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Organizational Neuroethics

Reflections on the Contributions of Neuroscience to Management Theories and Business Practices

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Introduction

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Joé T. Martineau and Eric Racine

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"Organizational neuroscience" is a new area of research that seeks to bridge neuroscience research, theories, and methods with management and organizational science. The goal of organizational neuroscience is to incorporate knowledge about brain processes underlying thoughts, behaviors, and attitudes of organizational actors in order to inform management theories and to assist management practice in understanding, predicting, and improving these behaviors in the workplace (Becker et al. 2011; Senior et al. 2011). Already, various examples of practical applications from organizational neuroscience research have emerged, such as the use of neurofeedback in order to modify behavior, notably for leadership skills development (Waldman et al. 2011); the development of consumer neuroscience research or neuromarketing techniques, for improved marketing and managerial practices (Hubert and Kenning 2008); or the use of cognitive or performance enhancement drugs (e.g., modafinil) to increase vigilance and manage fatigue of employees, especially in the military. Another recent area of organizational neuroscience research focuses on ethical decision-making and behavior of employees and

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managers. However, organizational neuroscience research and applications sometimes face methodological and technological limitations, which have important implication for their responsible use. They also raise profound ethical challenges regarding, among others, the understanding and interpretation of neuroscience research and innovations, organizational responsibility, discrimination, well-being of employees, informed consent, and thus possible coercion and abuse on the part of organizations.

The idea that neuroscience has the potential to enrich and have fundamental implications for organizational studies, among others, is not entirely new, but rather part of an ongoing debate about the contribution of neuroscience to resolving societal and ethical issues, most of it taking place in the field of neuroethics (Racine 2010, 2013). At the boundary of neuroscience and ethics, neuroethics is an interdisciplinary field that aims to analyze and discuss the impact of the development of neuroscience and neurotechnology on different aspects of human life. This field is typically divided into two main areas of interest: (1) the ethics of neuroscience and (2) the neuroscience of ethics (Roskies 2002; Levy 2007). The ethics of neuroscience is mostly associated with bioethics and addresses ethical issues related to the development of research and clinical neuroscience. For example, this area deals with issues related to the determination of brain death, as well as those related to the use of neuroimaging techniques. In contrast, the neuroscience of ethics aims to integrate the results of neuroscience research to contribute to our understanding of ethics itself. For example, the use of functional neuroimaging techniques now allows us to better understand the mechanisms underlying moral reasoning and emotional processes such as empathy. In the neuroethics literature, celebrations of the promises and epistemic supremacy of neuroscience have been met with equally passionate anti-naturalist critiques of this view, as well as more moderate positions [for a review, see Racine (2010) and Pickersgill (2013)].

In this edited volume, we wish to introduce, define, and map a new "organizational neuroethics" as an emerging interdisciplinary field of research that reflects on the ethics of organizational neuroscience research and applications, as well as on the neuroscience of organizational ethics, drawing on the debates and reflections that have been taking place in the field of neuroethics in the past two decades. To our knowledge, *Organizational Neuroethics: Reflections on the Contributions of Neuroscience to Management Theories and Business Practices* is the first book to tackle this important topic and to do it in an encompassing way.

This book is divided in two parts, each one prefaced by a section introduction that provides a general overview of the topic and the contributions regrouped in the section. Part I, *The Ethics of Organizational Neuroscience*, provides an overview of the different ethical and methodological issues as well as the technological limitations associated with research and applications in organizational neuroscience, including topics such as the ethics of neuroleadership, consumer neuroscience research, and neuromarketing practices. The contributions featured also discuss the ethical issues related to the use of neurocognitive enhancement drugs in the workplace. Part II, *The Neuroscience of Organizational Ethics*, features contributions on topics such as the neuroscience of ethical, and unethical, decision-making in

organizations, the neuroscience of online trust, and the neuroscience of empathy and its implications for organizations.

One important aspect of this volume is that it provides contributions from a real diversity of scholars, a diversity we sought and encouraged as editors. Emerging and well-established scholars coming from various fields such as business ethics, management, neuroscience, and neuroethics, as well as from different locations such as Canada, the Unites States, the United Kingdom, Denmark, Spain, and Japan, have generously contributed to this book. The reader will also find contradicting views between some of them, indicators of the debates going on in this new field. This diversity of point of views is also something we believe crucial to the deepening of our understanding of the ethical issues in organizational neuroscience.

The global objectives of this book are thus to paint a broad portrait of organizational neuroethics, to discuss its future, to separate wheat from chaff in matters of scientific promises, and to promote the development of organizational neuroscience in the most ethical way. Indeed, we believe that regardless of the interesting, seductive, and promising aspects of research and potential applications in organizational neuroscience, this cannot blind us and clear us from adopting a cautious stance toward the rapid development of this emerging field, as well as the important ethical reflection it engenders. We hope that this first book on the topic of organizational neuroethics will provide a balanced overview of organizational neuroscience research and its applications, appealing to a broad audience in management, business ethics, neuroscience, neuroethics, philosophy, and social sciences.

