meeting place and social inclusion center exemplified the multiple societal benefits that could be created if individuals were released from income-earning pressures. The MIES chairman had no difficulties admitting that this N=1 experiment was remote from meeting any criteria of solid scientific evidence. It was a 'marketing strategy', wholeheartedly taking up the policy entrepreneurship they found lacking in BI advocacy. MIES' key strategy to play into realization feedbacks were the self-recorded video blogs of the BI-receiving individual on their 'Our Basic Income' website. Sharing from the kitchen table "what he did with the money, and what the money did with him", he confronted contributors and other website visitors with the typical 'fourth wave' question: "What would you do with a basic income?" In turn, MIES' calls for broader BI experimentation received substantial media attention, with three nationally broadcasted documentaries as important reinforcements of a carefully fabricated 'hype'.

BI crowd-funding initiatives work with the typical immediacy of 'out-formation' strategies, creating political authority by inviting individuals to take part in BI realization - through financial contribution and through personal reflection. These expertise constructions are also characterized by attitudes of pragmatic inquiry and political independence. The German crowd-funding pioneers, who have spawned over two hundred of such (temporary) BIs, display policy entrepreneurship:

> We consciously decided to not appear political with 'My Basic Income' and avoid being put into the 'left corner', because we would not reach the many people that we need to reach if a basic income is ever to be implemented on national level. (JA, 5)

Finally, a similar BI 'lottery' in South Korea and the recent engagement of Silicon Valley CEOs in long-term, large-scale crowd-funded BI initiatives suggest that broader BI 'out-formation' campaigns are emerging beyond the one-off project.

### *Internet activism: making BI ubiquitous.*

BIEN has always made use of latest technologies to build, share and disperse expertise. Starting with early word-processing software, transitioning from printed letters to portable documents and eventually email newsletters, the newsletter as a compilation of recent research, academic publications, media appearances and country-specific or regional developments related to BI realization are regarded the "lifeline of the network, as it kept BIEN alive between congresses" (YV). This characterization captures the relevance of updates between small groups and isolated individuals who sought to collectively advance a common cause, whilst meeting their companions only biennially.

There is a marked difference between a dedicated newsletter by and for networked academics and the sharing of information on-line through websites and social media, where numerous BI networks, initiatives and interested individuals post information, share stories, like and comment, tweet and re-tweet. The latter communications are more effective in making the topic ubiquitous. BIEN's on-line domain basicincome.org functions as resource and information hub and features stories on BI-related developments across the globe, opinion pieces, reviews and analyses. With several news stories added to BIEN's web pages every day, the monthly e-mail BIEN newsletter Newsflash alerts its recipients only to a shortlist of highlights. In addition, the number of BI initiatives across the globe has soared, especially since the turn of the millennium. Besides BI initiatives, 'traditional', especially somewhat left-leaning, media have joined the BI choir, thereby popularizing the topic beyond the academic sphere. Collectively, the various BI advocates are thus producing a mixture of information as well as 'out-formation' communications. Each in their own ways, they try to expand the circle of subscribers, followers and possible supporters.

Flagging the importance of broadening the scope of BI realization efforts, the secretary of the Canadian BICN Board recalled that

> Around the BIEN congress in 2014 in Montreal, we did a lot of press releases and media appearances. And we had a media and stakeholder guide […] and it was, you know, our document that said "anytime you talk to the media, these are the key messages that you should hit up, and this is strategically how you should talk about basic income". And in that document we intentionally

> discussed basic income as something that we already have in part. … because we already have a version of it for seniors and for kids in Canada. (JvD, 6)

This framing, portraying the apparently 'counter-intuitive' as something already known and normal, proved to have a great media resonance. BICN therefore built the same line of reasoning into a more informative, interactive and user-friendly website. This new way of making the transformative concept of BI known signifies a different way of creating and communicating expertise, which apparently speaks well to a broad public.

An analysis of Google search and Twitter trends indicates a growing interest in the topic and an overall positive sentiment towards BI in recent years. Calls to action, on the other hand, have been found largely lacking on Twitter (van Draanen, 2017) and Facebook where diagnostic and prognostic assessments of why a BI is or will be needed prevail (Matuschka, in Backhaus and Pel, 2017). Although BIEN offers frequented and trusted information services on its web pages with "60 unique visits per day in June of 2013 to 1,365 unique visits per day in May of 2016" (Widerquist and Haagh, 2016), a long-term editor and now editor-in-chief of the BIEN newsletter explains that BIEN's outreach efforts are only part of the story. People concerned about related issues, such as social inequality, persisting poverty or the future of 'workfare', tend to find the topic by themselves:

> So a lot of people who are concerned about automation say: "What are we are going to do, when there are less and less jobs to go around?" They are finding basic income. There is a rich literature out there, I don't know if we can take all the credit for it, but they're finding it and they're talking about it. And that's how basic income is taken on. (KW, 5)

The Internet as a social space where news spreads, discussions unfold and judgments are made has aptly been described as a modern 'information agora' (Branscomb, 1994). A very significant implication for the construction of BI expertise is the proliferation of new pockets of BI discourse, well beyond the still important communication channels managed by BIEN and its national and regional affiliates. As a result, the BI becomes more ubiquitous, whilst the associated constructions of expertise become more diversified.

### *Petitions & popular initiatives: democratizing the BI debate*

Unlike earlier waves that pursued BI realization and the construction of political authority by 'speaking truth to power' (Wildavsky, 1979) and unlike the occasional BIEN member who sought to assume an office, this fourth wave cluster of realization approaches strives to democratize the debate and political decision-making. One of the heads behind the Swiss popular initiative for a BI suggests that Switzerland, which takes pride in 120-years of direct democracy, allows "asking a question that one usually ought not to ask" (DH, 1), subjecting this question to the broadest discussion possible. After four years of preparations, a citizens' initiative for a popular vote on a BI was officially launched in Switzerland in 2012. For eighteen months, existing and newly formed BI initiatives worked successfully to gain civic support for a popular vote: more than the required 100,000 valid signatures were handed in at the Federal Chancellery in Bern. On June 5th 2016, 77% of the electorate rejected, and 23% supported the proposal for a constitutional amendment that would introduce a BI in Switzerland. The 'world society', and not only BI supporters, paid attention as Switzerland voted on a BI. Importantly, the entire process was interspersed with remarkable public performances generating local and global media attention: a truck unloaded 8 million *Fünferlis* (Swiss coins), dancing robots demonstrated for a BI at the World Economic Forum in Davos, notes of 10 Swiss Francs were handed out as flyers, and a Guinness world record was set with a gigantic poster asking 'the BI question' in golden letters: "What would *you* do if your income was taken care of?". Amidst the public debate, political parties, unions, employers' organizations and other institutions were forced to take a stance. Remarkably, the initiators of the popular vote cast the BI realization process as a decidedly ethical discussion. This echoes the social critiques of earlier times, with their appeals to self-realization and solidarity.

Elsewhere, where representative democracy prevails, BI supporters made a lunge at the

political establishment by means of petitions. The first of its kind was an online petition launched in Germany in 2008 by a politically interested person who had, however, no background in political activism and no affiliation with existing BI networks. Many long-term BI supporters started rallying for the petition immediately, but the German BIEN affiliate had second thoughts about the precise BI model that should be proposed for discussion. The initiator herself was more pragmatic about that:

> And then I said: "Well, can't we link arms as long as we are all still standing under the same banner 'We want the BI' – because the discussion is not further yet, right? So, let's link arms and march in the same direction! And later, once we're closer to implementation, we can have these [model] discussions, …that's when they are appropriate." (SW, 6)

Another example of strategic engagement with political and scientific authority was the 2013 European Citizens' Initiative for a BI. The Unconditional Basic Income Europe (UBIE) network emerged in the aftermath of a failure to reach the quorum of one million supportive signatories. It comprised generally rather activist-minded people, who nevertheless sought the connection with the still more academically-oriented BIEN network. A similar citizens' initiative took place in the Netherlands in 2016, achieving the required 40,000 signatures for a parliamentary debate. Eventually, the appeal was dismissed in light of a previous debate initiated by an MP.

Striking about these various recent popular initiatives is the apparent transfer of this democratising realization approach across borders. Part of this is being carried by the recent rise of BI internet activism. It makes not only the concept, but also the associated realization strategies more ubiquitous.

### *Experiments: between evidence-based policy and citizen labs*

The crowd-funding initiatives are achieving considerable exposure and political authority through their constructions of experiential expertise. Moreover, these pragmatically-inquiring initiatives form part of a much broader movement towards BI experimentation. At first sight, the governmental commitments for BI experiments in Canada, the Netherlands and in Finland could count as achievements of second-wave 'evidence–based activism'. They evoke mixed feelings within BIEN, however. Somewhat dismissively, BIEN standard bearer Van Parijs underlined the 'propaganda-effect' of these scientifically less than convincing experiments. Fourth wave BI activism casts this 'propaganda-effect' in a more favourable light, however, deliberately aiming for experiments as the fusion point of mutually reinforcing scientific and political authority. Especially the Dutch trajectory towards experiments is instructive in that regard. They were motivated not only by commitments to evidence-based policymaking, but at least as much by ambitions towards 'citizen labs' and governance innovation.

For the aforementioned MIES collective, their crowd-funding initiative served as a springboard for broader programs of real-world experiments. As their chairman underlined, they decidedly moved away from BIEN members' traditional focus on national government. However important for implementing the *universal* BI, he considered national politics the wrong political entrance for a transformation process that should be initiated through small-scale, locally-rooted experimentation.

> On the local level, one is of course confronted with the fact that there is increasing numbers of people on the dole and in other welfare schemes as well. Here in Groningen, [...] the local administrators are surely aware that in this particular regional context, whatever one does, this number of people won't be helped into employment. [...] Any action will have to start at the local level. That is what's happening now, which is hugely different from what happened in the 1980s. Back then, the BI was actually an idea that was still largely confined in the heads of researchers [and some others, dispersed over various public sector organizations]. In any case, [the advocacy] wasn't anchored in politics, and surely not in local politics, and that is the great difference. (JR, 7)

MIES therefore published a framework for local-level BI experiments. Together with similarly experimentation-minded individuals they welded

a broad network of civic initiatives, local-level politicians and administrators to support their political calls for citizen labs, participatory governance and experimentation. The experiments played into the tensions between municipal and national-level government tiers over a recent devolution programme. Against the national-level policy doctrines of 'workfare' and toughness on the unemployed, the 'BI-inspired experiments' were to explore the scope for more lenient and less conditional welfare entitlements. Eventually, the responsible Secretary of State has created the requisite exception clauses for experimentation to the otherwise firmly anchored policies of conditional income – giving in to the considerable media exposure, broadly supported parliamentary motions and well-organized political entrepreneurship of social innovation initiatives, aldermen of middle-sized cities and BI researchers.

Along the lobbying process towards these real-world experiments, they have tellingly become reframed as BI-*inspired* experiments. According to the 'experimentation broker' who crowd-funded himself to weld the experimentation network, the BI label was initially rather an asset in gaining broad public interest.

> It is just entering people's minds directly. I think it was just often discussed at the kitchen table, or in the train, or wherever people meet. Anybody can relate to this, and form an opinion about it. So, it is really a topic that could 'go viral' in society, and it did. (SH, 14)

On the other hand, he also found the BI label to be a political liability. As the BI had already become known in the Netherlands as a left-wing hobby-horse, the recentnly attached 'Money for Free' slogan (Bregman, 2014) from an influential book publication only further increased the risks of winding up in ideological stalemate. The network broker therefore found it crucial to maintain an experimenting attitude. This would add scientific authority to the rather principled activism of the Dutch Basic Income association, for whom the experiments were at best reinstating the already proven points of BI feasibility

> ...the constituency of the association is generally activist in mindset: 'we want a basic income because it is a human right', or 'because that is how things should be' – but currently, that [view] represents only a very small minority of society, of course. So, then you're having rather a political movement, whereas the characteristic feature of these experiments is often to be pragmatic, to just see whether it works and not to assume from the beginning [what the outcomes should be]. And that is the role I have tried to fulfill, to move the debate out of the hypothetical sphere and away from the pro and contra positions. Exploring instead 'what can we do with this' – with all political parties together, that is. (SH, 16)

## Conclusion: Competing claims to expertise in Transformative Social Innovation

Synthesizing the above empirical analysis, we can answer our research questions: *What turns in BI advocacy can be distinguished and how to understand the related shifts in claims to expertise? What is their broader relevance for TSI and utopian politics?*

As this counter-intuitive way of knowing remains a largely unrealized utopia yet refuses to become extinguished, BI advocates have tellingly characterized it as a 'peat fire'. Shifting attention from the substantive (Collins and Evans, 2008) expertise about the BI towards the relational *claims to* expertise of BI advocates, the 'realization' concept of Voß (2014) has helped to unpack how this fire is fueled with different claims to scientific and political authority, and incited by multiple and ever-changing winds of co-production. Consequently, the dynamic 'realization' perspective has informed a process analysis to make sense of the recent 'turn' in BI advocacy. Our subsequent empirical analysis has yielded insights on the differences, the continuities and the co-production between the various 'realization strategies':

First, a distinct 'fourth wave' of claims to expertise in BI advocacy has become evident. Albeit diverse in approach, the crowd-funding, internet activism, civic petitions and experiments signify similar patterns of disjuncture from the earlier 'real utopianism'. Relying decidedly less on 'first wave' social critique out of pragmatism, they diverge even further from the 'second wave' of scientific underpinning. Especially the crowd-funding initiatives are frontally challenging the evidence-based activism of BIEN. However

sound and elaborate the reasoning, models and evidence basis, all of this they consider overly abstract and insufficiently decisive in the face of deeply held convictions and entrenched political positions. Rather than constructing expertise towards political decision-makers and specialized experts, the 'fourth wave' initiatives develop 'out-formation' strategies to persuade the broader public. The internet activism and civic petition activities display bypassing of expertocracy: Exploring alternative inroads into parliamentary politics, they revitalize the 'third wave' of policy entrepreneurship. The 'fourth wave' ruptures with traditional claims to expertise are confirmed by the accounts of 'traditional' BI advocates. Whilst the latter often voice admiration for the pragmatic political entrepreneurship, their various second thoughts reveal tensions in expertise: The crowd-funded 'BI lotteries' are seen to lose sight of the radical Welfare system reforms, and the pragmatism is seen to underestimate the need for principled, counter-hegemonic responses to persistent 'earning one's income' governmentalities. The BI-inspired experiments are at the centre of the contestation. Whilst being acknowledged as modest steps towards evidence-based societal debate, they are also mistrusted as confined, transient projects. Praising the experiments for their 'propaganda effects', principled BI advocates subtly underline that these are not the real thing.

Second, these ruptures in expertise construction should not obscure various *continuities*. The crowd-funding and experimenting initiatives may appear to have given in to post-political ideology, but this is also a matter of strategic political awareness. Crucially, the new approaches still draw heavily on the discursive archive and the evidence base created over decades or even centuries of social critique, scientific underpinning and policy analysis. Especially the internet activism and civic petition initiatives are eagerly standing on the shoulders of giants, and the 'fourth wave' is re-packaging the BI more than profoundly adapting it. This leads us to, third, the co-production between expertise constructions. The four waves are successive, but they are also intertwined layers of BI discourse. Other than mutually cancelling out, the associated constructions of expertise rather appear as different fuels that together feed the BI 'peat fire'. This can be attributed partly to the unmistakable ties and exchanges between the different BI initiatives. More importantly however, recent developments in BI advocacy display some of the feedbacks highlighted by Voß (2014): In some contexts we see indeed the convergence of scientific and political agendas onto real-world experiments. More generally, it has become evident how the various fourth wave 'out-formation' strategies generate public interest, 'hype' and political authority – which in turn prompts journalists, scientific advisory councils, opinion leaders, academic researchers and indeed BIEN members to add scientific authority to a widening discussion.

This brings us to consider the broader implications of the observed shifts and tensions in BI expertise construction for TSI initiatives and utopian politics more generally. A first basic insight is that the substantive (Evans and Collins, 2008) side of expertise should be appreciated as a key asset in the promotion of such new, transformative ways of knowing and doing. The 'evidence-based activism' (Epstein, 1995; Rabeharisoa et al., 2014) and 'real utopianism' (Wright, 2013) of BIEN members has developed a vast discursive archive on this counter-intuitive way of knowing. Ever since Thomas More's 'Utopia' (1516), BI advocates have been developing elaborate expertise that makes the proposal appear much more 'realistic' than *prima facie* appraisal would suggest. The international BIEN network has kept the fire burning over three decades already. Institutionalizing BI knowledge production through newsletters, studies, a dedicated journal and international conferences, they have helped achieve an important stage in TSI 'realization': The BI has become a common reference in political life worldwide.

