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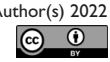

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Abstract

The figure of the brain has continued to rise in prominence for at least 30 years. This development continues to raise important questions: in particular, to what extent and in what ways does the brain supplant the person as the presumed origin of human behaviour? Whereas it has previously been discussed in general terms, here we address this question through an ethnographic study of the experimental articulation of the brain in neuromarketing research. Drawing on analytical themes from science and technology studies, we argue that it is crucial to investigate the enactment of the brain in situated practice and to understand the effects on prevailing accountability relations. We analyse the enactment of the 'consuming' brain in neuromarketing experiments and in experts' communication of experimental results. We show how the consuming brain emerges from reconfigured sets of socio-material relations (between e.g. consumers, brains, brain scanning operators, consultants) and how this entails a redistribution of accountability relations. This results in an ontological respecification of the consumer, who

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is no longer deemed accountable for his/her actions. Instead spokespersons on behalf of the brain – neuromarketing technologies and experts – assume accountability for revealing why consumers buy what they buy. We conclude that the putative shift from person to brain is in fact characterised by a redistribution of accountability relations in neuromarketing practices. We call for further studies of accountability redistributions in practice, so as better to situate novel explanations of human behaviour.

Keywords
accountability, consumer behaviour, enactment, ethnography, ontology, science and technology studies, social studies of neuroscience

Introduction: The rise of the brain

The figure of the brain has risen to prominence in science and society over a period of at least 30 years, and shows little current sign of abating. In the context of the development of sophisticated neurotechnologies, notably the visualisations afforded by functional Magnetic Resonance Imaging (fMRI) brain scanning, neurosciences have become an important part of the psychological sciences (Rose & Abi-Rached, 2013). President George Bush Senior formally designated the period 1990–2000 'the decade of the brain',[1] since when neuroscience research effort, funding and resources have continued to grow as evidenced by, for instance, the United States' National Science Foundation's (NSF) goal directed at 'Understanding the Brain', including a multi-year activity that includes NSF's participation in the 'Brain Research through Advancing Innovative Neurotechnologies' (BRAIN) initiative as well as the scheme 'Next Generation Networks for Neuroscience' (NeuroNex) to establish global research networks of excellence. Similar initiatives in Europe include the European Union's Horizon 2020 Research and Innovation Programme for the Human Brain Project. At the same time the position of the brain in popular culture and social and political discourse continues to solidify (Broer & Pickersgill, 2015; Thornton, 2011). In these settings the brain is frequently considered as the acknowledged centre of cognition, knowledge and affect (Rose & Abi-Rached, 2013). 'Neuro' is the epithet of choice to redesignate a range of disciplines and activities: we have seen the emergence of neuroeconomics, neuropolitics even neuro kitchen design. 'Brain training' apps enjoy widespread popularity.[2] A large array of recent consumer products feed the notion that the healthy functioning of the brain is enhanced by particular food and drink products: one brand offers variants promising to enhance a wide range of life's concerns and activities including fitness, sleep and more.[3] Sociologists Rose and Abi-Rached (2013) assert that: 'it is not that human beings *are brains*, but we *have brains*. And it is in this form – that our selves are shaped by our brains but can also shape those – that neuro-scientific arguments are affecting conceptions of personhood and practices of self-fashioning' (Rose & Abi-Rached, 2013, p. 22).

So the rise of the brain is associated with wide-ranging consequences and is said to give rise to profound questions about our understanding of human behaviour (Choudury & Slaby, 2012; Vidal, 2009). In this article we ask, to what extent and in what ways does the brain supplant the person as the presumed origin of human behaviour as claimed by

neuromarketers, who study consumers' preferences? And what are the implications of this claim in relation to neuromarketing research practices? Explanations of behaviour centring on the brain rather than the person suggest a shift in understandings of accountability. In order to get to grips with these concerns, we argue that more granularity is needed. We need to look in detail at how questions about the claimed move from person to brain map onto, or derive from, instantiations of the brain in practice. To investigate this, we specifically focus on studying shifts in accountability between person and brain.

Our study is based on a multi-sited ethnography of the experimental articulation of the consuming brain in the growing field of neuromarketing. Fisher et al. (2010) see neuromarketing as 'one manifestation of [a] new neuroculture' (2010, p. 230). Those working in the field describe neuromarketing as a 'hybrid field' (Plassmann et al., 2012, p. 18) that purports to adapt a number of methods and theories from neuroscience to understand consumer behaviour. Typically, this involves the use of brain imaging, scanning, or other brain activity measurement technology as well as biometric methods, to capture consumers' brain responses to marketing stimuli.[4] Proponents of consumer neuroscience (as researchers in academia, mostly, marketing, refer to the field) and neuromarketing (the term commonly employed by market research professionals and in the media) promise that the use of neuroscientific and biometric technologies provides consumer insights that are more accurate than those generated by other methods such as surveys and focus groups (Boksem & Smidts, 2014; Karmarkar & Plassmann, 2019). Neuromarketing companies characteristically describe consumers as not able to explain their consumer behaviour (Morin, 2011; Schneider & Woolgar, 2012) and hence distinguish themselves from traditional market research, which primarily uses questionnaires or focus groups to determine consumer insights. Similarly, academic researchers in consumer neuroscience emphasise the unique insights neurotechnologies provide compared to other methods (Schneider & Woolgar, 2012). In other words, both groups claim that neuroscientific and biometric measures enable the determination and even prediction of unbiased and internal consumer responses to marketing stimuli. The key to understanding consumer behaviour accordingly lies in understanding consumers' brains, as is the opinion of these two groups.