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Part I

The Ethics of Organizational Neuroscience

Section Introduction: The Ethics of Organizational Neuroscience

2

Joé T. Martineau and Eric Racine

Organizational neuroscience is a recent area of research. Given the enthusiasm of researchers and organizations themselves, the main focus and efforts of the last 15 years have been invested in the development of research and its applications. Ethical as well as critical views on this research have remained marginal. We believe this first book on organizational neuroethics provides an opportunity to step back and reflect on the past and current organizational neuroscience research and applications, their promises, as well as the ethical issues and methodological limitations they raise. It is also an opportunity to reflect on the future of organizational neuroscience and on how it is possible to promote its development in the most ethical way and how to overcome identified limitations. This is the main topic of the first part of this book.

This first part features five chapters. Spence provides a critical analysis and compelling argument to tackle issues related to sensory marketing although he argues that neuromarketing per se may not be problematic. Kim and Waldman offer an overview of organizational neuroscience research on leadership and put forth that the issues raised by this use of neuroscience research may not be as vexing as it first appears. Lindebaum and colleagues review ethics content in the use of neuroscience in management. They find these discussions severely restricted, with limited engagement with the deeper humanistic issues at stake. Hubert and Hubert

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propose a novel model to understand and propel discussions about the theoretical and methodological implications of consumer neuroscience. Finally, Dubljević and colleagues describe different pharmacological and device-based human performance enhancement technologies. They discuss ethical aspects of their use in the workplace with a focus on regulatory options available.

On the Ethics of Neuromarketing and Sensory Marketing

3

Charles Spence

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Abstract

In this chapter, a number of key ethical issues associated with the recent emergence of the related fields of neuromarketing and sensory marketing are reviewed. Now that these new techniques are really starting to show their predictive mettle relative to other, more traditional, consumer psychology/behavioural testing approaches to marketing, questions around the ethics of stimulating the brain's "buy button" start to raise their head. Here, I want to question what exactly is so special, and so worrying, about "looking inside the mind of the consumer". I will argue that public fears around the dangers of neuromarketing have been overblown, at least up until the present time and, as far as I can see, for the foreseeable future. I do, though, want to raise a number of concerns around the growing influence of sensory marketing on our behaviour, focusing, in particular, on the world of food and drink marketing. Ultimately, I believe that the consumer of

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tomorrow may well have much to fear from the emerging neuroscience-inspired approaches to sensory marketing. In fact, before too long, we may all start to find ourselves being sensorially "nudged" into a range of less healthy food behaviours. As such, establishing clear ethical guidelines will, I believe, become an increasingly important issue for those working in the field.

3.1 Introduction

In recent years, there has been a rapid growth of interest in the fields of both neuromarketing (e.g. Ariely and Berns 2010; du Plessis 2011; Pradeep 2010; Renvoisé and Morin 2007) and sensory marketing (e.g. Cooper 2013; Hilton 2015; Hultén et al. 2009; Krishna 2013; Lindstrom 2005; Spinney 2013). Both are relatively new fields of research,[1] and both are linked by a shared desire to use the latest cognitive neuroscience insights and techniques in order to influence the behaviour of consumers. The press have certainly been very active in terms of their promotion of the dangers/potential of these new approaches to influencing/controlling consumer behaviour (e.g. Anonymous 2008; Bray 2007; Winnett n.d.; see also Racine et al. 2005, 2006; Racine et al. 2010). But, one has to ask, is the public concern with all this purported manipulation in the marketplace, elicited by press stories of marketers somehow targeting "the buy button" in the consumer's brain, really justified? The buy button is the name given to the region or, more likely, network of areas that influence the purchasing decision. As one commentator put it, "The ultimate goal is to identify a 'buy button' in the brain which can be targeted and triggered by future commercials" (Winnett n.d.; see also Witchalls 2004).[2] Or, one might counter, is public sentiment being stirred up needlessly by all the overexcited journalistic coverage (Lawton 2010; Lawton and Willis 2010)?[3] And, furthermore, one might also want to ask, just how different is the situation today from the mass hysteria that supposedly gripped so many North American consumers on the publication of Vance Packard's *The Hidden Persuaders* back in 1957?[4]

[1] According to Madan (2010), the term "neuromarketing" was first coined by Ale Smidts, in 2002, in an inaugural university address (Smidts 2002). That said, Anonymous (2004) suggests that the term was already in use by Gerry Zaltman in the closing years of the last century. The BrightHouse Institute, though, were the first to use the term in print (see Anonymous 2002).