Notwithstanding the importance of substantive expertise, our study especially conveys insights on the challenges of having expertise *acknowledged* (relationally). The highlighted tensions in BI expertise reveal paradoxes and dilemmas that are arguably quite inherent to the 'realization' of new and counterintuitive ways of knowing more generally. The consistent repetition of key discursive elements is important, but an awareness of the multiplicity of audiences is crucial: Even once

the feedbacks between political and scientific authority have culminated in 'real-world experiments', as theorized by Voß (2014), this does not fully settle the contention - the political and scientific significance of the 'BI-inspired' experiments *remains* contested.

Exemplifying the challenges of constructing alternative expertise that holds both scientifically and politically, the case of BI advocacy is particularly revelatory for the politics of expertise that current social innovation initiatives are inevitably engaged in. The described 'fourth wave' in BI advocacy is not merely rehearsing the point that the internet age leads to different modes of collective action (Kelly Garett, 2006). More importantly, the described shifts in BI advocacy provide insight into a paradox that seems to present itself for current initiatives towards transformative social innovation and utopian politics more broadly: Counter-expertise and alternative ways of knowing are developed that break through established doctrines on what is politically realistic, yet aspirations towards epistemic authority keep informing quests for *solid* proposals on 'adequate' institutional arrangements. On the one hand, the case of BI advocacy is thus displaying the usual resistance of TSI initiatives against dominant governmentalities and ways of knowing (e.g. Scott-Cato and Hillier, 2010; Smith. 2017). Arguing against the current control-oriented arrangements of income distribution, the underlying macro-economic models are held to be fundamentally flawed for their negligence of ethical issues of entitlement and 'the good life'. On the other hand, its 'evidence-based activism' reflects the political-strategic tenet of 'real utopianism' (Van Parijs, 2013; Wright, 2013) that one cannot afford to stay out of the 'expertocracy game' altogether. The commitments to *universal* basic income entitlements inevitably entail activism that 'sees like a state' (Scott 1998) and engages in large-scale social engineering. The BI case is arguably not unique in that regard. As pointed out by Stirling (2016: 265-266), this rather reflects the more general difficulty for TSI initiatives to balance their alternative spirit with the temptations of control-oriented, evidence-based imaginaries of societal transformation. The presented case only exhibits these tensions in expertise more strongly: The reality of a fully implemented (unconditional, universal and more or less sufficient) Basic Income can as yet not be known.

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# **Collaborative Confusion Among DIY Makers:** Ethnography and Expertise in Creating Knowledge for Environmental Sustainability

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## ABSTRACT

Eco-oriented makers and grassroots subcultures experimenting with new technologies and ways to design sustainable futures are increasingly the subject of research. As activists address problems of environmental sustainability beyond institutional contexts, their work may appear vague, even confused, yet their activities are underpinned by intense and principled commitment. Working through their confusion, many DIY maker communities build new understandings about what 'sustainability' could mean. We argue that herein lie important resources for new knowledge and, further, that ethnography is the ideal way to track these processes of learning and knowledge production. The ethnographer participates in local confusion over values and the definitions of sustainability, but also about what constitutes useful knowledge. Supported by STS (and other) literature on environmental expertise, we argue that maker communities' own acknowledgement of this vagueness actually makes possible a position from which epistemological authority can be reasserted.

**Keywords:** DIY makers, activists, expertise, ethnography, sustainability

## Introduction

There is much disagreement over what is and is not sustainable across environmental discourses, but the knowledge practices that dominate conversations about global environmental sustainability carry within them a set of hypothetico-deductive principles born of stereotypes of laboratory science. This approach to environmental sustainability has long been known to be inadequate. It even suggests confusion in the advancement of knowledge. But if confusion proliferates, as we believe it does, this could be turned into a strength. The perspective we outline comes from empirical research into grassroots 'DIY maker' or materialist activist communities who self-consciously design more sustainable futures but do so amidst equally self-conscious confusion.

These groups are increasingly the subject of research. As they take on a mandate to "enact the future that others will subsequently live" (Suchman, 2011: 2), they challenge conventional

expert institutions while themselves embodying a distinct conception of knowledge and expertise. The idea that DIY makers are a radical challenge to conventions of knowledge production is partly problematic hype, yet worth analysing as a potential site of social change. We, an anthropologist and a design researcher both intermittently active in grassroots projects, argue that DIY maker communities are fostering epistemological renewal and, moreover, that critical ethnographic research can contribute to developing and sustaining this.[1] Our contribution is based on what is a dream situation for the researcher, the opportunity to work with highly reflective interlocutors who, like scholars, analyse and critique.[2] But maker-activist communities are often hesitant to offer advice and it is often unclear what has been learned in their practices, which makes their implications for socio-environmental sustainability difficult to articulate. The available (modern) vocabulary fitted neither makers' activities nor our efforts to make sense of them. Across all field sites we saw people coping with radical uncertainty, feeling their way to clarity in embodied, collective and hesitant ways quite at odds with prevailing conceptions of technical and scientific expertise.

Building on recent work in design research (Kohtala, 2017) and (activist) anthropology (Berglund, 2017), we show that although DIY maker practices are vague and even confused, they are underpinned by intense and principled commitment. We argue that the confusion can be productive and actually makes possible a position from which epistemological authority can be asserted. We reach this view from a dialogic, reciprocal and equal relationship with makers. Although we remain outsiders, our questions are similar but distinct from their questions and motivations. Under current conditions, such research is particularly constructive and timely. We draw on our own and others' empirical studies on DIY makers (e.g. Kohtala, 2016), studies on environmental activists (e.g. Berglund, 2001, 2016) and on STS and transdisciplinary research to develop the view that eco-oriented activist makers appear to (or have the potential to) contribute to knowledge production in ways that current policy and even research ignores or misunderstands (Hess, 2007, 2016; Smith et al., 2017).

We develop a suggestive concept borrowed from educational research, the 'dirt-way' of learning. Proposed by Rogers Hall and invoked by Geoff Bowker and Susan Leigh Star (1999), it refers to non-formulaic ways to solve problems. Hall's example concerned children's own methods for working out mathematical problems without following tutored methods: getting "the right answer the wrong way" (Bowker and Star, 1999: 321). Bowker and Star extended the notion to discuss how people develop innovative techniques to work around formal systems and structures. In the present context, the dirt metaphor conveys the ad hoc, dialogic and embodied way small-scale activist projects define and reach towards sustainability-supporting objectives.[3] 'Dirt' here captures a critical STS insight about how knowledge is 'purified' in order to give it power, but it also points to human bodies, substances and experiences that will not be contained, something increasingly highlighted in relation to the future coexistence of humans and others (Abrahamsson and Bertoni, 2014).

We identify a 'dirt-way' of learning within activist communities, and (hesitantly) in ethnography also, where people encounter the world as made up of dirt – conceptual and tangible – that might turn out to be precious. Operating in the dirt-way involves considerable uncertainty and vagueness about aims, but this is combined with high commitment to learning. We suggest that the epistemological power this generates is crucial for maker activists, although we also recognise the rewards of conviviality and the emotional respite offered by places populated by like-minded people (Longhurst, 2015; Kohtala, 2017).

Before introducing knowledge practices around sustainability and noting some of their instabilities, we first briefly sketch out how knowledge and confusion appear in materialist maker-activist spaces. We then expand on why we believe ethnographic research can render the confusion inside maker communities as valuable and valid.

## Introducing DIY makers

Materialist makers, crafters and builders, of artefacts, alternative energy solutions, food systems and production tools and technologies, are not just groups of hobbyists advocating for change

in their free time. They operate as collectives, designing their spaces, events and decision-making structures. Committed to re-configuring material flows and 'democratising' access to resources, tools and knowledge for sustainability-oriented aims, they align with what David Schlosberg and Romand Coles (2016) dub the sustainable materialist social movement emerging in industrialised countries.

Here our point of entry is the data collected for a doctoral dissertation (Kohtala, 2016) on digital makers in northern Europe, who experiment with digitally-controlled fabrication technologies, electronics and conventional crafts in shared, open-access workshops called fab labs and makerspaces (e.g. Walter-Herrmann and Büching, 2013; Maxigas and Troxler, 2014). While some subcultures in the digital-maker movement are marked by (and critiqued for) their techno-optimism, individualism and a tendency towards exclusion and elitism (e.g. Arieff, 2014; Morozov, 2015), others explicitly question unsustainable production and seek to redress inequality, material waste and values that promote passive consumerism (Hielscher et al., 2015; Smith A, 2017). In their endeavours and passions they are comparable with materially-engaged environmental activists in other times and contexts. What we have specifically noted in their workshops and events across northern and western Europe, is that these are often gathering places for other activists focused on urban agriculture, renewable energy, alternative currencies and postcapitalist modes of living (Kohtala, 2017; Berglund, 2016), as well as for projects like sensor-enabled beehives, water-saving showers, small-scale metal smelting furnaces, tools for recycling plastics and software for transparent collaboration. Using illustrative examples from both anonymous and named sources, in this paper we consider some emergent features of their practices rather than presenting the results of a bounded study.

The roots of these collectives lie in civil society and they can be framed as social movements (Hess, 2005; Schlosberg and Coles, 2016; Smith et al., 2017). Their politics is prefigurative and pragmatic more than it is oppositional; whatever varied forms they take, and however explicit their goals are, these groups are committed to hands-on action, peer-to-peer governance and active learning. Being generally educated and not immediately vulnerable, they risk being dismissed, even by academics.[4] Despite their marginality, or worse, frequent dismissal as utopian, they demonstrate tenaciousness and endurance and sometimes their expertise is recognised. Related to, for example, renewable energy, STS scholars have shown how active, inventive users have had impact in providing context- and use-based information relevant to manufacturing and approval standards (Ornetzeder and Rohracher, 2006; Hyysalo et al., 2013). Nielsen (2016) and Sørensen (2015) have argued that the early 'alternative technology' stage of Danish wind power development, marked by active cooperatives of turbine owners developing expertise through learning-by-using and sharing knowledge, were crucial to the later development and cultural acceptance of wind power.

Notably, many materialist-activist groups depart from the communities of grassroots innovators who focus on one theme, such as community energy (Bomberg and McEwen, 2012; Jalas et al., 2014). Instead they often organise under a shared identity with a suite of interests and varying objectives, defined ad hoc and often in contested ways. In Amersfoort in the Netherlands, the De War collective has organised art-based projects, citizen science initiatives and peer learning experiments to foster learning for environmental sustainability and self-sufficiency. In Helsinki, Finland, the arts and new media collective Pixelache changes its programme and themes from year to year depending on political circumstances and membership. What is constant is a counter-cultural standpoint from which to explore alternative economies, bio-art and bio-hacking, or protecting valued environments (Paterson, 2010). The annual festivals of both collectives (Koppelting and Camp Pixelache) are organised as 'unconferences' or 'BarCamps' requiring active co-organising from participants, often to their confusion. The festivals also feature workshops and lectures on peer-to-peer governance.[5]

Since materialist-activists do not specialise in only one issue (such as slow food or solar heat collectors) it raises the question of their status as knowledge producers: upon whom does the

'burden of relevance' lie (Marres, 2015). Even if assessing their 'impact' were straightforward, this would capture only features recognised by business-as-usual or, even more insidiously, reduce their contribution to the quick fixes of sustainability-as-usual that leave destructive regimes intact. If maker-activists outside highly resourced research laboratories and prototyping facilities are keen to engage with the complex issues such institutions pursue, this too is part of the dirt-way of learning: it is not for them as counter-publics to prove their relevance. Rather, it is for others to prove that the issues they pursue are somehow *not* relevant to how we live with and materially participate in science, technology and nature (Marres, 2015). Makers' dirt-way may not be the accepted, formulaic method of 'doing sustainability', but then doing sustainability is hardly uncontroversial with evaluative criteria for recognising it highly unstable (Skjølsvold, 2013).

In their efforts to do away with the negative environmental impacts of modern mass production and consumption, maker activists make visible some key paradoxes and tensions of doing *anything* in the unsustainable and palpably crumbling present. Benchmarking or judging their personal material sustainability or otherwise, as critics are wont to do, is of little account when everyone is entangled in unsustainable global circuits of goods and bads. Furthermore, scientific knowledge poses a problem: anyone with an environmentalist sensibility must attend to a universe of socio-technical as well as nonhuman dynamics, but do so through scientific knowledge that is at once reliable, inadequate and compromised (Lave, 2012). The most defensible position to take is experimenting with alternative ways of thinking and acting. Narrowed to a focus on grassroots innovation, defined as bottom-up initiatives committed to values of social justice and environmentally sustainable developments (Smith et al., 2017), today's eco-oriented maker practices "point to possibilities", particularly "to the inability of incumbent regimes [...] to respond to demands for sustainability, community involvement, democratization and convivial forms of production and consumption" (Smith et al., 2017: 121).

We will argue that environmentally conscious intellectual work needs to recognise and valorise the dirt-way. This may manifest in maker culture as pointless activity, as nuggets of valuable matter (resource rather than waste,) but also as the bodies so often discounted in Enlightenment epistemology. The need to operate in a dirt-way is born of not benefitting from an optimal situation, unlimited resources, all knowledge, and yet despite these problems, getting on with the work of experimenting and garnering knowledge with what is to hand.

## Contingent concepts and messy practices

Both sustainability and expertise are slippery concepts, but despite the confusion surrounding it, 'sustainability' has continuing appeal. It is invariably associated with new forms of expertise – new study programmes in sustainability science, countless journals and endless conferences (Huutoniemi, 2014). Sustainability as a concept may offer a boundary object, but beyond that it signals absence – unsustainability – or at best a goal, a kind of utopia.

Particularly in combination with expertise, sustainability points to core troubles in contemporary political dynamics with roots in the history of science. To generalise about a complex story that scholars continue to unpack, Science (capitalised) was elevated to the best possible knowledge available at the same time as modern habits and infrastructures became globally dominant. As STS demonstrates, heterogeneity and hesitancy in scientific practice was largely written out. The stereotype of expertise based in early modern experiences of the impressive power of Science, later bolstered by the confident modernism of the nineteenth and twentieth centuries, still has traction, no matter that science's histories, cultures and objects have always been more complex than this image suggests (Martin, 1998; Lave, 2012). Despite sometimes significant shifts, practices of knowledge making rarely change swiftly (talk of scientific 'revolutions' (Manzini, 2015) notwithstanding). Alongside the ideal of detached and politically innocent knowledge, there have always been fears about and hostility towards expertise (Nelkin, 1975). But recently the ancient "dilemma of expertise" (Nowotny, 2003) has worsened,

with climate change the iconic example of how experts offer promise yet fail to be the "immutable anchoring point outside the cacophony of politicians, social and economic interests" (Nowotny, 2003: 151).

Exposure to refutation, or openness, is an important source of legitimacy for scientific knowledge, as it allows claims that science is superior to other forms of knowledge, which appear dogmatic or merely traditional in comparison. Irrespective of how this openness is understood, the need for expert know-how to contain multiple and interconnected crises everywhere on the planet is irrefutable. Yet the trustworthiness of experts has suffered (Skjølsvold, 2013). Against this background, writing about the relationship between sustainability expertise and 'the public' feels extraordinarily fraught, but the tension goes back a long way. We can trace the seductions of external certainty, "whether enshrined in the laws of the gods, of geometry or of Nature" to the Ancients, e.g. Plato (Nowotny, 2003: 151). As expertise developed into a key institution of social order, experts became tasked with combining the needs of society (or other client) for predictive power with potentially endless scientific questioning – possibly leading to political paralysis by prolonged scientific analysis.[6] Analytically, though, expertise can be distinguished from science, in that it involves the filtering of "information produced off-stage" (Strathern, 2006: 194) and so performing a kind of closure of knowledge. It must also "be able to understand the interlinkages that bind diverse practices, institutions and networks of … actors together" (Nowotny, 2003: 152). As Maria Åkerman (2016) defined it, expertise consists in 'meaningful simplifications' (also Collins and Evans, 2002).