We suggest that this development towards 'brain-based' explanations of human behaviour (in the sphere of consumption) represents a more general tendency to explain human behaviour by relying on what is sometimes referred to as 'hard sciences' (e.g. biology, neuroscience, data science). Our article emphasises that the explanatory power of these purportedly more objective sciences and approaches rests on the uptake and employment of novel technological artefacts and/or procedures that are considered neutral. Such a view is highly contested in sociology, anthropology, Science and Technology Studies (STS) and beyond (Dumit, 1999; Porter, 1995), yet these debates have resulted in limited interdisciplinary or public discussion of and reflection on technological optimism, the belief that technologies will (neutrally) advance knowledge and contribute to national and economic development.

In this article, we report our research into neuromarketing experiments. The focus of our research attention is to examine the shifting attention from (purportedly) subjective knowledge of the consumer to (purportedly) objective knowledge of the brain during the neuromarketing study. The article is divided into four sections. We begin by reviewing existing sociological and anthropological research on how the brain features as locus of objectivity in the neurosciences. Secondly, we present our conceptual framework drawing

on recent contributions in the field of Science and Technology Studies (STS) to suggest an alternative to the constructed dichotomy between objective and subjective knowledge. We suggest that beyond studying the representation of the brain we need to understand the processes of enactment of the brain(s) in situated practices (Mol, 2002) and how this affects accountability relations (Woolgar & Neyland, 2013). Thirdly, we describe our multi-sited ethnographic approach to neuromarketing in Europe. We discuss three fieldwork vignettes in detail, paying particular attention to how the 'consuming' brain is enacted in neuromarketing practices. We show how ontological respecification of the consumer is accomplished in experimental practices and how this redistributes accountability relations between person and brain. We conclude by emphasising the contributions our findings make to situate the wider rise of brain-based and other technologically-enabled explanations of human behaviour and call for studying accountability in practice.

Sociological and anthropological engagements with the neurosciences: From personhood to brainhood

Rose and Abi-Rached (2013) assert that the brain sciences are transforming the ways we 'know ourselves' as human beings. Vidal (2009) argues that brainhood rather than personhood is gaining prevalence in the neurosciences and in public discourse. Yet, studies by, amongst others, O'Connor et al. (2012) complicate this picture. In their study of British news media they show that despite reportage about neuroscience that depicted the brain as '*biological proof* for the legitimacy of particular phenomena and beliefs' (p. 221, emphasis in original), the brain was also frequently portrayed as a resource to be optimised and 'an index of difference' to draw boundaries between different categories of people. Ultimately, the authors show that a rise of the neurosciences has not led to revolutionary understandings of personhood among publics in the United Kingdom. Other researchers have also relativised a radical shift from personhood to brainhood when studying the impact of the neurological gaze on subjects such as patients, children, or teenagers (Bröer & Heerings, 2013; Choudhury et al., 2012; O'Connor & Joffe, 2013; Pickersgill et al., 2011). According to these studies, people who are confronted with their biological constitution do not simply adopt a reductionist perspective of their beings, but reconstruct their own ideas of agency with the knowledge that is provided (Pickersgill et al., 2011). That is, people sometimes refer to their brain or neurochemicals as the actor of their behaviour, but at other moments they refer to themselves, their willpower, their emotions, or their social situation, as the cause of their actions (e.g. Brenninkmeijer, 2016). Moreover, some studies even demonstrated that neuroscientists rarely seem to perceive themselves as defined by the brain (Pickersgill et al., 2011).

Interestingly, neuroscientific experiments are not exclusively focused on the brain either, as 'laboratory studies'[5] of neuroscience suggest. Mahfoud (2014) emphasises in her review of extant ethnographies of neuroscience laboratories in the United States and Europe (e.g. Alać, 2008; Beaulieu, 2004; Roepstorff, 2001) how these studies reveal the role of interactions between bodies, artefacts and their environment in the experimental setting and how these co-constitute knowledge in neuroscience laboratories. For instance, Mahfoud (2014) reviews how the anthropologist Roepstorff (2002)[6] describes the

transformation of subjects into objectivity based on his ethnographic study of a brain imaging laboratory in London. His account shows how subjects participating in the brain imaging studies are turned into data and the role researchers, the place/setting, brain mapping software and, thus, the interactions between people and artefacts play in the process. He compares, for instance, the house in which the laboratory is located to 'a black box, where subjects enter at the bottom and objectivity exits at the top' (Roepstorff, 2002, p. 154 as cited in Mahfoud, 2014, p. 3).