Maker expertise has these same qualities. New knowledge becomes relevant and alive through action, experience and hands-on experimentation and is contested internally. Pronouncements made externally, rare as they are, are usually hesitant. However, DIY makers have advantages when compared with experts serving the proverbial public good. These institutional agencies are normally invited to optimise, innovate and solve problems. Their authority comes from the promise to achieve this, their work grounded in a technological conception of progress (Suchman, 2011) operating alongside a 'techno-economic paradigm' of environmental management (Kostakis et al., 2016). Maker communities in contrast are not held to account like this. They even appear to revel in the absurdity of such lofty aims.

One example are the numerous global maker experiments with wind and water turbines.[7] As engineering projects, the turbines, usually produced in plastic on desktop 3D-printers, are decidedly non-optimised solutions. They come out of community change projects committed to social transformation through eco-technologies, and their knowledge emerges in collective and accumulative learning-by-doing that is based only on resources to hand (Kostakis et al., 2013; Light, 2014). Such maker expertise is then the expertise of *not* optimising a product, but rather keeping boundaries vague and responsive to others' contexts and capabilities (de Laet and Mol, 2000). When 'expertise' is rendered visible in the tutorials DIY activists produce for each other, this highlights contingencies and offers work-arounds instead of rationalisation and standardisation. What we see here are dogged efforts to deal with and learn from the 'dirt' that seeps into bolt threads or causes printing filament to expand, gusts to quell and people to be faulty. It is *socio*-technical (and *socio*material) expertise, built of the will to communally imagine, design and live a better future. And, we could say that DIY makers do this, not to get *away* from facts, but in order to get closer to them (cf. Latour, 2004).

Examples such as the wind turbine, like rapid socio-technical change generally, challenge popular models of the relationship between scientific expertise and sustainability. And yet useful environmental knowledge is often assumed to emerge from academia and then be used for, or applied to, policy (or other 'interested') purposes. This view is not just inaccurate (Weingart, 2011; Lave, 2012), it obscures the significant but under-acknowledged role of other actors. Early environmentalists (Jamison, 2001) and other movements often deftly combined technical and other specialist expertise with arguments for greater democratisation and openness, even if they felt uneasy at the borderlands of science and practical

campaign work (Yearley, 2005). Then there were the unspeakable technological disasters at Bhopal and Chernobyl in the 1980s, followed by publicly visible failures of expertise to protect populations in wealthy Europe (Weingart, 2011), which led to newly visible tensions around scientific knowledge and its application. As STS has demonstrated (e.g. Hess, 2007), environmental knowledge from ad hoc community protest to professionalised lobbying through ENGOS, has routinely and for a long time been created and disseminated as a form of oppositional knowledge, what Andrew Jamison (2001) has called 'green knowledge'. More prosaically, even numerous international treaties on environmental protection have originated in maverick or at least non-mainstream research (White et al., 2016).

Arguably, the rise of science and technology studies itself paralleled and supported (even emerged out of) the recognition that science was contingent and messy, thus making space for a new kind of critique of earlier techno-optimistic discourses. Through countless critical analyses, often informed by feminist (Star and Strauss, 1999; Haraway, 2008) and postcolonial insight (Lave, 2012), scholars showed how expertise performs social distinction and authority, and that the epistemic criteria for deciding which problems should be studied and how, have often been fickle (Lave, 2012; Hess, 2007). More generally, in the late twentieth century the production of authorised expertise was shown by detailed studies to have been shot through with politics and human fallibility.[8] This led to discomfort with the political implications of STS (Collins and Evans, 2002), and the problems still need addressing. As we noted, they are exacerbated by policy makers' demands for proof of harm (that science cannot guarantee) and corporate requirements to protect the freedom to make profit, which together can paralyse regulation. If STS-based critiques of expertise can be seen to weaken the scientific (epistemic) case for taking action, the problem has certainly not gone away.

In the search for better ways to address wicked problems, across our fieldsites as elsewhere (Jasanoff, 2016), we see public participation and collaboration linked to a drive for 'solution finding' (Konrad 2012: 8), often understood as integrating technical proficiency with 'social robustness' (Nowotny, 2003; Huutoniemi, 2014). Where policy supports vague sustainability and wellbeing goals, improvements are expected to materialise through better collaboration with diverse actors. Thus, in the urbanised, wealthy spaces where DIY makers mostly operate, knowledge practices around environmental issues, even among maker activists, are guided by multiple principles. These combine normative or goal oriented commitments to broadly modern or even Enlightenment principles of universal applicability and a value-neutrality, with commitments to advocacy and what Huutoniemi (2014: 6) calls a "more democratic and socially robust culture of knowledge production". As part of the democratisation of science, languages of networks and assemblages are also gaining popularity, signalling some acknowledgement of the embodied and situated nature of knowledge production, and a realisation that the human beings doing research are also part of the systems they study or, in a less scientistic idiom, these vocabularies point at forms of togetherness that need to change. Within a detached modern epistemology this provokes discomfort. Among makers it appears to be celebrated.

We might say collaboration for DIY makers has less to do with now routine calls to enhance legitimacy through public participation, than it has with entanglements with multiple environment-altering forces, not least in the DIY-biology ventures often linked to the makerspaces we know (on DIYbio, see e.g. Meyer, 2013). These tendencies have been picked up in recent environmental humanities scholarship focussing on the messiness of dealing with more-than-human worlds (Abrahamsson and Bertoni, 2014). When imagined as horizontal networks, collaboration may appear more malleable and benign than it is, leaving the sharp inequalities at play in producing environmental damage out of the discussion. Sometimes it even happens that 'the public' is defined to include massive corporations or complex networks of decision making well beyond public accountability, 'collaboration' that covers experiments of which people may not be aware (Evans and Karvonen, 2014). And while almost anyone can be treated as a

knowledge maker in some circumstances, in a complex and unequal world where agnotology (socially constructed ignorance, Proctor and Schiebinger, 2008) is a useful concept, expanding the knowledge commons can seem like an abdication of epistemological authority. No wonder many yearn for tough action based on scientific certainty! The reality is, however, that knowledge proliferates, data explodes again and again, and yet little changes.

## The dirt way in maker communities

Maker activists are challenging these dynamics. Their knowledge practices are recognised by many labels (DIY, lay, citizen, guerilla), yet they are continuous with other forms of legitimate knowledge production. In many respects makers resemble producers of science and technological expertise elsewhere, but what we find significant is that they clearly make their own decisions about how technology is designed and used and what problems are worth pursuing. As Carl Mitcham argued over two decades ago, the prevailing politics of innovation support "going along with the flow of various social forces and whatever inherent momentum is manifest in technological change" (Mitcham, 1997: 43). This process has then imposed socio-material demands on ever wider publics in an anarchic and crisis-prone way. We argue that this is not happening in makers' collectives. Although what is going on there is initially difficult to fathom and even self-consciously messy, activists are developing expertise in democratising technologies and judging them with reference to stringent definitions of sustainability. The rapidly evolving, heterogeneous and diffuse phenomenon of environmentally oriented makerspaces is then reasonably straightforward to outline while our shorthand for the myriad processes going on in their efforts to reach towards sustainability, is learning the 'dirt-way'.

DIY makers foster principled openness about the limitations of contemporary expertise even in connection with sustainability and transition. Above all, they further epistemic renewal away from conventions that build on hypothetico-deductive methods. Fab lab workshops are one example. They have been characterised as "real-life laboratories" for experimenting together, with activities less judged by commercial success than social and ecological orientation (Dickel et al., 2014). Playful experimentation and the possible ways to fail that it entails, appear virtuous (Smith TSJ, 2017: 135). Yet at the heart of the experiments we do not find artefacts like wind turbines or bio-materials, but paths to transition to a postcapitalism where "peer production itself is a real-life-experiment in societal transformation" (Dickel et al., 2014: n.p.). Makers debate the endless compromises involved in making sustainable practices both more sustainable and more appealing. Their practices represent not only struggles against passive acceptance of how commodities, materials and power circulate, but confrontations with what qualifies as transformation or innovation.

Let us illustrate this with an example. One of the groups we studied started life as a university-funded short project called Waste-lab.[9] The project involved experimental electronics artists, designers, design researchers, media researchers and waste management researchers from inside and outside the university. Its aim was collaborative, multidisciplinary explorations on waste streams, e-waste, overconsumption and sustainable solutions, in ways and means from lectures to experiments in a university makerspace.

As a project Waste-lab did not produce any tangible results or exhibit-able solutions, but it continues to exist as a group and an entity in its home town in northern Europe. Its longevity is largely due to its roots in an independent non-profit arts collective whose members fluidly move through the city's various activist communities – from guerrilla gardening and dumpster diving to realising commissioned public art projects. Both Waste-lab and the arts collective have been among the most environmentally oriented experimental technology communities we have encountered in our work. They are also unusually and consistently critical of the substantial and often green-tinged, technological hyperbole around them.

Waste-lab's coordinator was Ben,[10] a researcher himself but so involved in coordination duties he had little time for research-like reflection. Ben made different uses of Cindy's thesis research and

was grateful to have her as an external shield to reflect back the meaning of his efforts. This came informally all along the first year in small conversations. It came more officially when she gave a summary lecture as part of the project at the end of the first funded year. When Cindy's dissertation was published, Ben considered including it as a reference in funding applications for the collective, as proof of activity and impact.

In that important first year, the Waste-lab group met in the university makerspace several times to discuss a collaborative project: how do we together learn about waste? In what ways can this learning take place? How do we involve others in the process, and how do we communicate what we think is important? Some of the artists were extremely critical of the technologies in the lab, especially 3D-printers; others felt comfortable using them as tools for enhancing what they could already do by hand. Discussions on them revolved around appropriateness, but they were also complicated by the venue: some of the artists felt uncomfortable in the clean and tidy lab space that stifled ad hoc invention and creation, not to mention its association with an 'elite' university. It was an open discussion that went beyond black ("you're a luddite") versus white; we sensed that there is something in this digitally-enabled world and we could see that this is the future, but we did not know how to identify and sort out the possible dangers.

> "I'd like to get a bit away from being dependent on technology to do this stuff", said one member, in the first meeting. Then she clarified, "It's alright for us to use technology because we're doing it right". Another member replied, "It is how you use it". Ben added, "The point is to have a space where people are encouraged to do it with others".[11] But what should the group do? What is the project *for*? And who should be involved? How can they animate and mobilise others in this ongoing conversation? One of the most critical members, Terry, said, "We could figure out something simple enough, so that when an enthusiast or non-enthusiast comes in, we could have (...) presentations, plus some kind of brainstorming sessions, or if we want to have this energy question, if we want to build something big regarding energy production, or something very small, a mesh of very small motors, if we start making small generators, wind and wind-up, cogs, gear systems, dynamos, designing gearboxes".
>
> Three months later the group was still meeting and discussing these potential projects, but attendance was irregular and the group had not agreed on nor made visible progress on a collaborative project.
>
> One day Ben and a Waste-lab member, Tom, were trying out a Waste-lab related design on the 3D-printer. Jack entered the makerspace and Ben joked that they were making something with "new waste". The rest of the day continued with sarcasm and jokes. Tom showed Paul an etched piece of sheet acrylic he had just experimented with in the laser cutter. Paul said with fake reverence: "it's cooooooool. It's so coooool". Tom replied, "It's clean, it makes this appearance of perfection. It's impossible to do this kind of stuff by hand". Paul said, "It makes humans obsolete". Ben and Cindy laughed. Tom continued: "Still, we have to make the images they print". Paul: "Why did I waste time going to art school?" Cindy reminded the group that she was audio recording. Continuing the sarcasm, Ben said, "Cindy is doing research on why we are bothering to make anything at all. Why are we bothering. When there's a good commercial system out there instead. Why bother". The group then went over to the 3D-printer, but the settings were not correct and the print was a fail. Terry said, "Now what are we going to do with that piece of waste?"

While there are several reasons why the group did not complete a project, the discussions illustrate the varied attempts to establish the relevance of their collective actions; to demonstrate their skills and their commitment to the problem of waste; offer critique but also show a willingness to learn; and work in a mode open to unknown future others with unknown resources. They also showed how members made use of the ethnographer's presence to reflect on the potential of the movement to foster new, empowering and sustainable modes of production.

Broadening out from this illustration, together with activists we too have been exploring, in a 'dirt way', the meaning of digitalisation and its relation to a future in the making. We know that members of the collective 'live' this future; they do not visit it occasionally as middle-class citizens might visit an allotment once a week. The arts collective ebbs and flows in terms of members and activities, but it consistently returns to questions of material flows and power in its cultural programme of

repair events, music performances realised with discarded electronics transformed into instruments, or workshops where reclaimed materials are turned into furniture.

Materialist makers often engage in repair and reuse; it matters how maintenance and repair work are seen, valued and facilitated or even prevented (in planned obsolescence). Even as their activities are accompanied by discussions of global supply chains or critical views on 3D-printers, they are always embedded in experiments with alternative ways to produce. In so consciously choosing what to focus their efforts on, they also extend their understanding and practices, in shared spaces, at festivals and online. In discussions, materialist makers are markedly reluctant to judge things as clearly good or bad (especially when speaking of proprietary software). Nor do they indulge in a rhetoric of progress akin to mainstream sustainability discourses where sustainable innovation becomes part of green cognitive capitalism. Rather, the new tools and technologies are evaluated with regard to their usefulness in understanding, deconstructing and then rebuilding anew the processes by which we make or grow and distribute things: the "de-composition and re-composition of everyday action" (Marres, 2015: 68) that is a hallmark of DIY making. Their collective material experiments are often deliberately incomplete and interoperable, intended to traverse contexts and embed themselves in multi-layered technology landscapes. Many explicitly want to work in vague and open-ended collaboration based on the resources to hand. The dirt-way to sustainability is thus a critique of the present, one that does not cripple action, is not beholden to notions of efficiency, novelty or optimisation, and takes in the dirt and messiness of bodies in their environments.

Groups like Waste-lab do produce reports for funders, which are recognised as official measures of productivity. Yet there is regularly a lack of clarity about aims and even about what is going on. These qualities make the longevity of such groups and the continuity of their efforts worth remarking upon. The knowledge that their openness allows to be incorporated, has partly to do with cultural and other locally contingent factors that influence the extent to which an innovation may or may not reduce unsustainability. In this sense, makerspaces are institutionalising at a small scale what Noel Longhurst (2015) calls alternative milieu, protective spaces or niches where experiments in sustainability flourish due to geographical density and intensity. Longhurst's case is the town of Totnes in South West England, but the dimensions of his alternative milieu concept apply here also, if implicitly: radical politics, new social movements, alternative (institutional) pathways, alternative spiritualities and alternative lifestyles (Longhurst, 2015: 186).

These features were in evidence, for instance in 2015, when a fab lab and innovation festival known as POC21 gathered together over one hundred maker-activists in Millemont, France. Their intention was to prototype their Proof of Concept (POC) open source solutions for a 'fossil free, zero waste society' in anticipation of the United Nations COP21 (Conference of the Parties) assembly. At the end of the seven-week prototyping period, their eco-innovations were put on public display at the Millemont chateau. But it was in the preceding prototyping stage that an intense experience of co-living gave participants an impactful learning experience. Up to one hundred people lived together in the castle creating an eco-village of self-organisation and 'self-sufficiency'. Organisers, inventors and mentors performed all domestic duties alongside materialising their inventions. In practice, this meant teams working on circular, open-source solutions in the temporary fab lab and then pitching them to investors in between keeping the space organised and equipped. It also involved ensuring security (taking turns on night-watch) but also managing the requirements of the human biological 'life cycle' with its meals and dry toilets needing regular emptying and cleaning. When asked about POC21, participants first talked about the co-living experience and only then about the inventions.

These accounts resemble those of long-gone Euro-American back-to-the-land communities and back-to-nature writers, and should thus flag concerns over longevity and exclusivity as well as unanticipated future trajectories (Turner, 2006). Such concerns noted, participating in events like POC21 creates fluid geographies that sustain

longstanding networks of individuals who travel and collaborate across Europe, to host organisations (e.g. OuiShare, Paris and OpenState, Berlin), art and design groups, companies and consultancies, as well as the grassroots Open Source Circular Economy Days. This is itself a fluid network of networks: local materialist groups who come together to stage events supported via online activity. POC21 is for us an example of a typical commitment to sustainable materialism in the context of living and making decisions together. It also demonstrated willingness and ability to showcase this to mainstream audiences. Yet even as it borrowed from corporate innovation processes – mentoring, pitching – the organisers chose a collaborative camp as method, a dirt-way far removed from how mainstream green technology usually gets exhibited.