However, notions of objectivity in neuroscience change due to the introduction of digital tools and resources, as Beaulieu (2001) highlights in her ethnographic study of brain atlases developed in the 1990s US Human Brain Project. Considering atlases as 'repositories and enforcers of objectivity' (2001, p. 638), she argues that we can see the formation of 'digital objectivity' that enables 'the bypassing [of] human judgement in the evaluation of large numbers of scans' (2001, p. 667). She emphasises that:

> . . . the displacement of expertise away from an embodied observer has non-trivial consequences for notions of objectivity. If judgement and experience are delegated to technologies in neuroinformatics, it is likely that other notions that have been part of scientific practice and traditionally located in the subject (creativity, understanding, discovery and insight) will also be reshaped by informatics. (Beaulieu, 2001, p. 669)

Beaulieu emphasises that the shift of expertise away from human observer to technology classifies the technology as more objective. It is this shift and what it implies for the making of objectivity, that we ethnographically explore in our study of neuromarketing experiments.

Yet, the person is not completely absent. In an ethnographic study of two fMRI laboratories, Alač (2008) shows that making sense of brain scans is not merely a process of looking at the data, but includes gestural engagement of the scientists: 'Gesture, talk and the manipulation of the digital screen function together as techniques for managing perception' (2008, p. 493). Research by Cohn (2008) demonstrates that neuroscientists tinker with their experimental settings, their subjects, and their statistical results to constitute neuroimaging results. This is also the case in neuromarketing experiments as we have shown in a recent publication (Brenninkmeijer et al., 2020). A study of a neuroscientific therapy demonstrated that the experimenter had to work with 'the whole person' not only with 'the brain', for example by calming down people's minds, or correcting their bodies. (Brenninkmeijer, 2016, p. 127). And an anthropologist who became a neuro test-subject was told that it 'doesn't matter' that she could see her own brain responses during the experiment, and expressed her surprise at this 'lack of interest in subjectivity' in such experiments (Martin, 2013, p. 149). That made us wonder: if patients, test-subjects and neuroscientists do not see themselves and each other as brain primarily or exclusively, and if neuroscientific experiments are not as simple and effortless as their reported outcomes imply, how then are consumer brains enacted in practice?

Brains in practice: Ontology and accountability

STS provides important analytical concepts and methodological procedures for studying how the brain is rendered accountable for consumer behaviour. By attending to

'techniques that make things visible, audible, tangible, knowable' (Mol, 2002, p. 33), we can observe how an entity is enacted in practice. In her ethnography of medical practices in a Dutch hospital Mol (2002) has argued for a shift from epistemology to ontology, i.e. from examining which representation of reality is accurate to considering how practices enact reality differently. Foregrounding the multiplicity of entities (objects, technologies, persons) and their practice-based accomplishment complicates the distinction between subjective and objective accounts of a phenomenon. This so-called 'ontological turn' in STS (e.g. Woolgar & Lezaun, 2013, 2015) and the question of how entities are enacted has spurred an important debate in STS (e.g. Lynch, 2013; Sismondo, 2015) and beyond. Instead of talking about beliefs, representations or culture, researchers explore 'ontologies' as entities or objects that have been brought into being and could have been otherwise. Entities as various as salmon or diets can have multiple realities when they are enacted in different practices (Lien, 2016; Mol, 2013). For instance, de Boer et al.'s (2020) study of Non-Invasive Brain Stimulation (NIBS) in the field of cognitive neuroscience explored how the scientific object of 'visual attention' is constituted interactively between scientists involved in the development. The study showed that different technologies used to study visual attention 'do not so much offer different perspectives on one singular object that can be identified as "visual attention", but rather make scientists relate to different provisional objects that need to be actively stabilized' (de Boer et al., 2020, p. 2).

Whereas these approaches help us understand how the ontology of entities is achieved, they say rather less about ontological respecification. Our interest is critically to assess the claimed shift from person to brain through an empirically oriented focus on ontological enactment and respecification. By ontological respecification we mean the process whereby the ontology of an entity, what an entity *is*, is reclassified. We draw on Woolgar and Neyland (2013), who analyse how mundane objects or technologies like bin bags, traffic lights, or ID cards can be subject to an 'ontological respecification' when they are made to speak for politics and how this can also change accountability relations. They give the example of a cup of coffee that changes (is 'respecified') from 'coffee' into 'too hot coffee' after a customer successfully sued McDonald's because their coffee caused her burns – as reported in the media. The ontological respecification of the coffee entailed corresponding changes in accountability relations. While burns arising from the (mis) handling of coffee were previously a customer's individual responsibility, burns deemed to result from 'too hot coffee' made McDonald's accountable. In similar vein, they discuss the case of the 'wrong bin bag', in which a woman was fined by her local council for using the 'wrong' type of black plastic bag for waste disposal. Woolgar and Neyland show how an ordinary black plastic sack comes to be viewed as 'wrong'. The ontology of the bag is reconstituted in and through its (textual) articulation in the news media (2013, p. 50). They argue that 'the situated ontology of an entity (the bin bag) made possible its apprehension as a moral matter ("wrong")' (Woolgar & Neyland, 2013, p. 55).

Woolgar and Neyland (2013) build on Garfinkel's ethnomethodological understanding of accountability (cf. Linstead, 2006): 'Activities whereby members produce and manage settings of organized everyday affairs [being] identical with members' procedures for making those settings "account-able"' (Garfinkel, 1967, p. 1). For Garfinkel social order and accountability are produced in and through processes of social interaction. Actions can be rendered accountable either by directly observing these actions or by

turning them into an account (e.g. a report) that enables others to become witnesses and to evaluate and understand the reported activities. For instance, Suchman's (1993) study of airport operations rooms shows how the monitoring and reporting of activities – in this case movements of aircrafts – is rendered accountable. The standardised and centralised recording of all activities in a national computer system makes them accountable to different 'publics' across time and space. Records need not only be text-focused reports and database entries. Neyland and Coopmans (2014, p. 1) argue that images can become part of the organised relations of accountability. They show how surveillance images, photographs of traffic violations and mammograms are mobilised and contested as evidence. Attending to how visual accountability is realised in these three cases, they emphasise the 'hailing' effects of images. By this they mean that images 'call for and prefigure a certain kind of response and dispersing of responsibility' (2014, p. 1).