Such events are performative and therefore political, seeking to draw in new people and trying to get them to *participate* in new socio-material practices themselves. The illustration below is of an art collective that has organised regular transition-oriented peer-learning workshops on skills such as beekeeping. Two of its founding members also run a fab lab and DIYbio lab, where workshops and experiments can be conducted. One member has undertaken 'square metre ecosystem' experiments in the area around the fab lab to study flora and plants' inter-relations as a hands-on and immediate way to understand biodiversity. The following is adapted from fieldnotes.

> A new visitor to the lab has come to try 3D-printing for the first time. He asks Cindy what field she is from and when she says design, he asks if there are companies or processes for automating disassembly the same way the assembly of products is automatised. This gets her thinking, and they discuss current and emerging processes, design-for-remanufacturing opportunities and the supply chains of rare earth metals. The printer is free and the visitor goes to try to print his file. He tries on his own for some time, examining manuals and websites, and eventually goes to ask the volunteer lab manager for help. Soon the two founding members, Maria and Thomas, come in for their evening shift. Maria has brought in two bags of coffee grounds for growing edible mushrooms; the bags are marked with how many days old they are. Cindy wonders in her fieldnotes if Maria has a log book where she writes these down, or if she documents the metre garden boxes in the same way.
>
> She asks Thomas about their last festival. He says the festival and its self-organisation would need a more stable community, with people "stepping in", self-selecting for tasks when necessary without a strict hierarchy, as they currently have in the fab lab. Initially, he explains, there is much enthusiasm for planning, the festival as with any other maker project, that tends to wane, despite best intentions, as other work, family and life commitments begin to intrude. "There's a fairly high (…) turnover, people stepping in and then stepping out again. But some of them will stay. And from these people who stick and stay, slowly, a more powerful community arises, and that's the pattern that I now see, that, in the beginning it's all very vulnerable and you can be doubting whether there's any sense in what you're doing, except that the idea is tempting and also needs a lot of enthusiastic reactions. But still, it's hard to get this done".
>
> We discuss whether they have had any major setbacks. Later Thomas returns to this idea: "Of course, the fab lab, to me, maybe is a bit of an exception because (…) it's not that they experience severe setbacks, but it's more that their development or growth or community development goes through a slower phase. Sometimes there's this spark, this idea. It can be a workshop or a lecture that generates a lot of energy around one topic, and then you have a lot of meetings in a short period of time. That can lead to finding a next step of organising yourself, because it becomes a product or becomes a stage or a festival or a workshop or, could be anything. But something that has a shape of itself and has benefits for all these people involved. Sometimes you get stuck because you get into a hard phase of something that is not working out. And then we become less intense and people drift off and do other things. But most of the time I see this energy like simmering for a while; it could be months or even a few years, but every once in a while you meet these people and you recall, hey, we were working on this idea back then. How's it going? Yeah, it was nice, and maybe we should pick it up again. Then, all of a sudden, something happens. Maybe there is a demand for a product or maybe there is demand for knowledge or maybe there's

a technology development that facilitates some breakthrough. (…) A lot of these things do not have a plan to achieve A, B or C, but it is more a shared energy or a shared value that draws energy and that makes you come together. Sometimes you find a possibility for something, and you go ahead and then it becomes a plan, and sometimes, you all recognise that you should spend your energy differently for an unknown amount of time and until the next impulse".

Later in the evening, Cindy asks directly about sustainability: "What do you see, with this whole fab lab, peer production, maker movement thing spreading quite fast, what are the danger points if we think of sustainability?" Maria replies immediately: "3D-printers producing lots of junk. Ours doesn't produce much useful stuff but also uses PLA,[12] which is not so harmful, but those really big ones with the powder stuff, those are really horrible". Thomas adds: "Also it's not industrial-scale at all and not even household-scale so it's, you know, it is spreading fast but still compared to – maybe we have 250 labs now, well, maybe it will be 2500. Then still it's nothing. As long as they remain rapid prototyping places, you can point out a few things […] that are harmful or could be better, but that's missing the point, really".

Cindy pauses to think about what Thomas thinks *is* the point. After a few seconds she asks: "How do you know when you're going in the right direction?" Maria responds: "You never know. We know we are going in the *wrong* direction, after a while, but, no, we want to be free to try a lot out and not worry too much about the direction. Of course we know where we want to go roughly, but--". Thomas adds: "No, I'm sure there's some indicators. I think, if what you do meets both a lot of enthusiasm *and* a lot of criticism or scepticism, there's something to it that's worth examining. We have had all this discussion about, what's your business model, and this can't work out, this can't be right, it's not serious, and this place is a dump, and the machines that you have produce crap. You know? That's all true, and at the same time, people are completely inspired by all the possibilities that are in the air, and that they breathe in and experience. This is, yeah. It means that at that moment, you enter something that has not been settled yet. So in a sense, that, I would say, is the right direction". Maria continues: "I would say an indication of being in the right direction is that you suddenly get people showing up that are really interested in it and that are also really interesting people. That's one of the indicators. For us it's usually hard to tell what we're doing right to get those people, but sometimes, really nice people just suddenly emerge from I don't know where and start participating in something and that's a nice thing".

Activists' motivations are mixed as these illustrations show, but respond to a need to nourish both ethical and technical competencies, and they identify cognitive-capitalism-as-usual as inferior. What is happening – acknowledging a debt to Mary Douglas' (1966) work on pollution – is something like 'behaviour out of place'. Patiently waiting for serendipity and highlighting interpersonal experience would, in a scientific context, likely be counted as messy and awkward, better discounted or hidden.

Such being out of place, as person, behaviour or material, combines with abstract technical and scientific knowledge, as in this example, from yet another fab lab. The lab is managed by the entrepreneur-owner herself. The researcher was talking to the manager about a locally developed 3D-printing biopolymer filament with potential environmental benefits in terms of biodegradability and its biomass source (potato waste).

The manager explains: "This year we are investigating what the influence of recycling is on the quality of the PLA filament. So they are printing, and then scrapping misprints, and then extruding it again. Since it is interesting to be able to throw it away, but I think it's even more interesting to collect all the prints that have gone wrong and then make new filament out of it". Cindy replies: "I was talking to John in [another fab lab in another part of the country] on Saturday, and he said that some expert had said it can go through basically five processes. And then it just deteriorates too much. In the making of the filament, that is already three processes. So you can basically only try to reuse and recycle it twice more, but if you start from powder, then you can get a few more lifetimes out of it". The manager replied: "We're checking it right now. They're printing all the tensile test parts. And they will tear them apart. Print new ones, tear them apart. Make filament, tear them apart. I'm curious, I think a lot of the quality depends on the

> process, and how you are managing the process of the extrusion. And I think the material will really degrade a lot when you're using the in-home extruders. Or I'm curious how that influences the quality as well".

Similar work in new material development is carried out in universities and industry by people with the same expertise as our industrial design fab lab manager. Operating in an independent lab rather than a corporate environment or university research centre is her choice, and allows her to work with local artists and artisans, who provide different perspectives on and alternative ways to work with the new material, as well as alternative understandings of its environmental implications. They make sculptures of the potato waste filaments and bury them in the fab lab's back yard – to monitor, in a dirt way perhaps, the rate of biodegradability. This appears not to be at odds with her professional work with the filament manufacturer. In conversation, she is quite comfortable expressing her intellectual pursuits as a professional designer who also has an identity as an artist and maker. And both she and Cindy are comfortable in the confusion, which leads to more curiosity for both parties.

This is an example of a frequent experience we recognise where researchers and the researched are feeling their way through partly shared conundrums of modern expertise to reach new insight and better questions. Recent literature suggests in fact that situations proliferate where researchers and interlocutors somehow collaborate on conceptual work (Holmes and Marcus, 2012; Marcus, 2016; Escobar, 2018), and out of this new vocabularies are emerging that are helpful in positioning the activists described above in relation to the social and philosophical underpinnings of mainstream sustainability, ones that materialist makers' practices contest. We have in mind such varied places as innovation studies, environmental humanities and work aligned with the so-called ontological turn, indeed anywhere that researchers are discussing knowledge making as part of practices of consciously designing futures, but in disturbing conditions of likely danger combined with unacknowledged ignorance (Jasanoff, 2016).

Some of these vocabularies are based on a post-enlightenment ontology that considers sustainability scientists to have the most solid possible – if still incomplete – grasp of environmental problems and their dynamics, leading to multiple and, importantly, experimental pathways. Smith et al. (2017) is a typical example. Others (de la Cadena, 2010; Escobar, 2018) posit that the very distinction between environmental/natural and social/human is a European imposition. An illustrative example is given by Marisol de la Cadena (2010), of how human affairs can be affected by an angry mountain whose intentions nevertheless remain unknowable. In contrast to what attentive people in Highland Peru can learn about Earth-beings (angry mountains), mainstream expertise, including sustainability discourses, compromises the ability to learn about the world by ignoring knowledge practices marked 'different'. Recent research (Marres, 2015; Smith TSJ, 2017) also notes how the powers of strange, often unknown agencies, are similarly to the fore in DIY makers' knowledge practices, elicited through experimentalism and imagination. These bring in different collectives, including non-humans, "to find ways of going on in life, failing, and thus altering these ways of going on" (Smith TSJ 2017; 135).

## Discussion: Collaborative confusion and ethnography

In conclusion, we reflect on the suitability of ethnography as a methodology that takes seriously both what people do and what they say about what they are doing. Ethnography may also be a 'dirt way' of studying the 'dirt way' of learning, an epistemologically strong methodology that confronts a messy reality (cf. Fortun, 2014).

Ethnography undoubtedly objectifies, allowing us to speculate on materialist makers' challenge to expertise as imagined today. As ethnographers we could also identify slippages between activist self-reporting and actual practices. Yet whatever else it achieves, ethnographic fieldwork puts two sites and their preoccupations in relation to each other (Strathern, 1999; Holmes and Marcus, 2012). Through the illustrations above, we have sought to capture situations where knowledge and ignorance jostle against each other, and

where spoken ideas are sometimes only barely grasped while countless other interesting things may be happening as well. Such situations are typical of social movement gatherings (Jasper, 2016). In fab labs, as she seeks to make sense of activists' change making efforts, the ethnographer participates in local confusion – over values and the definitions of sustainability – but also about what constitutes useful knowledge and for whom, or about how one might define time wasting. She learns in an embodied and thus also ethical way (Gibson-Graham, 2008), allowing her to rise to the challenge, as Kim Fortun (2014: 309) has put it, of how to live in "a world still gripped by industrial order yet also beyond it, technically, ecologically, conceptually".

Fortun's concern there is academic debate on ontology, Bruno Latour's AIME project specifically, a conversation that still leaves so much of real importance 'off the radar' (Fortun, 2014: 310). In her critique of new vocabularies for narrating the troubled present, she also notes that "what can't be articulated isn't flagged … a presumption that the habits of mind, language, and politics present to us today can themselves produce a different future" (Fortun, 2014: 315). Fortun's article does not feature the word 'expert', but her work is relevant not least because it demands honesty about what kinds of mess are problematic, for whom and for what reasons. In particular it points out how truths are created and defended in corporate labs and strategy rooms, "which link all too easily to regulatory science panels, which end up licencing hazards" (Fortun, 2014: 320). The epistemological grounds for such licencing, like getting caught up in industry-fuelled innovation trends (Mitcham, 1997), have never been strong. And this licencing shapes everyday life and planetary futures. Spaces of materialist activism foster knowledge practices and expertise that do not yield to this, nor to treating alternatives as mere utopian fantasy.

Maker knowledge practices echo aims towards the 'socially robust' knowledge of the science policy discourse discussed above, with participation by a range of stakeholders. However, freed of the demand for problem solving and its links to cognitive capitalism, makers are also freed of epistemologically dubious (if commercially or politically expedient) requirements such as fitting in with existing incumbent regimes. They may even pursue paths strewn with ontological conundrums. Some of these may come from genuinely perplexing situations; some are historically produced consequences of habits of mind.

Building on what Marilyn Strathern (1999) has called the ethnographic moment, we have explored these options in shared activities and intense conversations with makers. The ethnographic moment refers to the overlapping but divergent questions of researchers and activists that themselves sometimes foster confusion, but the process also provokes sharper reflection. It helps prevent the collapse of knowledge claims into information overload or neoliberal nonchalance. As ethnographic knowledge emerges in the travel from human problems in the research field – in Strathern's case in the cultures of Papua New Guinea – to human problems generated in academic discourse, we are (or should be) alert to the possibility of different and possibly incommensurate criteria of intelligibility and value. Yet, as Strathern writes in the context of interdisciplinarity, each encounter "points to a fresh encounter in a terrain only uncertainly mapped. It is the obviousness of the uncertainty that is important here. The constant shortfall of knowledge that never gets beyond recognition spaces holds out the hope that one can always re-engage" (Strathern, 2006: 203).

In Strathern's (2006: 198) analysis, uncertainty keeps management (the search for a specifiable outcome, a closing down) at bay, and orients us instead to the proliferation of possibilities. Uncertainty can, as we indicated, also be an excuse for inaction, but maker communities, as we have also indicated, are motivated by a need for serious change. Furthermore, they are sustained in engagements pursued with scholars and others beyond, who are trained to problematise the social structural, political economic, micro-political, socio-material and techno-ecological and other discernible conditions that impinge on maker communities – as they impinge on all of us.

If expertise-as-usual is in trouble as it tries unsuccessfully to balance between a fictional appearance as 'pure' on one hand and the pragmatic need to acknowledge uncertainty and multiple entanglements on the other, one

widespread result is that the trustworthiness of experts has suffered. Expertise within maker-spaces is concerned with much more than problem-solving but qualifies as expertise in creating meaningful simplifications (Åkerman, 2016). Maker activists should thus be framed as experts, not 'outsiders', 'lay' or 'citizen' critics, but continuous with epistemic practices beyond. As they also indulge myriad varieties of 'dirt' that the inquisitive human – body, mind, history and expectations all together – can profitably draw upon, maker-activist communities also foster a particular confidence based on knowing that they are learning, that they are self-organising and that working this way is something they have to figure out. It confuses at times and can seem to undermine itself and the hoped-for future, as the passages above illustrate. But in bothering to continue, they have learned to identify what and who they need to realise a project, how to work within limits, how to deal with what emerges and things that just happen, and, importantly, to identify what they do not want. Makers' expertise is developed collectively, as people converge on ideas worth pursuing that emerge with their own 'shape'; the way new forms of knowledge, symbols and practices emerge and gain traction here, is by collectives of makers experimenting with those ideas and materials in the dirt-way.

Indulging confusion collaboratively, through listening, experimental making and situated humour, leads ultimately to change, of people, processes and things. Whether we call this the dirt-way or something else, makers at least implicitly value it. We see it as something that should be recognised and valorised by academic researchers as well.

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## Notes

1 Having worked together as academics and activists, we started to compare our experiences of ethnographic work with environmental social movements. Kohtala was fixing her data into a doctoral thesis. Berglund's work with environmentalists focussing on their complicated loyalty to tenets of modern science, goes back over 25 years.

2 We would like to extend our grateful thanks to the many people whose work has inspired us and this paper.

3 The concept of 'Adhocism' as a term arising from architectural criticism and popularised in the 1970s by Jencks and Silver (2013 [1972]) is also relevant here.

4 They certainly invite critical social and political analysis, but given their potential role in expanding collective imaginations, we follow Gibson-Graham (2008) in avoiding critical and judgmental framings of their experiments.

5 Note that *de war* in Dutch means 'confused' (Hielscher et al., 2015).

6 Endocrine disrupting chemicals are a paradigm case (Honkela et al., 2014).

7 A search for 'wind turbine' in Thingiverse, an online repository for designs for additive manufacturing (i.e. 3D-printing) on 8 February 2017, garnered 251 results.

8 Even in the field sciences that are most relevant to environmentalism, expertise operates heuristically while its authority remains tied to notions of laboratory-style procedure (Yearley, 2005).

9 Names have been changed. Descriptions are based on fieldnotes and quotations are taken from full transcriptions of audio recordings.