By attending to 'accountability in action' (Neyland & Woolgar, 2002), these and other ethnomethodologically inspired ethnographies of accountability contribute to an understanding of how accountability is generated and sustained. Accordingly, Woolgar and Neyland define accountability as 'no single thing, fixed in time and place. Instead, accountability admits a range of interpretations in terms of the direction, intent, audience for, and distribution of responsibility' (2013, p. 58). They explain that '[f]or ethnomethodologists, what is accountable is a mundane, pervasive organizing orientation for social action' (p. 32). They distinguish between accountability as a form of intelligibility that attends to 'making accounts, accountably available' (p. 32) and responsibility as accounting for conduct in interaction that is one possible effect of accountability. Woolgar and Neyland call for a focus on shifts in accountability as these shifts have significant consequences for how entities are brought into being and sustained through the realignment of accountability relations (Woolgar & Neyland, 2013, p. 58).

To what extent can this conceptual repertoire contribute a different reading of the prominence of the brain? How far does the power of the brain emerge in virtue of reconfigured sets of accountability relations in experimental practices in neuromarketing? Neurotechnologies such as fMRI and electroencephalography (EEG) render consumers' measured brain activity observable and transform this information into measurements and then visuals (e.g. brain scans) or texts (e.g. published articles, client reports). In the process, we argue, the brain is enacted as an entity that comes to play a pivotal role in the accountability of consumers' behaviour according to neuromarketing experts. Whereas commonly accountability for knowing about and reporting on individual consumption behaviour rested with consumers themselves, neuromarketing purports to reveal that consumers' brains are the ultimate source of information about consumers' preferences. Moreover, as we show, the enacted consuming brain engenders a redistribution of accountability relations in neuromarketing accounts of consumer behaviour. The consuming brain mediates the network of accountability relations and takes a central role, whereas consumers' accounts become negligible. Who or what has access to revealing why consumers buy what they buy? We claim that this is central to understanding how the shift from person to brain occurs in practice. In particular, we see that the ontological respecification from person to brain is not so much a reduction as an extension and redistribution of accountability relations between consumers, brains, brain scanning operators and neuromarketing consultants.

Enacting the consuming brain: An ethnographic study of neuromarketing

Building on previous laboratory studies of neuroscience, we participated in and observed commercial and academic neuromarketing practices in different sites in Europe intermittently between 2009 and 2015. The study involved attending neuromarketing conferences (in 2011, 2012 and 2014), public lectures (2014) and courses (2014), participant observation of neuromarketing experiments (2012, 2014) and conducting interviews with 23 people from Europe or the United States (intermittently between 2009 and 2014). Interviewees worked for neuromarketing companies, held academic positions at universities and conducted neuromarketing research, or were involved in related activities (e.g. writing books, organising events) to consumer neuroscience. Researchers conducting neuromarketing experiments employed a range of different neuroscientific and biometric techniques aimed at measuring consumers' biometric and neuronal responses to products or similar stimuli in the laboratory setting. In the following, we introduce each setting and three exemplary vignettes from our fieldwork in detail.

Neuro Consultancy

Over the last two decades a growing number of neuromarketing consultancies have started offering their services to corporations seeking consumer insights. As part of our fieldwork we gained access to a neuromarketing consultancy in Europe, which conducts fMRI research to test consumers' brain responses to advertising commercials. This consultancy, which we call 'Neuro Consultancy', claims on its website to determine the 'true motives' of consumers by measuring their brain activity with fMRI. Neuro Consultancy is highly respected both by members of other consultancies and by neuromarketing academics. In an interview one of the founders explained why they use brain scanners instead of questionnaires to predict consumer behaviour:

> It is an empirical issue. You can ask people something – there are many publications on this – [or] you can scan their brain. And then it turns out that the brain scanner predicts better what someone does, then what he said himself. That's just a finding. (Interview 1, January 2014)

In line with this claimed higher prediction rate when drawing on brains rather than consumers' accounts, Neuro Consultancy used a mere 24 test-subjects per experiment. According to our interviewees this conforms to the general norms of fMRI research (see also Pajula & Tohka, 2016). To find out in detail how a brain scanner reveals whether 'people' (truly) will buy a product or brand, using only 24 subjects, co-author Jonna Brenninkmeijer arranged to attend one of Neuro Consultancy's experiments. Stefie, a student, who felt comfortable participating as a test-subject, accompanied her.