10 Names have been changed.

11 Do-It-With-Others, DIWO, is used in some maker communities to contrast with Do-It-Yourself, DIY.

12 Polylactic acid, a biopolymer.

# From Barracks to Garden Cities
## The Finnish Population and Family Welfare League as a Housing Policy Expert in the 1940s and 1950s

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## Abstract

This article examines how Väestöliitto, the Finnish Population and Family Welfare League, developed into a housing policy expert during the 1940s and 1950s. Through frame analysis, I outline how Väestöliitto constructed urbanisation and 'barrack cities', i.e. an urban, tenement-based environment, as a social problem and how, respectively, it framed 'garden cities' as a solution. In the 1940s, Väestöliitto promoted a national body for centralised housing policy and national planning. When the ARAVA laws (1949) turned out to be a mere financing system, Väestöliitto harnessed its expertise into more concrete action. In 1951, together with five other NGOs, Väestöliitto founded the Housing Foundation and embarked on a project for constructing a model city. This garden city became the residential suburb Tapiola. This marked a paradigm shift in Finnish town planning and housing policy, which had until then lacked a holistic and systematic approach. Along the 1940s–1950s, Väestöliitto thus constructed and developed its expertise from an influential interest organisation to a concrete housing policy actor.

**Keywords**: housing policy, town planning, urban history, garden city, expertise, non-governmental organisations

## Introduction

The Second World War was not merciful towards Finland. The country fought against the Soviet Union in two wars (the Winter War 1939–40 and the Continuation War 1941–44) and ended up as one of the losing parties of WWII. The Soviet Union annexed large areas from Karelia and northern Finland, which left over 400,000 evacuees without housing or land. In the period immediately following the war, the focus in regard to housing was on arranging settlements for the (mostly Karelian) evacuees and war veterans. However, it was not the only housing issue that was being noticed and raised.

Väestöliitto, or the Finnish Population and Family Welfare League (due to the long English name, I will use the Finnish name in this article), was founded in 1941. Its purpose was to act as an umbrella organisation for associations involved in population policy. It was a pronatalist organisation that sought to elevate the number and quality of the population. According to Väestöliitto, this was the solution for preventing an unfavourable population growth that would exacerbate the vulnerable geopolitical situation of Finland.

In the very beginning of its activities, Väestöliitto primarily concentrated on the 'popula-

tion question'. However, housing soon became another central topic. During the 1940s and 1950s, Väestöliitto established a role as a housing policy expert, and it was one of the founders behind Asuntosäätiö, the Housing Foundation. The foundation, for its part, was the agency behind the renowned 'garden city' of Tapiola, built in the outskirts of Finland's capital, Helsinki, in the early 1950s. In this paper, I study how Väestöliitto identified and defined housing-related matters as social problems that needed to be solved, what it labelled as the underlying causes, and how it sought to address these problems. I also study Väestöliitto as an expert: how it built, developed and exercised its role as a housing policy expert.

## Study subject: Väestöliitto

During the research period of this study, the core objective of Väestöliitto was to elevate the number and quality of the population. Its members included social and health policy organisations and politically engaged associations, both left- and right-wing, the latter often with a nationalist stance. Yet, several of Väestöliitto's board members and executive managers were affiliated with nationalist organisations and/or centre-right parties like the Agrarian League or the National Coalition Party. Väestöliitto is thus primarily to be regarded as a centre-right organisation. In addition, it engaged in close governmental collaboration, and its board included two representatives of the Ministry of Social Affairs.

Väestöliitto's executive managers and board members (whom I refer to when speaking of 'Väestöliitto') consisted of various professionals. V. J. Sukselainen, one of the people behind the establishment of Väestöliitto and its long-standing chair (1941–1971), was trained in sociology and economics. In addition, he was a politician: he was the leader of the Agrarian League (renamed the Centre Party in 1965) 1945–1964 and acted twice as Prime Minister, among others. Long-standing (1943–1965) executive manager Heikki von Hertzen was a Master of Law. In addition, he was a notable figure within Finnish housing policy, and acted as the chair of the Finnish Housing Foundation 1951–1976.

Other important figures in Väestöliitto during the 1940s and 1950s included, among others, vice chairs Aarno Turunen and Elsa Enäjärvi-Haavio. Turunen was a professor in gynaecology and obstetrics, and he was one of the people behind the blood service of the Finnish Red Cross. Enäjärvi-Haavio was the first Finnish woman to obtain a doctoral degree in folkloristics as well as the first female adjunct professor of the discipline. She was affiliated with the National Coalition Party, and she was actively involved in the Finnish voluntary sector and cultural policy. Within Väestöliitto, she was the prime figure behind its home aid activities.

## Research questions and material

In this paper, I answer the following research questions: How did housing policy become an important theme for Väestöliitto? What were the phenomena that the actors of Väestöliitto perceived as problematic, and how did the association wish to address these issues through housing policy? Indeed – what formed the core of Väestöliitto's housing policy and strategy?

In 1949, ARAVA, the state's agency that provided subsidised financing for rental housing construction, was founded – a process in which Väestöliitto had a prominent role. How did the ARAVA system reflect Väestöliitto's housing policy principles and objectives? What was it not satisfied with and why?

Why did Väestöliitto establish the Housing Foundation? Why did it embark on a garden city housing project, which became one of the most iconic suburbs of Finland, Tapiola? From the perspective of Väestöliitto, how were these to address the issues the association had defined as housing problem?

The research period thus encompasses the 1940s and early 1950s, ending at the laying of the foundation stone of Tapiola and an analysis of what Tapiola symbolised for Väestöliitto.

The source material of this study consists of Väestöliitto's minute books, action plans, annual reports, programmes, researches and other material, both published and unpublished. See Appendix 1 for a complete list of archival sources referred to in this article. I will also utilise the journal *Asuntopolitiikka* (referred to as *Housing Policy* hereinafter), which was published by Väestöliitto, more precisely its Housing Policy

Office (*asuntoasiaintoimisto*), since 1950. The journal served as a channel for vocalising and distributing the organisation's views on housing policy. For referencing purposes, Väestöliitto's Housing Policy Office is used as the author of anonymous works in *Housing Policy*.

A matter closely linked with housing policy is national planning, which also takes rural areas and their socio-economic viability into account. This topic was also acknowledged in Väestöliitto. In 1955, it began publishing a journal dedicated to the matter, *Valtakunnansuunnittelu* (*National Planning*), in addition to *Housing Policy*. However, in the 1940s and early 1950s, the focus of Väestöliitto was on urban housing policy, which is also the focus of this article.

## Methodology: Social problems and expertise as constructive processes

In my analysis, I draw upon a combination of methods. The constructionist analysis of social problems, in accordance with Malcolm Spector and John Kitsuse (2009), problematises the problem nature of phenomena perceived as social problems. It does thus not focus on social problems per se, but rather on the processes through which phenomena are identified, defined and represented as social problems – i.e. how phenomena are constructed as social problems – and on the actors conducting these processes. (Spector and Kitsuse, 2009.)

As a systematic and structuring tool, I apply frame analysis as formulated by Robert Benford and David Snow (2000). It deals with social problems in a similar way as Spector and Kitsuse (2009). Frames are sets of beliefs and purposes through which actors perceive, interpret and label phenomena in the surrounding reality. Benford and Snow (2000: 614–618, 623–624) have outlined three core framing tasks: 'diagnostic framing' – the process of identifying problems and the entities and reasons the problems can be attributed to; 'prognostic framing' – finding solutions and strategies for problem-solving; and 'motivational framing' – the final thrust for mobilisation, seeking either consensus or action. In addition, framing has an interactive, discursive feature: frames are defined or articulated as well as amplified through specific discourses.

My analytical understanding of power is Foucauldian. According to Foucault (1995, 1980), power is ubiquitous; it is thus not merely a form of dominance or exploitation, but it is produced everywhere and penetrates everything. Foucault ties power, knowledge and truth intrinsically together. All societies have their own regime of truth, and intellectual political struggles are essentially tied to this truth. In this context, 'truth' does not refer to what is or is not true; it refers to the status of truth – who has the power to determine how truth is evaluated, and what its political and economic role is. (Foucault, 1995: 194; Foucault, 1980: 119, 131–132.)

Together, these approaches form a method for identifying and analysing the ways through which the actors construct specific phenomena as social problems. Since the studied actors are associations specialised in various social policy issues, such problem-defining is closely interlinked with their expertise. In other words, expert organisations develop and solidify their expertise and expert role by constructing and addressing social problems.

## Previous research

The history of housing policy in Finland has been studied by several researchers from diverse fields and various perspectives.

Antti Palomäki (2011) has studied the resettling of the Karelian evacuees and war veterans in 1940–1960 and its impact on Finnish housing policy. The resettlement process, in which land was given to the evacuees and war veterans in accordance with the Land Acquisition Act (396/1945), was a land reform of magnificent scope: family members included, it had an impact on the lives of 700,000 Finns (of a population of four million), and by 1949, almost all resettled Karelians had received their plots. Like many other, Palomäki (2011) notes that the resettlement process significantly deferred and complicated the urbanisation process in Finland. Construction primarily took place in the countryside, and since new farms were formed by dividing old farms, this more or less abolished big land ownership and replaced it with a large number of small farms. Eventually, this proved to be unsustainable; urbanisation

finally took place in the 1960s, and thousands of small farms were abandoned.

Contrary to many other studies, Palomäki (2011) argues that in the long run, the most viable and sustainable residential areas in accordance with the Land Acquisition Act were constructed, paradoxically, in cities and towns. While the law initially sought to secure land for housing and farming for evacuees and war veterans, urbanisation was already slowly underway. War veterans wanted to settle in their home towns with their families, which put unprecedented pressure on land and housing policy in cities and towns, thereby also eventually complicating the urbanisation process. However, the Land Acquisition Act also led to entire new neighbourhoods being constructed, e.g., in cities like Helsinki and Lahti.

Housing shortage and substandard housing was a severe problem in 1940s Helsinki. Antti Malinen (2014) has studied how families coped with poor housing conditions in 1944–1948. During this time period, the population of Helsinki increased from 262,000 to 290,000, but, as also noted by Palomäki (2011), housing efforts were concentrated in rural Finland. In 1940–1949, a mere 10,600 apartments were constructed, which meant that nearly 28,000 people had to find their place in the existing dwelling stock, which led to severe overpopulation and deteriorating housing conditions. As his key argument, Malinen (2014) notes that the families' success with adjusting to these demanding conditions partially determined how families were able to cope with other, war-related challenges and changes. The longer the families had to wait for adequate housing, the more their emotional and other resources were exhausted. Parents feared not only for their relationships, but also the health of their children.

In her seminal dissertation *Model Houses for Model Families*, Kirsi Saarikangas (1993) has studied the architectural typologies, ideological arguments and cultural and gendered signifying processes regarding the standardised one-family type-planned houses in Finland. The type-planned houses, applicable to rural as well as semi-urban environments, were the standard solution during the post-war reconstruction period. Saarikangas (1993) argues that the type-planned houses served as a tool for creating and normalising biocultural differences; they were architectural representations of the middle-class, gendered nuclear family.

Saarikangas (1993) and Palomäki (2011) note the so-called home cult and its impact on Finnish housing policy. The home cult glorified womanhood and motherhood, and it connected family and population policy, antiurbanist and bourgeois ideology, and town planning and housing policy. In accordance with pronatalist population policy, housing policy was to cater to families with children and encourage procreation; respectively, poor housing conditions were seen as discouraging reproduction and exposing children to health and moral risks, among others. In general, urban environments and tenements were seen as detrimental to health and morals, and children and young were particularly vulnerable. Instead, single-family houses, agrarian or green environments and the nuclear family were seen as the ideal combination for raising new, large and healthy generations.

Johanna Hankonen's doctoral dissertation in architecture (1994) has become somewhat of a classic within the field of community and town planning. With a sociological approach, she studies the birth and development of suburbia in Finland. Her focus is on the 1960s and early 1970s, during which Finland was undergoing a broad change process; urbanisation was extremely rapid, and the economic structure of the country developed from agribusiness to service industry. In her dissertation, Hankonen (1994) demonstrates how the idea of efficiency emerged and developed within this historical and societal context and was combined with the construction of suburbia in order to manage the urban–rural migration. Hankonen (1994) discusses Tapiola as the first suburb of Finland, which for its part marked a paradigm shift in Finnish housing and town planning, which until the 1940s had been fragmented and lacked a holistic approach.

Mika Pantzar (2013) has written an article on the garden city Tapiola from the perspective of consumer research. He studies the idea and the construction of Tapiola as a means of managing forthcoming affluence (excessive consumption and urban sprawl) in post-war Finland, which he argues was "more utopian dream than any kind

of reality" (Pantzar, 2013: 11). Social progress was viewed as inevitable, and Tapiola was seen as a tool for restricting the wrong kind of growth. It was constructed as a garden city, anti-urban, anti-consumerist and anti-individualistic, but ironically, by the 1970s, it had followed the overall trajectory of Finland and transformed to an urban, consumerist and individualistic community that relied heavily on private transport.

In *Practicing Utopia* (2016), Rosemary Wakeman studies the twentieth-century 'new town' movement from an intellectual history perspective. She approaches the movement, rooted in the British garden city movement of the late nineteenth–early twentieth century, as a global phenomenon of optimistic plans and ideas. One of her case studies is Tapiola, which she pairs with the Swedish town Vällingby as examples of the 'Scandinavian model'. She argues that they were perceived as "spellbinding visions of modern living" and turned out to be more successful than their British counterparts (Wakeman, 2016: 85).

All of the above-mentioned studies have studied housing policy and Tapiola with different approaches. They provide a comprehensive and analytical historical picture of the social and gendered frames and processes that were involved in the housing policy development in post-war Finland. My research contributes to the discussion from yet another perspective. Housing policy or Tapiola are not my research topics per se, but rather a means through which I study the processes through which Väestöliitto constructed housing as a social problem. Moreover, it serves as a tool for analysing how Väestöliitto developed its own expertise in the matter, thus highlighting how also expertise and knowledge are socially constructed.

## "Save the children from barracks" – framing the housing problem

In the 1940s, Swedish architects, planners and social reformers engaged in an interdisciplinary discussion about furthering the Social Democratic 'people's home' (*folkhemmet*) ideal through architecture and urban planning. The discussion had a gendered tone, following the ideas of Alva Myrdal, whose population policy ideas portrayed collective housing as a means to emancipate working women from domestic work and childrearing. (Wakeman, 2016.)

Väestöliitto followed the Swedish population and social policy discussion closely and linked population policy and housing policy intrinsically together in a similar vein. However, the organisation did not advocate a Social Democratic welfare state agenda (cf. Wakeman, 2016), but used Myrdalian population policy models for furthering bourgeois-conservative family and gender models (Bergenheim, 2017). Respectively, in its housing policy agenda, it embraced and propagated the home cult (Saarikangas, 1993; Palomäki, 2011) and linked population policy and housing policy intrinsically together. The home was seen as elementary for socially, morally and physically healthy, happy and procreating families, and Väestöliitto celebrated motherhood as the most important role and duty of the woman.

In line with this perspective, the very first programme of Väestöliitto (1942) featured a section dedicated to the 'housing question' (Väestöliitto, 1942: 22). Before I proceed to its content, I wish to draw attention to the wording. Labelling something as a 'question' – for instance, the 'population question' or the 'housing question' – was a rhetorical tool for politicising and depoliticising. Formulating a phenomenon as a 'question' drew attention to the issue and called for action, thereby politicising it. But more importantly, it was a specific and uncontested representation of the issue and how it should be solved. The problem nature of the phenomenon and its outcomes were portrayed as inevitable, and the given solutions, for their part, as the only alternative, thereby depoliticising the issue. (Definitions derived from Kettunen, 2008.) The 'question' representation was thus a form of diagnostic and prognostic framing: it identified the causes of the problem and provided strategies for addressing the issue.

Initially, the housing question concentrated on two aspects of housing. Firstly, since rental housing was the most common form of residency in population centres (cities and towns), it should be placed under the control of the society. Secondly, families with children were having difficulties finding apartments, whereas Väestöliitto

saw that they should, on the contrary, be prioritised in procurement of housing. (Väestöliitto, 1942: 22; VL 9.6.1942, Appendix 4.) After the war, the resettlement of the evacuees from the Soviet-annexed areas was an acute housing issue (VL Action Plan 1945; VL Action Plan 1946; Väestöliitto, 1946: 101–102). The visions of prioritising families with children were indeed realised in the Land Acquisition Act. In addition to giving evacuees priority, it included a familial condition for war veterans, which placed single war veterans in a significantly disadvantaged position. (Palomäki, 2011: 455–456.)