Hence, in June 2014, Stefie and Jonna arrived at the neuroimaging centre. A research assistant brought them to a small waiting room where the course of the experiment was explained and Stefie was asked to fill in medical screening and informed consent forms. In the lab, a woman who worked as the operator of the fMRI machine asked Stefie to take off her shoes, empty her pockets, and to remove any metal objects (underwire bra, hair

clips, piercings). The operator then took Stefie to a separate room with an fMRI machine, which was connected to the lab with an observation window. Stefie was asked to lie down on a small bed that could be rolled into the machine, and laced up with a couple of bands. She was wired up to devices that measured her breathing and heartbeat, put on earphones to offset the noise of the machine, was given an alarm button 'in case anything should go wrong', and some pillows to make her position more comfortable. Then the cap of the fMRI machine was closed around her head, and Stefie was rolled into the scanner. When the operator entered the lab room again, Stefie had almost completely disappeared. Then, she reappeared on several computer screens: her brain scans on one screen, her eye-movements on another, and her heartbeat and breathing was registered on a third.

Stefie watched multiple pictures of advertisements in the scanner and was asked (through a speaker) to press a button whenever she saw the same ad twice. Next, she watched TV commercials, and listened to radio commercials. And in the last part of the experiment Stefie was exposed to a mix of pictures (faces, buildings, objects, mutilations), statements (personal and factual) with which she should agree or not by pressing a button, and gambling tasks in which she won or lost 2 euros after pressing a button. After the fMRI experiment, Stefie was rolled out of the machine again, released of the bands and wires by the scanning operator, and asked to complete a questionnaire. The purpose of all this was not to find out how Stefie responded to commercials or gambling tasks, but to register her brain responses as one of the 24 consumer brains.

Pivotal for the success of the experiment, however, was the importance of establishing a relationship between experimenter and test-subject. To this end the research assistant and operator have to make sure that the participant understands the tasks, feels comfortable, is motivated and participates as intended (cf. Cohn, 2008). If any of this fails, for example, when the participant does not perform well, moves at the wrong moments, or falls asleep, the experiment fails. In other words, in order to measure the brain, the researchers also have to manage the person.

Stefie admitted being nervous getting into the scanner, and was a bit worried about the pictures she would have to look at in the last part of the experiment. According to the information brochure these could be experienced as 'nasty' or 'shocking'. The research assistant, however, comforted her, and told her that she was free to withdraw at any time. When Stefie was prepared for the scanner, everything that was connected to her body – the bands, wires, headphones, hairnet, etc. – was mentioned and explained by the scanning operator. Throughout the experiment Stefie was repeatedly assured that she was 'doing very well'.

The operator and the research assistant did not only use words to make Stefie feel calm. While the operator was 'planning' the scans, Stefie was asked to watch a short movie. In her account of her experience after the experiment, she wrote: 'I watched a short movie about penguins, but because I was still getting used to the sound of the scanner, and because I was a bit tense yet, I wasn't really paying attention' (self-report Stefie, June 2014). In interview, one Neuro Consultancy researcher explained that this initial movie is especially meant 'to make the participant feel more comfortable' (Interview 7, June 2014). Simultaneously, they use this moment to make a structural (static) scan of her brain, which they need to capture its functional changes.

We can see that from the moment Stefie agreed to become a test-subject, she was undergoing preparations for becoming an objective locus of consumer behaviour (i.e. a research subject that provides 'objective' brain responses): aided by instructions and acts of the scanning operator and the research assistant, but also, for example, by the information brochures, the medical screening and informed consent form, and the look (and sound) of the fMRI machine itself. During the experiment, Stefie obediently complied with the researchers' script (Roepstorff & Frith, 2004). She did not move, although she sometimes felt the need to; she tried to pay attention, although she experienced some of the tasks as boring; she watched pictures that she found very unpleasant; and she hardly paid any attention to the setting she was in. After the experiment the data were analysed by the researchers with statistical programs that calculated how Stefie's brain responses on the emotional triggers and the commercials relate. So, if a snake is shown, Stefie is supposed to give a brain response that corresponds with something we call fear – if this same response is given when watching an advertisement, the advertisement apparently evokes something we call fear.

For the operator and research assistant, Stefie was an obedient research respondent, who did not move and pressed buttons when asked, but inside of the scanner Stefie perceived herself as a person with feelings and opinions, and she also had some meta-thoughts about herself as participant in the experiment. For example, Stefie was asked to agree or disagree to impersonal statements ('Berlin is the capital of Germany'), but also to personal statements ('I often doubt', 'I am a perfectionist'). And the experiment ended with a questionnaire about her commercial behaviour and the commercials she had watched. She reported that she felt nervous and tense in the beginning of the experiment, and that she felt the researchers intentionally let her win or lose money to test how she would react (self-report Stefie, June 2014). She also reported that she was not always completely concentrated during the one-hour experiment, and that some of the pictures where so unpleasant that she could not watch them too long.

However, the researchers who developed the experiment and analyse the data stressed that the experiment was not about personal ideas and preferences, and not even about personal brains.[7] In their view all brains are more or less equal, and the tasks given to subjects evoke comparable brain responses in everyone. In a next step the responses on these tasks are compared with the responses on the commercials. So, they calibrate the individual brain responses on general emotional tasks, to see what 'emotions' are evoked by the commercials. As interviewee 2 explained it: 'I am not afraid of snakes, but in the scanner my brain shows fear' (January 2014). According to these researchers it did not matter whether Stefie feels disgusted by some of the pictures, or whether she sees herself as a perfectionist, which was one of the questions in the questionnaire. That is, for the researchers Stefie was not a person with individual feelings and preferences, but a brain that is 'quite universal': a representative of the majority of other consumers' brains, and not just during the experiment but more importantly beyond the laboratory, too.[8]

Our fieldwork leads us to suggest that enacting the 'true' motives of the consumer with an fMRI scanner entails a redistribution of accountability relations. The consumer is no longer accountable for his or her actions – it is the brain scanner that reveals the true motives of the consumer. The ontological respecification of the consumer from a subject with ideas and preferences, to a brain that can be calibrated and calculated occurs in

virtue of a process in which the subject (the person) is backgrounded, but also still present. Yet, only spokespersons on behalf of the brain – neuromarketing technologies and experts – assume accountability for revealing why consumers buy what they buy. In the process of ontological respecification, accountability is redistributed from person to brain through the people conducting the experiment as well as the technologies used to understand consumers' brain activities during the experiment – both are central for the extension and redistribution of accountability.

We thus see that the distribution of the brain in visual representation and the rendering of the brain as a universal brain are part of the work done in achieving the shift from consumers' accounts of what they desire to brain activation patterns as markers of consumers' desire. But this is not simply making circumstances, background, context and experience irrelevant to the procedure. Rather it involves bringing into play a whole new series of connections and relations, for example the backgrounding of personal preferences and feelings, the attention to personal understanding, concentration and arousement; and the checking of pressing buttons and not moving or falling asleep.

SI Lab

We also had the opportunity to connect with an academic research laboratory in which a group of experimental psychologists study interactions between the senses of touch, smell, sound, taste and vision. The research lab's website announces the research as 'changing the way we view our senses, and providing important new understandings of the brain'.[9] The director of the lab took time to meet us and explain some of the group's ongoing experiments. Based on this initial conversation in which we also explained our ethnographic research interest in neuromarketing, we were invited to visit the research lab and to participate in experiments. Co-author Tanja Schneider followed up the invitation. After her first visit she signed up to a participant email list and received emails inviting her to take part in a range of sensory experiments. On her third visit she participated in a 'smell experiment'.

> I'm participating in a study about fragrances and their associations. David, a doctoral student, who runs the study, greets me. He shows me the room in which the experiment will take place. The space is very small, has no windows, black walls and a black door. I cannot help but think that I am being black boxed! Next to the door is a desk with a chair. On the desk sits a computer monitor, keyboard and mouse, and what looks like a medical device connected via a translucent plastic tube to a gas cylinder. The gas cylinder is introduced to me as an olfactometer that will allow me to smell certain fragrances. (Field note, November 2012)

After completing the Participant Information Sheet and signing the Participant Consent Form, David explained the experimental set-up. He invited Tanja to smell a number of fragrances with the help of the olfactometer set-up. Next she was asked to rate the smell on a scale displayed on the computer screen with the help of the computer mouse: is the smell 'rather pleasant' or 'unpleasant'? Between a series of these tasks Tanja was given short scheduled breaks so as to 'give your nose a rest'. Once she completed this series of so-called 'implicit-association tests'[10] she was taken to a different room in the lab and

introduced to an 'odour/smell kit'. David asked her to smell a number of the odours and simultaneously to complete a questionnaire. The end of the experiment was signalled by thanks from David and his giving Tanja a small remuneration for her participation.

Two weeks later Tanja participated in a study on food perception, also run by David. The experiment seeks to create the illusion of a dinner scene in the lab space and Tanja is invited to sit at a table (with tablecloth and cutlery but white cardboard plate) and eat three variations of a salad. She records her experiences in a questionnaire that asks how the food tastes (or she expects it to taste), how visually appealing it is and how appealing is its texture.

These experimental research designs reflect SI Lab's focus on the investigation of interactions between different senses. As a member of SI Lab, Petra, explained during an earlier meeting:

> . . . you cannot really study a taste by itself because it's gonna be influenced by all the other senses that you experience at the same time. So actually something might taste different to you depending on the music playing in the background or probably what you see around you, the colour of the food; all kinds of things that seem to be unrelated but actually have an impact on how it tastes. (Interview 22, August 2012)

As a consequence, instead of asking general questions about taste in the experimental set-up, specific questions were asked about the association of taste with a range of sounds. Subjects were obliged to make the choice.

> Because if you were just to ask 'do you in general associate taste with sounds', I'm very sure almost anybody – except people with synaesthesia maybe, would say no but then if you go and insist and force them to choose, and ask them 'is something bitter high pitch or low pitch' and you have to pick one, then you see that most people pick the same. (Interview 22, August 2012)

Tanja remembered feeling uncertain about being compelled to make a choice. Evidently, the key assumption here is that in 'being forced to make a choice' (field note, November 2012), Tanja (or was it rather Tanja's brain?) picks an option based on a heuristic that is then rendered explicable in terms of unconsciousness made measurable. Tanja certainly found herself at times puzzled by the tasks and questions that formed part of the experiments described above. Learning to choose (and becoming less surprised at the choices on offer) is, it seems, a central part of enacting Tanja's neuromarketing brain.

In the case of SI Lab the brain at first seemed absent. There was no brain imaging or scanning in the experiments in which Tanja participated. However, as we learned from our conversations with the researchers and by reading their published papers, the senses are reckoned to be intricately entangled with a person's brain. It is the brain which receives and interprets sensory signals. As one SI Lab researcher put it: 'The senses are channels that give information to the brain. . . . The brain is constantly putting this information together. Through the senses you receive information but the brain is the one that makes the connection and makes sense of this information' (Interview 23, August 2014).