As in many other countries, the building industry was more or less paralysed in Finland during and immediately after the war; there was a severe shortage of both work force and building material. However, this did not leave Väestöliitto idle in the matter. Instead, it advocated making use of the mandatory pause and studying what should and could be done once the war ended. In 1942, it set up a committee for planning a housing programme. Väestöliitto's chair V. J. Sukselainen acted as the chair of the committee, and the three other members were board member Elsa Enäjärvi-Haavio and architects Ole Gripenberg and Jussi Lappi-Seppälä. Sukselainen had been interested in housing matters already in the 1920s. During the 1930s, he advocated a system similar to the Swedish rental housing cooperative Hyresgästernas Sparkasse och Byggnadsförening (HSB) for solving urban housing problems, i.e., housing shortage and the expensiveness of housing construction in Finland. (Perttula, 2010: 308–309.) Enäjärvi-Haavio was replaced by Heikki von Hertzen in 1943 when he joined Väestöliitto as its executive manager (VL 6.11.1942; VL Annual Report 1942). Before Väestöliitto, legally trained von Hertzen had worked as a bank manager. Yet, housing policy was a great passion of his, and he actively participated in the housing activities of Väestöliitto from the very start of his career in the association. Sukselainen and von Hertzen soon formed Väestöliitto's 'dynamic duo' of housing policy.

According to Väestöliitto's annual report of 1942, the housing policy committee was to avoid "the mistakes in housing policy that have been previously made in regard to population policy" (VL Annual Report 1942: 16). What these mistakes were, exactly, are not defined in the minute books or annual reports. However, drawing from the general viewpoints and framings of Väestöliitto, the mistakes probably referred to the neglect of a holistic and anti-urban approach that connected housing, population and family policy. According to the association, a pronatalist population and family policy should be intertwined with and promoted through housing policy and national planning that favoured the nuclear family as well as hampered detrimental urbanisation.

The committee finalised its report and programme during 1943 in collaboration with the housing policy experts of larger cities, building construction experts, architects and labour market organisations. The contribution of Otto-Iivari Meurman, architect and professor of town planning, was given a special mention in Väestöliitto's annual report 1943. (Väestöliitto, 1944: 13–14.) Unfortunately, neither the committee report nor the final programme were found in Väestöliitto's archive, but it can be assumed that the committee's work laid the foundation for the association's housing policy and that the later statements of Väestöliitto reflect the viewpoints of the committee.

After the war, it was time for lobbying – or propaganda, as it was called at the time. In its action plans for 1945 and 1946, Väestöliitto states that it was to perform "strong propaganda in order to guide urban building and town planning into a socially and population policy-wise healthy direction" (VL Action Plan 1945). Propaganda was thus a part of the prognostic and motivational framing of Väestöliitto: in order to address the problem of 'unhealthy housing policy', it sought to formulate a model for ideal and healthy housing policy and to get decision-makers to adopt these ideas.

In 1946, Väestöliitto states that "the housing question has a fundamental societal and population policy-related meaning", which was why the organisation had to monitor and assure that population policy aspects were taken into account in town planning and building activities (VL Action Plan 1946). At the time, cities and municipalities did not impose strict town planning requirements (rural municipalities did not require any town

planning), which together with the post-war resettlement programme and acute housing shortage led to randomly scattered small-town districts in the outskirts of towns (Sundman, 1991: 98–99).

In 1945, Heikki von Hertzen was commissioned by Väestöliitto to compose an illustrated pamphlet on housing policy, in which he consulted Meurman and housing policy expert Yrjö Harvia, in particular (VL 20.12.1945; von Hertzen, 1946: 3). The booklet, entitled *Koti vaiko kasarmi lapsillemme*, or *Homes or Barracks for Our Children* as I will refer to it hereinafter, was published in 1946 and was distributed to various decision-makers on both municipal and national level (von Hertzen, 1946: 3).

*Homes or Barracks for Our Children* crystallises what Väestöliitto strived to promote and achieve within Finnish housing policy. The booklet is, cover to cover, a splendid demonstration of an attempt to construct a phenomenon as a social problem through rhetoric and images. To such a degree, even, that it is difficult to select just a few illustrating examples – von Hertzen certainly did not make any efforts to curb his pathos in the pamphlet.

In the foreword, von Hertzen states that Väestöliitto sought to

> blow the initial fanfare in the crucial fight for a higher living culture that now must begin. Our heart's desire is that the onslaught now gains momentum and will not stop until the goal – "only fine dwellings, only beautiful, open residential areas" – has been reached. (Von Hertzen, 1946: 3.)

*Homes or Barracks for Our Children* claims to speak on behalf of all people in need of apartments, with a wish list at the end of the booklet. According to the list, people no longer wanted to live in 'barrack cities', but wished that the new areas to be built would be park and garden cities, and that old areas would be updated to better conform with modern-day requirements. At its worst, the 'barrack city' referred to urban concrete- and tarmac-ridden environments with high tenements and little to no green areas. It could also refer to more rural areas and lower buildings; the common feature was the lack of greenness and the monotony of buildings. Detached and terrace houses were the preferred types of houses, and tenements higher than four floors were not to be built at all. The tenements that were to be built as residence buildings should be placed away from the city streets, into the middle of nature, "to an open and freely sculptured environment". (Von Hertzen, 1946: 78.)

The booklet ends with the claim:

> WE WANT HOMES – NOT BARRACKS – FOR US AND OUR CHILDREN.
>
> Let our demand ring in the ears of those whom we have selected as the representatives of ourselves and our interests in the governing bodies of cities and boroughs. Let the year 1946 mark the turning point in our country's housing policy. (Von Hertzen, 1946: 79.)

The booklet goes into detail both in words and pictures in describing and explaining the differences between 'healthy' and 'unhealthy' housing. In the section dealing with the "social" and "societal and population policy-related" impact of the "housing question", von Hertzen argues how poor housing conditions lead to an array of "social diseases", such as crime, low morale, alcoholism, poor public health, broken homes and difficult problems among children and the young. (Von Hertzen, 1946: 5–7.) The illustrations support the written message: the pictures represent toddlers in a narrow cul-de-sac, youngsters smoking cigarettes, a factory hall, female typewriters, hard-studying pupils and a café – all signs of an unhealthy environment according to the captions:

> Sooner or later, they will all become robots, unless society sees to that they have a home, where they can completely disengage themselves from life's hurries, unwind and refresh themselves in the proximity of nature, to dedicate a moment for their families and hobbies, and to gather new strength.
>
> Yet, this cannot be offered by the modern barrack city. Only cafés, movies and tarmac streets… (Von Hertzen, 1946: 7.)

The pamphlet features several illustrations of various 'barrack cities', with captions that emphasise their detrimental nature.

> Storehouse or human dwelling – not much of a difference in atmosphere! – We have plenty of such urban landscape. They are telling of neglected opportunities, incompetent municipal politics and the lack of creative cultural will. (Von Hertzen, 1946: 11.)

> Like a city of the dead. No wonder children disappear from here. (Von Hertzen, 1946: 23.)

Von Hertzen does not even shun references to the newly ended Second World War:

> A concentration camp? – No, but one of the newest residential areas in Finland, completed as late as 1943. A textbook example of how utterly important town planning factors are for the sculpting of residential areas. (Von Hertzen, 1946: 33.)

The booklet portrays garden cities as a complete opposite to barrack cities. The garden city movement originated in Britain in the early twentieth century, and the term was coined by Ebenezer Howard in his book *Garden Cities of To-Morrow* (1902). Like many of his contemporaries, Howard expressed concern about rapidly progressing urbanisation, which resulted in slums and aggravated social inequality. As a solution, he presented garden cities: self-sufficient planned communities of 32,000 inhabitants, which were run as cooperatives. The garden city coupled nature, agriculture and modern living, and it catered to the needs of individuals as well as the community. Howard's garden city was more than urban planning; it was a socialist utopian plan for social reform and equality. (Wakeman, 2016; Fishman, 2016.)

However, *Homes or Barracks for Our Children* does not make references to the British roots, but instead takes note of American influences, such as Lewis Mumford. He was a notable figure in the Regional Planning Association of America (RPAA), a left-leaning organisation that promoted progressive planning and social reform ideas. Mumford articulated his ideas of communitarian regionalism in his book *The Culture of Cities* (1938), and his visions were also depicted in the documentary *The City* (1939), produced for New York World's Fair's exhibit City of Tomorrow. (Wakeman, 2016.) Von Hertzen had seen the film at the fair, and it had made a profound impression on him (von Hertzen, 1946).

In contrast to the pictures illustrating 'unhealthy' urban living, *Homes or Barracks for Our Children* features several photographs of young children playing outside in vast, green environments. The captions emphasise how this is the best and most natural environment for children:

> The children's world. (Von Hertzen, 1946: 16.)

> The garden city allows children to grow up and develop into bright, free and natural [individuals]. The sons and daughters of dark back yards, on the other hand, often bring about worry and trouble for the society. (Von Hertzen, 1946: 18.)

> Someone who gets to enjoy life… (Von Hertzen, 1946: 19.)

In other words, urban environments, or 'barrack cities', were explicitly depicted as unsuitable for children; grim places that fostered unhealthy development and did not allow children to lead a happy life. Garden cities, on the other hand, were better environments for children and adults alike:

> It certainly is a whole other story to spend time [gardening] rather than being caged inside four walls in a stone barrack, where one's existence might be further sweetened by quarrelling neighbours or the din of the traffic from the street. (Von Hertzen, 1946: 17.)

While von Hertzen claims that "we do not know how to build cities" (von Hertzen, 1946: 29), he has found quite a few examples of ideal residential areas both abroad and within the Finnish borders. He presents several cases from Sweden: a tenement area in Stockholm, the open-air town in Malmö and Guldheden in Gothenburg; and the United States: Radburn, New Jersey, and Greenbelt, Maryland. (Von Hertzen, 1946: 48–65.) Radburn was a test case planned by the RPAA in 1928. Greenbelt, which was featured in the film *The City*, was a garden city constructed under the auspices of the New Deal Resettlement Administration. The initial aspiration of the programme's administrator, Rexford Tugwell, was to build 3,000 greenbelt towns, but the plan ultimately fell short due to the Americans' suspicions towards government interventionism. (Wakeman, 2016.)

While Guldheden "does not deserve to be entitled an ideal residential area" due to its high tenements, von Hertzen pays attention to the collective facilities, which were designed to ease the housekeeping burden of women (von Hertzen, 1946: 60). Considering how domestic appliances such as washing machines and refrigerators were still practically unknown or at least extremely rare in Finland at that time (even running water was considered a luxury in several areas in Helsinki), Guldheden, its equipment and its idea of rationalisation stand out as very modern and innovative. Indeed, once the development reached Finland, it marked a paradigm change in Finnish consumption culture (Pantzar, 2013: 21–23).

As noted earlier, Alva Myrdal saw collective housing as a way to emancipate women: domestic appliances freed women's resources from housekeeping to, e.g., waged work (Wakeman, 2016). Väestöliitto, on the other hand, propagated the home cult. In this framing, collective housing was not an emancipating measure, but a part of pronatalist population policy. It was a means to make the bourgeois nuclear family model attractive and achievable, and thereby to encourage procreation.

Through *Homes or Barracks for Our Children*, von Hertzen established a distinct portrait of wanted and unwanted housing development for Finland. The play with images and associations is encapsulated in the booklet's covers. The front cover features a colour painting with nature, detached houses and low tenements, children playing along a dirt road, with factory pipes looming in the faraway distance. As a contrast, the front cover features a black and white photograph of a concrete inner yard surrounded by high tenements. The back cover portrays a young couple with three small children watching over a small town or district, with low tenements, its own bay, large green areas, and again with factories far away. The picture is finished off with a large, beaming sun.

In short, *Homes or Barracks for Our Children* does not leave much to the imagination in regard to what Heikki von Hertzen and Väestöliitto perceived as favourable and less favourable housing policy, and what a 'harmful' housing policy would lead to. The pamphlet thus served the role of both diagnostic and prognostic framing. It represented urban environments as unhealthy and detrimental and as the source of various 'social diseases'. Respectively, the booklet represented, in a wholly unproblematised manner, garden cities as the antidote and the 'natural way' that would, in line with the home cult, produce healthy individuals for a healthy society.

## Promoting a centralised and competent housing policy body

As noted above, the committee set in 1942 sought to formulate a housing policy programme. Considering how meticulously the committee consulted numerous parties engaged in social and housing policy in drafting its report, it is probable that the final programme was to be distributed broadly in order to have a profound impact on national level.

As procurement of housing got going after the war, it provided quantitative information on the demand for housing. This, in turn, put more flesh on the bones of Väestöliitto's claim that a specific housing policy programme was needed urgently. (Väestöliitto, 1946: 102.) In September 1947, the board discussed the "extremely critical situation in regard to the housing question" and concluded that the government's actions were needed in order to solve the situation. The board established a specific division under its Housing Policy Office, to whom it delegated the task of furthering means for addressing the housing question. (VL 3.9.1947.)

In its action plan for 1948, Väestöliitto concluded how the housing question, which had a central role in population policy, had become increasingly severe; it was alarmed by how housing production had almost died down. It criticised heavily that housing policy planning was completely paralysed, even though planning work should have been a focal point of attention and was not dependant on material supply. (VL Action Plan, 1948: 2.) In its draft for the action plan, Väestöliitto expressed particular concern about the lack of a governing body:

> One of the worst flaws is that the country has no competent and centralised housing policy management whatsoever, neither a body that would control and develop this economically important field of social policy. Quite the chaos

> prevails. […] It has been 3.5 years since the truce agreement, but the government still has no kind of housing production programme. (VL 2.3.1948, Appendix 4.)

In the plan's final form, Väestöliitto toned down the criticism somewhat, leaving out the accusations of incompetence and by just stating that no housing production programme existed (instead of "no kind of"). It also removed the differentiation between housing policy management and a housing policy body, which would have implied two separate actors. Instead, it emphasised how a body should immediately be established for "comprehensively" managing and developing housing policy, instead of scattering housing policy issues around various ministries. Väestöliitto gave itself the task of furthering this goal by drawing the attention of the government, the parliament and the general public to the matter. (VL 2.3.1948, Appendix 4.) It is slightly unclear why Väestöliitto wished to tone down its statement, considering how it had not refrained from dramatic expressions and representations earlier, e.g. in *Homes or Barracks for Our Children*. Since the changes were made in the annual meeting, which also representatives of the member associations of Väestöliitto attended, one interpretation is that the board of Väestöliitto was more confrontational in its approach compared to some of the member associations. The minutes do not reveal by whom the changes to the action plan were proposed.

In spring 1948, Väestöliitto agreed to team up with the central association for tenants, Vuokralaisten Keskusliitto VKL, in regard to statements on the housing question. In addition to Sukselainen and von Hertzen, the representatives of Väestöliitto consisted of architect and industrial counsellor Yrjö Laine-Juva and Martta Salmela-Järvinen, who was engaged in various welfare organisations for women, children and elderly and MP representing the Social Democratic Union of Workers and Smallholders. (VL 24.3.1948.)

In June 1948, the associations sent a letter regarding the housing question to the government. The content of the letter reflected the viewpoints Väestöliitto had formulated in its action plan, but in contrast to the plan, the rhetoric was not mellowed. The letter was titled "The housing situation faces imminent disaster", and the rest of the paper followed suit. The "social flaws and disease phenomena" resulting from increasingly difficult housing circumstances, particularly in population centres, were becoming alarmingly grave. "Turmoil and chaos" prevailed within Finnish housing policy, and "tens of thousands of families impatiently wait for a relief in their extremely difficult, often downright unbearable housing circumstances". In addition, the housing demand was constantly increasing as new marriages and families were formed in the baby boom (what the pronatalist Väestöliitto itself had strongly promoted). The two associations conclude that "it is thus no exaggeration to claim that we are rapidly nearing a complete housing disaster". (VL 8.6.1948, Appendix 1.)

According to the letter, a systematic and comprehensive housing policy programme and a centralised managing body were "essential" in order to solve the housing question. Indeed, a permanent managing body for housing policy was "the only salvation". In regard to concrete activities, the focal points largely reflected Väestöliitto's views: housing should take house types, population growth, health and recreational requirements for children and adults alike into account, as well as collective facilities for housekeeping and childcare. (VL 8.6.1948, Appendix 1.) As a whole, the letter was a depoliticising framing of housing policy, which holistically combined anti-urbanism, pronatalism and the home cult.

It seems the plea was heard. In August 1948, the government appointed a committee for urgently drafting a plan for a centralised governmental body that would manage housing production, its funding and the procurement and distribution of construction material (Committee Report 1948:17: 1). Von Hertzen was invited as a committee member, which is an indication that housing policy expertise within Väestöliitto was recognised and valued on governmental level.

The committee published its report in October 1948 (Committee Report 1948: 17). It proposed concentrating on population centres and that housing policy planning and execution should be centralised. It also sought to strive towards cost-efficient construction. A national central agency, ARAVA, would be formed for managing housing policy and production and for granting funding.

The agency would consist of representatives from various interest and professional groups, such as building and town planning professionals, economists and finance experts, social and population policy experts, municipal governments and representatives for people in need of housing. (Committee Report 1948:17.)

The so-called ARAVA laws were passed in the parliament in 1949, but Väestöliitto was not satisfied with the end result, as the bills based on the committee report were amended in the parliament's select committees. In April 1949, Väestöliitto sent a letter to the members of parliament (VL 21.4.1949, Appendix 3), in which the association expressed its dissent. The changes had stripped the agency of its authority to plan and implement centralised and general housing policy programmes, as well as removed the goal of furthering suitable and functional town planning. Väestöliitto argued that dwellings were not the goal in itself, but high-quality housing and "socially correct" town planning. (VL 21.4.1949, Appendix 3.) In essence, the changes rendered ARAVA primarily into a funding agency for housing construction and disregarded the most fundamental idea Väestöliitto had promoted. In addition, the ARAVA loans lacked the objective of social housing and construction. While some evacuee and war veteran alliances did benefit from it, it primarily served to fund property development. (Palomäki, 2011: 472–473.)

## Taking housing matters into own hands

### *The Housing Foundation*

While Väestöliitto welcomed ARAVA as a step forward in the housing issue, the agency did not meet the high hopes Väestöliitto had set for it. From Väestöliitto's perspective, ARAVA did not respond to a sufficient degree to the needs of Finnish housing policy. The board of Väestöliitto therefore decided to grab the reins itself and embark on a career in housing construction. It was, in other words, time for the final core framing task, motivational framing: a "call for arms", or a process formulating a rationale for action (Benford & Snow, 2000).

Heikki von Hertzen argued in the late 1950s:

> There were no signs of improvement in the development of community and town planning. This was a constant matter of concern in Väestöliitto[.] […] [W]e had perhaps sparked a lively discussion, but nothing more. It truly seemed like the time of holding speeches and [publishing] writings was over. We had to do something concrete. (Von Hertzen & Itkonen, 1985: 22.)

The idea was not sparked by the ARAVA laws, though, but had been bubbling under for some years. In December 1945, the board of Väestöliitto discussed the association's possibilities of taking part in social housing production in order to guide housing into a "healthy direction from the perspective of population policy" (VL 10.12.1945). It engaged in discussions with the Social Insurance Institution and the central associations of insurance companies and savings banks. The Swedish rental housing cooperative HSB was proposed as a possible model for the joint company or foundation. The pamphlet *Homes or Barracks for Our Children* was a part of these ideas and plans. (VL 10.12.1945; VL 20.12.1945.)

The housing construction company did not take wing at that time, but the idea was nevertheless fostered in Väestöliitto. In its action plans for 1946 and 1947, it stated that it sought to accomplish collaborative activities in social housing construction with other associations engaged in housing policy, and by consulting the best experts in building and town planning (VL Action Plan 1946; VL Action Plan 1947). Von Hertzen also conducted various trips abroad in order to draw from ideas and implementations.

During 1948–1951, Väestöliitto engaged in discussions and planning activities with the previously mentioned tenants' association VKL, the Central Organisation of Finnish Trade Unions SAK and the Confederation of Intellectual Employment HTK. The four associations formed a committee in 1949 and began organising joint events and publishing joint statements, and they also discussed collaborating in social housing production. (VL 30.11.1948; VL 24.10.1949, Appendix 9; VL Action Plan 1949; VL 11.5.1950.) In September 1951, three of the associations, Väestöliitto, VKL and SAK, together with the Mannerheim League for Child Welfare MLL, Invalidiliitto (the League for Civil and War Invalids) and Virkamiesliitto (the

Federation of Civil Servants) founded the Housing Foundation. Sukselainen and Laine-Juva sat in the foundation's delegation – the former as vice chair and Väestöliitto's representative, the latter as an expert member. Von Hertzen was elected as the foundation's chair of the board. (VL 12.10.1951; VL 27.11.1951.)

The Housing Foundation had several purposes according to its charter of foundation. It strived to combat the housing shortage and elevate the general quality of housing. It was also to develop social housing production and create unified residential areas in accordance with modern town planning. These areas were described as garden and park cities, which were planned from the very beginning to take into account the interests of the dwellers, as well as the needs for children and the young. (VL 29.2.1952, Appendix 7.) The rules thereby reflected the view of Meurman and Väestöliitto, particularly von Hertzen, Juva-Laine and Yrjö Kankaanpää (as of 1951, Kouti), that garden cities were the modern and correct – as opposed to outdated and detrimental – way for housing policy.

### *Tapiola*

As noted in the previous section, the idea of addressing the housing and town planning question on a concrete level began to gain momentum in Väestöliitto during the late 1940s. The action plan for 1950 notes how "the housing shortage in its current scale is the most serious social flaw of our society at the moment" and how the housing question was tied to numerous other social and population policy matters. In the plan, Väestöliitto sets its goal to "work hard" for eliminating the housing shortage and for creating housing production that meets "social requirements". (VL Action Plan 1951.)

The housing issue had become a highly pressing matter for Väestöliitto. It was becoming increasingly difficult to promote pronatalist population policy and the home cult – families who indeed had procreated and had several children (i.e., the baby boomers) were living in substandard housing conditions that were a far cry from what Väestöliitto deemed appropriate.

In his notes from the late 1950s, von Hertzen describes how "we" (Väestöliitto and its board) began to establish in the late 1940s the impression that

> town planning would never reach the vital level of development if we relied solely on the written or spoken word or sparked heated debates. Something had to be done. We had to show that better housing and communities could be produced also in practice. (Von Hertzen and Itkonen, 1985: 23.)

While von Hertzen's words are written in retrospect and from the point of view of only one person, this spirit is generally visible in the minute books, annual reports and other material and publications of Väestöliitto. The people of Väestöliitto engaged in housing policy, primarily von Hertzen, Sukselainen and Juva-Laine, saw that the association could and should adopt a pioneer role in Finnish housing policy. In terms of frame analysis, Väestöliitto had proceeded from diagnostic and prognostic framing to a very concrete level of motivational framing.

According to Benford and Snow (2000), motivational framing includes constructing vocabularies of motive. Benford (1993) has outlined four such vocabularies: severity, urgency, efficacy, and propriety. In his study of the US nuclear disarmament movement, Benford (1993) also noted that the vocabularies worked in in a contradictory rather than complementary fashion; for instance, framing that emphasised the severity and urgency of nuclear threat diminished the sense of efficiency.

However, in the case of Väestöliitto and the Housing Foundation, such contradictions are not distinguishable, but the vocabularies were, on the contrary, complementary. The urgency to act due to the severity of the housing situation was much emphasised. Knowledge production and lobbying (or 'propaganda') were a part of motivational framing as well, and they served an important role in the development process of Väestöliitto's expertise. However, lobbying had merely led to the ARAVA system, but not to a centralised housing policy or town planning programme, contrary to the central objective of Väestöliitto. Moreover, housing shortage in Helsinki was still severe, which placed families in difficult situa-

tions and threatened to lead to undesired forms of urbanisation.

According to von Hertzen, Sukselainen and the other active actors, uncontrolled urbanisation and the housing shortage would lead to inadequate and unhealthy forms of housing (tenements, barrack cities), which would cause various forms of social, health and moral problems. This development was, in other words, perceived as unsustainable and accumulatively detrimental. The solution – embarking on a concrete social housing and garden city project – was justified with both efficacy and propriety. It was framed as a sustainable (efficacy) and socially and morally healthy (propriety) option, a model town, to counteract the harmful looming development and its consequences.

In July 1951, Väestöliitto bought a 220-hectare land area from Espoo, the neighbour municipality of Helsinki. The ownership of the area, called Hagalund (later renamed to Tapiola), was transferred to the Housing Foundation once the foundation was officially established. (VL 20.7.1951; VL 16.8.1951; VL Annual Report 1951: 1–2.) According to the description of the Hagalund plans in Väestöliitto's annual report of 1951, the foundation had begun to create a "modern, detached house-intensive garden city" in accordance with the town plan Meurman had designed for the area. (VL Annual Report 1951: 1.)

Meurman outlined his plan in *Housing Policy* (Meurman, 1950). He argued that despite its good intentions, Howard's garden city model had fallen short. New towns had emerged as dormitory suburbs whose residents commuted to the city centre or remote industrial areas, which brought about increased traffic and provided no relief for the congested centre. Instead of Howard's ideas, Meurman followed (unspecified) newer English models, which probably referred to Patrick Abercrombie's and F. J. Forshaw's ideas for 'Greater London' (Wakeman, 2016: 80–84).

Meurman's plan was based on the idea of a residential suburb, which consisted of residential cells. Each cell would have around 1,000 residents and the residential suburb up to 10,000 residents. Hagalund would thus form a residential suburb of its own. The principle of this town plan idea was to keep distances at a minimum; all necessary services and activities (schools, cultural activities, businesses etc.) should be within walking distance, and this was to be achieved by creating a business centre for each residential cell. In addition, the residential suburb would have a 'city', the shopping and business centre of the area, as well as diverse common facilities and institutions, harbours and so forth. (Meurman, 1950.)

The pioneer and example-setting role of the Housing Foundation and the Hagalund project was expressed very explicitly:

> [A] body has been established that has the practical opportunities to create a model town and to gather experience in large-scale area-based building and the related town plan and plot issues. Based on these experiences, the foundation can guide housing production in a healthier direction[.] (VL Annual Report 1951: 2.)

In 1950, Väestöliitto began to publish the journal *Housing Policy* in order to address topical housing policy issues. The journal was to be distributed to decision-makers and influential people in the government, the parliament, towns and municipalities, within the architect circles, the press and so forth. In short, the target audience of the journal was anyone and everyone who could have a say in Finnish housing policy. The staff of the journal was composed as to have competence and authority. Yrjö Kankaanpää (later Kouti) was selected as editor-in-chief and Heikki von Hertzen as a member of the editorial staff. Kankaanpää was the director of the Housing Policy Office of Väestöliitto and had previously worked in the Ministry for Communications and Public Work, under which ARAVA operated. The editorial staff of *Housing Policy* consisted of several influential people, such as architects Alvar Aalto, Otto-Iivari Meurman and Esko Suhonen, who was also the director of the Technical Division of ARAVA; social politician and statistician Gunnar Modeen; and Maiju Gebhard, who worked as the director of the home economics unit of Työtehoseura, the Work Efficiency Institute.

The Hagalund project was presented and promoted in *Housing Policy*. In 1951, the first article on the topic was titled "An ideal garden city in the outskirts of Helsinki is being planned". According to the article, Hagalund was not to become a dormitory suburb, but a highly self-

sufficient daughter city of Helsinki. Each residential cell would have its own business centre with its businesses, collective facilities, laundry facilities with washing machines, movie theatres, saunas etc., hence precisely in line with the vision of Meurman. The pictures feature idyllic landscapes with green forests and open waters. (Väestöliitto's Housing Policy Office, 1951: 4–5.)

According to the same article, "modern housing policy aims, as we know, towards systematic area-based building". This kind of housing policy was "the only effective means" for rationalising housing production, lowering building costs and creating "socially good" residential areas. (Väestöliitto's Housing Policy Office, 1951: 4.) The 'we/they' rhetoric implies that the writers and readers of *Housing Policy*, i.e. the housing policy quarters of Finland, formed a homogeneous group. Combined with the idea of knowledge and expertise ("as we know"), this rhetoric suggests and reinforces the idea that this group shares a common vision of the correct principles for housing policy. In other words, anyone who would have a different opinion would not only be excluded from 'us', but their expertise would also be called to question. The supremacy and necessity of the presented housing policy was further strengthened and depoliticised by calling it the 'only means' for achieving specific goals that were likewise presented as universally accepted.

The foundation stone of Hagalund, which was renamed Tapiola in 1953 according to the winning suggestion of a naming contest (Väestöliitto's Housing Policy Office, 1953b: 2), was laid on 3 September 1953. At the event, the charter of Hagalund was read aloud by von Hertzen. The charter announced how Hagalund would become a home and ideal living environment for at least 12,000 residents, and how the founding associations of the Housing Foundation have sought to fight against the housing shortage and to elevate the general standard of living. In line with the rules of the foundation, the text emphasised how the area was planned and would be built by taking the residents' health and recreational needs as starting point. The charter ended in "prophetical and hopeful" (von Hertzen & Itkonen, 1985: 12) words:

> Let the garden city that will arise on this spot fulfil the wishes set for it, and let it serve as a strong thrust forward for the entire nation's housing policy development. (Väestöliitto's Housing Policy Office, 1953a: 5)

In his own speech, von Hertzen noted that the "best expert force" was used in planning Hagalund, in which connection he mentioned Meurman as the head person behind town planning (Väestöliitto's Housing Policy Office, 1953a: 5). However, it should be noted that the town planning and design activities regarding Tapiola were not quite as straightforward and uncontested as *Housing Policy* or the official material of the Housing Foundation portrays, but included several sources of ideas and inspiration (Pantzar, 2013). Architecture, on the other hand, was publicly opened up to new ideas: an architecture and design competition was organised for the 'city' of Tapiola. Both Meurman and von Hertzen deemed the competition an enormous success. As largely everything else related to Tapiola, von Hertzen saw that also the competition could and should serve as a pioneer and role model for the entire society. (Väestöliitto's Housing Policy Office, 1953c; Väestöliitto's Housing Policy Office, 1954.)

According to von Hertzen's speech, the initial construction phase of Tapiola included building both detached houses and tenements as high as ten floors (Väestöliitto's Housing Policy Office, 1953a). These were to be placed next to each other, so that detached houses create spaciousness amidst tenements, and block houses allowed detached houses to be equipped with the same technical conveniences and maintenance as tenements (Pantzar, 2013). This probably referred to plumbing and electric or district heating, which were by no means to take for granted at the time.

In 1956, von Hertzen published an article on the planning and execution of Tapiola. He resolutely dismissed comparisons between Tapiola and Vällingby, Sweden, and claimed they differed in spirit and core idea. According to von Hertzen, Vällingby was a somewhat depressing city of masses – masses of people and masses of buildings. Tapiola, on the other hand, gave priority to nature, and it represented a "socially and, first and foremost, biologically correct living environment for the human being". The "biologically

correct" character of the garden city was probably a reference to modern cities, which von Hertzen described as "powerful destroyers of human material", causing family lineages to die out. (Von Hertzen, 1956.) Tapiola was, in other words, designed to encourage and facilitate reproduction through a 'socially and biologically sound' environment.

Tapiola was seen as a project of constructing "a perfect small city" for everyone, from workers to professors (von Hertzen, 1956). Wakeman links von Hertzen's vision to the new town movement's idealist visions of social equality and justice, rooted in Howardian social utopianism, and describes new towns as the "deus ex machina of the welfare state" (Wakeman, 2016: 49). However, she also notes how social hierarchies were embedded in the idealist visions for Tapiola (manifested, e.g., as the grander buildings' better views over natural scenery), and Tapiola soon gained a reputation as an area for the better-off (Wakeman, 2016: 97). In an unpublished response to a polemical book that criticised Tapiola as a "village of better people" (Hiisiö, 1970), von Hertzen asks with slight bafflement what is wrong with "the upper middle class [becoming] an object of imitation" (quoted in Pantzar, 2013: 26).

Von Hertzen's reaction highlights how the welfare state (at least the Social Democratic welfare state) might not be the best frame for interpreting Väestöliitto's housing policy efforts. While there certainly were genuine aspirations to improve the life of individuals, and Väestöliitto's housing policy ideology was rooted in social reformist and social utopian ideas, the starting point and objective was nevertheless to normalise the home cult, i.e., a pronatalist bourgeois lifestyle, rather than enabling different lifestyles in a pluralist spirit.