In this account, the brain looms large. It is said to be the key mechanism for integrating cross-modal correspondences. Since cross-modal effects are considered to operate on

an implicit level, experimental research designs are favoured over, for instance, focus group research. So the category of 'implicit knowledge' – supposedly unobtainable through introspection and talk – renders consumers' own accounts secondary. Only controlled laboratory studies of consumer behaviour, it is maintained, can provide access to these implicit processes in which the brain is central. We thus see how the stipulation of consumer knowledge as implicit is achieved through a specific ontological distribution of people and things and through a specific distribution of accountabilities between them. Accountability for 'knowing' consumers passes to the experimenters, who are reckoned to have privileged access to understanding consumer behaviour. Enacting the consuming brain in SI Lab entails submission to this ontological respecification, brought about through an array of practical experimental routines, whereby consumers are enacted as non-knowledgeable and as lacking reliable access either to their brain or to their (unconscious) emotional states.

Advertising effectiveness

We also examined some outcomes of the process of enacting a brain – specifically the results of neuromarketing investigations as published on the web. A number of neuromarketing consultancies purport to be able to measure the effectiveness of television advertising. The stakes are sometimes especially high. During televised coverage of the US Superbowl the typical cost of advertising space for a 30-second slot was around US$2.6 million in 2009[11] rising to US$4.5million in 2015. Unsurprisingly, advertisers are keen to know if they are getting value for their money. As a neuromarketer blogs: 'Super Bowl ad prices make an investment in a neuromarketing study look cheap.'[12] And various neuromarketing agencies are keen to provide an answer.

The neuromarketing agency Sands posted an analysis of the 2011 Superbowl advertisements on their website and in particular a detailed neuromarketing analysis of the Volkswagen (VW) advert 'The Force'. The 60-second video narrative of this advert follows the several unsuccessful efforts of a small boy, dressed in full Darth Vader outfit, trying to evoke reactions to his Vadic powers from various household characters and objects – a doll, the family dog, the washing machine. Standing outside in the driveway, he is astonished finally to succeed by starting up his dad's (new VW) car by the mere gesture of his (Vader's) hands. Viewers are then shown that the dad, using a remote control while standing inside the house, in fact started the car. The ad concludes with the onscreen caption: 'The new VW Passat has arrived'.

Of the 69 adverts they tested for effectiveness, Sands rated this VW advert top. The company website carries a description of their products and services, and a video of what purports to be a real-time video analysis of brain response to the VW advert.[13] The Sands video analysis of 'The Force' juxtaposes the running of the video of the advert itself alongside a record of changes in eye tracking superimposed on the video; as well as two moving graphs showing changes in 'Overall Engagement' (the Neuro Engagement Score) and in 'Emotional Valence'; and six cross-sections of a brain showing changes in brain activation. The viewer thus sees the brain in real-time action, with different areas of each brain section exhibiting changes in colour, corresponding to the progress of the video advert.

How was the brain enacted in this case? Elsewhere on their website Sands provide an account of their methods, as used in their 2011 analysis. They report that participants (they don't say how many) were fitted with EEG caps and lightweight eye tracking glasses equipped with cameras. This allows Sands to record each viewer's non-verbal brain response on a millisecond by millisecond basis and sync exactly where and at what level their attention is at that millisecond.[14]

Again we see, as with Neuro Consultancy and SI Lab, that the experimental brain is far from an isolated entity. Subjects themselves may be unreliable but their brains need to be taken care of. This involves, on the one hand, adequate connections with recording apparatus and monitoring technology. At the same time it seems important that the investigated brain is situated in a naturalistic setting which is here portrayed through the register of a domestic environment: 'individually in a relaxed living room type setting and sitting in a comfortable lounge chair'.[15] Intriguingly, it is in this situation, notably as individuals rather than amongst family and friends, that brains are reckoned to exhibit typical responses to TV adverts.

As with Neuro Consultancy and SI Lab, the generality of the specified brain is achieved through its subsumption within a population of similar brains. In Neuro Consultancy 24 participants was adequate. In SI Lab the brain was the overarching mechanism of synthesis. In the Sands assessment of the brain's reaction to the Superbowl ads, an undisclosed number of participant brains were deemed adequate. Any possibility of individual difference was absorbed within an overall summary visualisation of the results. As with Neuro Consultancy and SI Lab, the Sands rankings thus encourage us to understand the brain as universal. Accountability for knowing any individual brain's performance is displaced by statistical aggregation.