While von Hertzen hailed Tapiola as a success story, which indeed ticked several boxes in accordance with *Homes or Barracks for Our Children*, it did not meet all of von Hertzen's or Väestöliitto's requirements and wishes. Von Hertzen had to cave in to tenements towards which he had a profound antipathy – and not just any tenements, but ten-floor block houses, which were portrayed as an abomination in the pamphlet. In addition, Tapiola would have its own movie theatres, cafés and even bars, which von Hertzen saw as detrimental. (This is also discussed in Pantzar (2013) from a consumer research perspective.) To further add to the insult, by the 1970s, Tapiola had developed to the opposite of what was envisioned for it: an individualistic, urban, consumerist community that relied on private transport (Pantzar, 2013; see also Wakeman, 2016: 97–98).

Nevertheless, at the time of its planning and construction in the late 1940s and the 1950s, Tapiola can be regarded as a success for Väestöliitto and its housing policy actors. Where motivational framing in the form of propaganda and ARAVA fell somewhat short, Tapiola was a significant step towards the ideal housing policy in accordance with the prognostic framing of Väestöliitto. The garden city suburb was believed to act as a buffer against uncontrollable urbanisation, which would lead to unhealthy housing. Despite the initial and eventual shortcomings of Tapiola (from the perspective of von Hertzen et co), its town plan was in accordance with Meurman's residential suburb plans with its residential cells, 'city', vast green areas, short distances, and so forth. The technical conveniences of the block houses facilitated domestic work, which reinforced the home cult with a modern touch. All of this was believed to encourage reproduction in happy families and provide suitable social, health and moral conditions for children and families.

## Conclusions

The housing policy of Väestöliitto during the 1940s and early 1950s forms an interesting example of the construction of a social problem. From the perspective of frame analysis, it includes all three framing tasks as well as discursive methods. Through diagnostic framing and deliberate rhetoric, Väestöliitto established an unproblematised image of urban housing, or 'barrack cities', as detrimental, unnatural and downright dangerous on a social and societal level. As the opposite, Väestöliitto represented garden cities as the ideal and natural option. This was connected to the main objective of Väestöliitto, namely, pronatalist population policy.

The diagnostic framing was not constructed on a whim, but was a result of meticulous inves-

tigation and research, including study and inspiration trips abroad. Directing housing policy in Finland towards garden cities was thus a part of prognostic framing – an attempt to distinguish the means for combatting the problem and preventing it from spreading and arising in the future. In order to achieve this goal, Väestöliitto attempted to influence both decision-makers and the general public through propaganda.

These processes of diagnostic and prognostic framing also included knowledge production. Väestöliitto studied housing policy from a problem-identification and problem-solving perspective: it attempted to recognise the core of the problem and develop methods for addressing it. These methods were based both on theory as well as practice (examples from abroad) and were not intended to remain mere written words. On the contrary, the goal was to spread this knowledge among decision-makers in order to transform it into practical reality. ARAVA can be seen to have come to being partially as a result of this influence.

However, when this means for addressing the problem proved to not quite have the impact Väestöliitto sought (i.e., the shortcomings of ARAVA), the association proceeded to a new form of prognostic and motivational framing. Namely, planning, developing and finally realising its own housing policy project. In this project, the association could act according to its own goals and ideals, in which it by and large succeeded at the time, even if the development later on proved to take the opposite trajectory of what was intended.

In the course of these processes, Väestöliitto established an expert role within Finnish housing policy quarters. A demonstration of the acknowledgement of this expertise was for example that von Hertzen was invited to as a member to the committee that drafted the ARAVA agency and laws, and that the government requested statements from Väestöliitto on diverse housing policy matters. The influential editorial staff of *Housing Policy*, published by Väestöliitto, also shows that the association was reckoned as a serious actor within the field.

In addition to being a very concrete means for addressing the housing problem, the Tapiola project was also a new level in the housing policy expertise of Väestöliitto. Väestöliitto regarded the project as a pioneer within Finnish housing policy, and one can say that the view was indeed justified – the project was the first of its kind, and Tapiola can be regarded as the first Finnish modern suburb. Väestöliitto certainly did "do something", and from its perspective, it did "show that better housing and communities can be produced also in practice".

## Acknowledgements

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## Appendix 1:

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# Kevin LaGrandeur, James J. Hughes (eds) (2017) Surviving the Machine Age. Intelligent Technology and the Transformation of Human Work. Cham: Palgrave Macmillan. 166 pages. ISBN: 978-3-319-84584-5

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This is a book for those who think about the future, a book that challenges many common sense perceptions about the current organization of society. It addresses the future of work, that ubiquitous activity that many people believe defines us as human.

From the current reality, the authors look for and explore the future social scenarios that work automation is producing. The volume includes contributions from authors with extensive experience and reflection on the subject, coming mainly from the world of entrepreneurship, law, communication, economics, sociology and public policies.

Work is among the human activities most impacted by emerging technologies, particularly in the areas of digital technologies and automation (robotics, artificial intelligence, machine learning, 3D, etc.). This is because work in today's societies is not just a way of making a living, but an activity that gives dignity, self-esteem, socialization and meaning to people's lives. Therefore, it is not surprising that the automation of many jobs and the increasing achievements of the machines appear as a threat to human nature and society. As Thomas D. Philbeck writes in Chapter 6 (p.84), "this technological transformation is challenging socioeconomic stability as it threatens our productive roles as individuals." This is not a new historical phenomenon, as James Clark argues in Chapter 3. Similar trends of 'creative destruction' have already been observed in previous historical periods; but today the acceleration of time, the extent of the disruption produced, geographical globalization and the extension of life expectancy make this transformation unique. Presenting the challenges posed by this transformation is the objective of this book.

For the purpose of this review, I will organize the contents of the book into three main themes and show how each of the ten chapters contributes to them.

The first theme is *the scope and characteristics of the current transformation of work and unemployment*. In Chapter 1, the editors, based on figures and data from various sources, present the scope of the problems that new technologies pose to traditional work. In Chapter 2, Melanie Swan complements this analysis by presenting the characteristics of current technological unemployment and highlighting its relationship with income inequality. In Chapter 3, James P. Clark addresses methodological issues, such as 'the suffering and the theory,' reminding us that the people who lose their jobs in these transformations are not the same as those who get the new ones. This demands political responsibility. He then analyzes the fundamental differences of past and current technological revolutions, claiming that we are experiencing a 'phase change' of human civilization. In Chapter 5, John Danaher draws attention to the close links between technological unemployment and the extension of life. Technology is doing both, helping to extend life and eliminating something that people today consider part of life, that is, work. This opens a rich discussion about ways for future policies in

this field. Finally, in Chapter 9, James J. Hughes presents a detailed study by type of activities, jobs and professions, both those threatened by new technologies and those that will potentially arise or be created in this new era.

The second theme is *what to do in this new scenario*. The facts and data presented require actions in the form of *new frameworks, models, strategies and policies*. In Chapter 6, Thomas D. Philbeck (p.85) considers several "popularly advocated policies and tactics for building resilience into the labor market" and wonders if "these policies will be enough to address the issues of inequality, instability, uncertainty, and growth." In Chapter 8, Yvonne A. Stevens and Gary Marchant (p. 123) discuss several other possible policies and strongly advocate what they call a 'long-term solution': the badge proposal, a reward system for "supplemental goods and services [as opposed to basic income] that are desired but not necessary for basic living." And so we come to new models, new worldviews to address this radically new environment. In Chapter 2, Melanie Swan defends an 'Abundance Economics,' a 'new philosophy of economic theory' arguing that traditional economic notions of material scarcity are no longer valid in today's digital economy. In Chapter 7, Scott Santens discusses 'Unconditional Basic Income' not only as a solution to technological unemployment, but as an opportunity to take a "collective step that is humanity's next giant leap. (p. 115)" In fact, he sees it as "the abolition of enslavement once and for all. (p. 115)" Finally, in Chapter 10, David J. Gunkel analyzes the changes that these transformations are making in the field of training and education. He calls for "reworking educational programs from both ends of the spectrum --developing top-down updates in the structure and operation of the institution and encouraging bottom-up mods that can have immediate impact on the lives and careers of both teachers and students. (p.160)"

The third theme, one that permeates all the chapters, and makes the book so fresh and enjoyable, is *reflection and speculation about the future*. An iconic chapter in this regard is that of Robin Hanson on "Employment in the Age of Em." An *em* is a simulation of a particular human brain through a computer system. These 'copies' of people may carry out human labor and work. The thought experiment vividly shows the challenges that not too distant technology will present to humans: the notion of status and property, the scope of functions, the marginalization of groups of humans, competition against humans, etc. As Hansen (p. 61) concludes, "humans are no longer at the center of the world's story during the em era." In such a scenario, the meaning of human life comes out as a central theme.

It is impressive how a nonfiction book can be so fascinating to open the imagination and devise future scenarios. And it is remarkable how in a few pages the authors can explain the reasons for this phenomenon and provoke a reflection on it. As with any book, one could complement and suggest missing issues. Here are some comments from me about it. First, the book is rather biased towards the experience of the United States and Europe. I believe that today the experience of China cannot be ignored (there is a mention of the social credit experiment in Chapter 8), but more importantly: today it is unthinkable to reflect on humanity if the vast majority of the marginalized population (even more deeply by these transformations) in the "south" is not included (Clark touches it in Chapter 3 regarding population). Second, I had the feeling that workers appear in most texts as "others." You keep asking yourself when you read: do the machines work by themselves? Are "we", the human race, involved in this problem as a whole, or is it just a problem of "the workers", those aliens who live on their wages? What would happen if the machines belonged to humanity as common goods? What would be the meaning of "work" in that environment? In some articles you can find sparks from this necessary discussion. But the current socio-economic system as a whole, except for a couple of authors, is not in doubt: sometimes one feels that capitalism and private ownership of machines is the only stable thing, almost like nature, under which we have to discuss the new society that will emerge from these transformations. Third, although it is beyond the scope of the book, one misses a deeper philosophical and humanistic discussion about the very notion of work itself. Today such consideration is not a luxury or a disciplinary issue, but something fundamental to understand what work has meant,

means and will mean for humanity. In particular, for the topics of this book, it is essential to understand whether or not the work goes beyond an economic need. However, beyond these considerations, the text we are reviewing has the great intellectual value of inspiring these and many other questions.

Therefore, I strongly recommend the book to readers seeking reflections and ideas about our common future, to people who understood that our civilization is experiencing, as Clark says, a phase change.

# Varun Sivaram (ed) (2018) Digital Decarbonization: Promoting Digital Innovations to Advance Clean Energy Systems. New York: Council on Foreign Relations. 146 pages. ISBN: 9780876097489

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In but a few decades the face of the world's most highly valued public companies changed remarkably. During the latter part of the 20th century, with few exceptions, the highest-grossing corporations were in the energy sector. Today, things look different with digital technologies specialists forming the world's five most valuable businesses. This indisputable fact forms the linchpin of Varun Sivaram's introduction to his essay collation, *Digital Decarbonization: Promoting Digital Innovations to Advance Clean Energy Systems*. The volume is a compilation, edited by Sivaram, of submissions from various parties who attended a 2018 conference convened by the Council on Foreign Relations, a New York-based think tank. Participants traveled to discuss the risks posed by the rapid digitization of the global economy as well as the areas in which digital technologies can enable the adoption and development of clean energy systems. Conference attendees and authors contributing to this volume include researchers such as Dr. Kyle Bradbury, a fellow of Duke University and machine learning expert alongside representatives of private-sector businesses like John O'Leary, a director of Strategic Marketing at Boston-based AlphaStruxure. Sivaram himself is a previous Rhode's scholar, CTO of ReNew Power, India's largest renewable energy company, and author of well-received 2018 title, *Innovations to Harness Solar Energy and Power the Planet*.

The point that economic digitization offers the potential for decarbonization and is one of the main drivers of change for global power infrastructure is already a topic of vigorous debate as discussed in Maria Luisa Di Silvestre's (2018) oft-cited work, *How Decarbonization, Digitalization and Decentralization are changing key power infrastructures*. It is not surprising, however, given the complexity of the world's economy and the inherent uncertainty of new energy technologies that no firm consensus exists on what the overall impact of new clean energy technologies will be. To this end, the multi-author format Digital Decarbonization is a great asset. The book is able to encapsulate usually mutually exclusive perspectives. For example, Jesse Scott's piece on the economic and privacy risks derived from energy sector digital innovation emphasizes the need for caution and well-designed policies to manage change. Conversely, Lidija Sekaric's survey of digital decentralized power system innovation offers a more straightforward and hopeful look at potentially transformative technologies.

The structure of Digital Decarbonization makes this a good source of information for those familiar with energy sector digital innovation and newcomers to the topic alike. Digital Decarbonization's first section provides background for the discussion followed by essays on potential digital innovation opportunities. Later follows a discussion of risk analyses and, finally, a compilation of

policy recommendations is presented. Despite the number of contributors involved in creating this work, the common-sense nature of this construction ensures that consecutive articles appear to build on one another's findings such that the reader feels they are experiencing a cohesive narrative.

Following Sivaram's introduction, Part I of Digital Decarbonization consists of two essays dealing with the background of digital clean energy innovation. Anyone reading about clean energy innovation trends for the first time will be particularly grateful for the accessibility and level of detail here. In his piece on early-stage financing trends, Stephen Comello provides convincing numbers that suggest corporations investing in digital energy startups are making more savvy choices than they did between 2008 and 2011, a period in which large sums were sunk into the industry, bearing little fruit.

Sivaram elects to turn Part II of this work into three subsections that respectively discuss the digital energy opportunities associated with electric power, transportation, and big data. The sheer volume of articles in this section leads to slightly repetitive content, but there are still some strong pieces here such as Ben Hertz-Shargel's chapter How Distribution Energy Markets Could Enable a Lean and Reliable Power System. Here, Hertz-Shargel describes how advanced monitoring infrastructure may relieve the world's outdated grid systems which, with their costly and slow-to-implement infrastructure upgrades, are increasingly struggling to cope with modern energy demands. As a solution, Hertz-Shargel puts forward a compelling argument for a quick-to-react decentralized blockchain-powered energy market that would eradicate supply-side and consumer behavior inefficiencies. Sunil Garg also makes a welcome addition to this part of the book with Applying Data Science to Promote Renewable Energy, a chapter that convincingly demonstrates the cost of renewable energy generation can be reduced by data science through better prediction of equipment failure and accurate output projections. Although Garg is an executive of a data-science business providing such services to energy corporations, he only spends a few paragraphs discussing his affiliated-company. One does not get the impression that he is being unfairly optimistic about the potential impact of big data. Garg's piece goes a long way toward explaining why digitization may contribute to decarbonization, a connection often made by the general press but one for which a confidence-inducing mechanism is rarely put forward.

At no point does Shivaram claim that this work is intended to form a comprehensive treatise on digital energy innovation, but one sour note is that Digital Decarbonisation's Part III, a summary of risks associated with innovations, fails to mention the existential crises predicted by some for much of the last century that would stem from the development of a sufficiently advanced Artifical Intelligence (AI) system. Few contemporary thinkers warn of a doomsday-like consequence of AI development, but several such as Markoff (2015) argue that even with a carefully defined goal, a super-intelligent AI system could easily develop unintended and potentially dangerous sub-goals.

The omitted mention of AI-risks aside, the contributions of Erfan Ibrahim and Jesse Scott on innovation risks do a good job of summarizing the short-term problems associated with economic, privacy, and cybersecurity issues. This section transitions neatly into the closing chapter of Digital Decarbonization which offers policy recommendations that take into account digital risks and opportunities already discussed.

In the first part of this final chapter, Richard Kauffman and John O'Leary consider generic state-level reforms and policies that can enable next-generation digital grids. Meanwhile, Hiang Kwee Ho provides an analysis of Singapore's transition into clean energy. The connection between the two is obvious and satisfying: Only by exploring the specific circumstances of an economy with a unique set of dependencies on fossil fuels can we understand how Kauffman and O'Leary's policy recommendations would be practically implemented.

It would be hard for any reader to walk away from this book without a deep interest in what the onward march of digitization holds for the future of energy generation, transport, and the global economy. Although there are some inevitable weak links, the work from contributing authors can

generally be characterized as thought-provoking and successful when it comes to highlighting and contrasting the major trends and risks associated with digital innovation.

Overall, Sivaram and the Council on Foreign Relations have successfully compiled an informative volume that is sure to spark further debate on decarbonization and economic digitization. Digital Decarbonization does the unenviable job of tying together a disparate collection of opinions on a complex topic and does so with a good deal of finesse.

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## Guest editorial



## Articles



## Book reviews