Conclusion

We encountered a diverse range of neuromarketing practices in the different settings we studied and report in the three vignettes above. The classification of marketing practices as 'neuro' does not always require the use of what have been conventionally understood as neuroscientific technologies. Neuro can also be attached to the study of consumer preferences through a range of other research techniques and set-ups (e.g. biometric research, experimental psychology) and by way of inference to existing neuroscientific knowledge and the explication how this is relevant for marketing. This brings up the issue of hype about neuromarketing. It also raises questions to what extent neuromarketing knowledge and technologies are employed to render marketing practices more 'objective' and 'scientific'. The latter was discernible in some of our interviews with neuromarketers. For instance, as one of our interviewees, an entrepreneur, who had co-founded a start-up focusing on eye tracking, a biometric measurement of engagement, put it: sometimes it proved useful (for her and the company) to be associated with the neuromarketing 'banner' (field notes, May 2011).[16] All the neuromarketing professionals we visited, observed or interviewed share the position that consumers do not have access to their true motives. This provided the marketers' rationale for going beyond consumers' accounts in order to reveal the hidden causes of consumer behaviour (Schneider & Woolgar, 2015). Technologies such as fMRI and EEG are crucial to achieving this revelation according to

neuromarketing professionals. However, this achievement rests on the central assumption that the uptake of these technologies is neutral and, more importantly, that this neutrality is essential to achieving valid knowledge about human behaviour. Consumers are thereby secondarised as an object of research and neuromarketing technology and experts assume accountability for revealing why consumers buy what they buy.

In this article we propose a different interpretation by describing how in experimental practice consumers are rendered non-knowledgeable and how the brain is achieved as the locus of objectivity. We have shown in particular how the interlinked actions of multiple (human and non-human) actors contribute to a shift in accountability relations such that the person becomes respecified as a brain. Ontological respecification is accomplished in these neuro experimental settings. But the complexity of these experimental practices belies the arguments that the brain is a mere reduction of the person. In enacting the consuming brain the person is not so much reduced as reconfigured in terms of a specific series of expectations, rights, responsibilities and assumptions about what counts as an adequate explanation of their behaviour. Ontological respecification is not so much reduction as it is a redistribution of accountability relations. As we showed in our ethnographic sections above, accountability is redistributed from person to brain in situ through people conducting the experiment as well as the technologies employed to understand consumers' brain activities during the experiment. We call for further studies of ontology and accountability relations in practice, so as better to situate novel explanations of human behaviour and to account for the political effects of technologies on transforming agency.

More than this, we might say, the redistribution of accountability is quintessentially messy. For despite the recurrent appeal to the brain as a way of avoiding the unreliability of subjects' views, we note that all three of our experimental cases also involved the administration of questionnaires. Consumers' views (in questionnaires) cannot be relied upon except, it seems, when they are extracted as an integral part of an investigation of the brain. From some lofty philosophical vantage point it would be tempting to denounce this as contradiction. More charitably, perhaps, it suggests the intriguing possibility that ironies and contradictions of this kind are necessary in order to achieve the brain. And if the messy redistribution of accountabilities is key to the achievement of the brain, this may provide a clue to the coexistence of different brains in different neuromarketing practices.

Finally, we should note one particular feature of enacting the consuming brain which invites further exploration. As was suggested at the end of the last section, accountability for knowing the brain can be distributed in many different ways. We have described some of the ways in which brains are enacted in neuromarketing practice. Yet our description of these processes itself proceeds by implying distance between our own brains and this descriptive work. What is happening in our brains when we write/read this text? What happens to the universal brain as it apprehends this argument? And, apart from subjecting ourselves to the same kinds of experiment described in this article, how would we know?

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Notes

1. For more information see, www.loc.gov/loc/brain/proclaim.html (accessed 11 August 2021).
2. 'Consumers spent an estimated $1.9 billion on digital brain health and neurotechnology apps in 2018, a fourfold increase from $475 million in 2012, according to global data from SharpBrains, an independent market-research firm' (Toy, 2019: 4th paragraph).
3. For more information see, www.drinkneuro.com/ (accessed 31 May 2021).
4. In the case of brain imaging with the help of functional Magnetic Resonance Imaging (fMRI) participants watch, for instance, a commercial and the brain's response is measured in the form of blood oxygenation level-dependent (BOLD) measurement that is considered a proxy for neural activation.
5. Laboratory studies attend to the processes and artefacts of knowledge production in scientific research labs and have prominently been developed in STS (e.g. Latour & Woolgar, 1979/1986).
6. Unfortunately, we had no access to the paper of Roepstorff.
7. Please note, the operator and assistant are not the researchers who conduct the analyses. The operator and assistant work with Stefie the test-person, the researchers with Stefie's brain data.
8. One of them explains: 'The most important brain spheres that people have are quite universal. Also when reduced to brain structures. Everyone wants reward. There are rewarding circuits in our brain and when you can touch these, you are almost there. We are all driven by certain fears. . . . We are all determined by what other people do. We all want internet; we all wear Uggs. When we see something on the street or read something in the newspaper, we all want that. We are just relatively simple animals' (Interviewee 1).
9. To keep the lab anonymous, we do not cite the exact link.
10. Implicit-association tests (IAT), a measure often used in social psychology, are designed to detect the strength of a person's automatic association between mental representations of objects (concepts) in memory.
11. For more information see, https://en.wikipedia.org/wiki/Super_Bowl_commercials (accessed 31 May 2021).
12. For more information see, www.neurosciencemarketing.com/blog/articles/neurobowl-neuromarketing-and-super-bowl-2012.htm (accessed 31 May 2021).

13. For more information see, www.sandsresearch.com/little-darth-video.html (accessed 31 May 2021).
14. For more information see, www.neurosciencemarketing.com/blog/articles/darth-vader-wins-super-bowl.htm (accessed 31 May 2021).
15. See note 11.
16. See also Schneider and Woolgar (2015).

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