[2] Though, as Blakeslee (2004) wryly notes in the title of her article: "If you have a 'buy button' in your brain, what pushes it?".

[3] Just take the conclusion from one newspaper article entitled "Admen seek 'buy button' in our brains" (Winnett n.d.): "A trip to the local supermarket or car showroom could soon become a psychological challenge with shoppers fighting subconscious urges that are manipulated by the marketers".

[4] Referencing the original, John Bunyard published *The Honest Persuaders* in 2010.

Some people are undoubtedly worried by the supposed power of neuromarketing. No wonder, when the neuromarketing companies themselves claim that they can "peer into the subconscious mind of the consumer" (quote from Wall 2013). Just take the following quote from Commercial Alert, a consumer group who consider neuromarketing both dangerous and Orwellian in scope: According to an article that appeared in *The New York Times*, Gary Ruskin, the group's executive director, wrote to the Senate Committee on Commerce, Science and Transportation—"What would happen in this country if corporate marketers and political consultants could literally peer inside our brains and chart the neural activity that leads to our selections in the supermarket and voting booth? What if they then could trigger this neural activity by various means, so as to modify our behavior to serve their own ends?" (quoted in Blakeslee 2004; see also Editorial 2004b; Grey et al. 2003). However, as Eric Spangenberg, at the time, dean of the College of Business at Washington State University, countered, "I don't think you are going to be able to make someone buy a car or a computer that they don't need, but you might persuade them to choose one model instead of another" (Anonymous 2008: 111). This is what Murphy et al. (2008: 297) term "a 'soft' attack on autonomy". Indeed, given the latest evidence from the field of sensory marketing suggesting that we can all be biased to choose and consume foods that our bodies most certainly don't need, then maybe we should now all be more worried about advances in the latter field. This is especially true when consumers are time and again shown to be seemingly completely unaware of the sensory factors ("nudges") that the research demonstrates really does influence their behaviour.

Worries about the dangers of neuromarketing have led some to take concrete action. France, for instance, has tried to crack down on the perceived rogue use of neuroscience. Back in 2011, the French parliament revised its 2004 rules on bioethics which were amended to read: "Brain-imaging methods can be used only for medical or scientific research purposes or in the context of court expertise". Of course, while this law effectively bans the commercial use of neuroimaging, neuromarketing companies need only cross the border to get around this legal restriction (see Oullier 2012).

3.2 What Is There to Worry About?

For a number of years, both the theoreticians and practitioners working in the field of neuromarketing have struggled to demonstrate the added benefit that their new neuroscience-inspired methods can provide over and above traditional consumer testing and focus group research (e.g. Catterall and Maclaran 2006; Lunt 1981; see Ariely and Berns (2010), for an authoritative state-of-the-art review from a few years ago). At the same time, commentators such as Raymond Tallis (2008) and Legrenzi and Umilta (2011) have vocally criticized what they characterize as a headlong rush by so many fields of study to embrace neuroimaging and explain all human phenomena in terms of brain activity. They have even coined a term, "neuromania", to describe this worrying trend. Indeed, according to an anonymous commentator

writing in the top science journal *Nature Neuroscience* a little over a decade ago, "Neuromarketing is little more than a new fad exploited by scientists and marketing consultants to blind corporate clients with science" (Editorial 2004a; Laybourne and Lewis 2005).

It is certainly true that many people have questioned the validity of traditional methods of consumer testing, for instance, consumer panels and focus group research (see Spence 2009, for a review).[5] And, given the exceedingly high failure rates of new product launches documented in most categories, it is hard to disagree. Commentators typically suggest that somewhere in the region of 70–95% of all new products fail within a year of launch (Schneider and Hall 2011). The exact figure here depends on the commentator and the particular product category under consideration [see Spence (2016b), for a review; though see also Spence (2015b), on the dangers associated with taking such scientific-sounding, but typically unsubstantiated, percentages at face value]. However, while winning that battle has certainly not proved easy, there are now growing signs that some of the most innovative researchers working in the field of neuromarketing are finally starting to provide significant gains (e.g. see Berns and Moore 2012; Boksem and Smidts 2015; Falk et al. 2016; Kühn et al. 2016; Telpaz et al. 2015; Venkatraman et al. 2015, for some representative examples); typically, it has to be said they have done so by means of a combined methodologies approach—that is, by combining neuroimaging data with more traditional measures (see Jarrett 2015; Spence 2016a, b, for commentary and review).

It is at this point, then, that the question really starts to emerge (or become relevant) as to the ethics of this kind of approach to modifying consumer behaviour [see Nill and Schibrowsky (2007), for a more general review of ethics and marketing, and Hensel et al. (2017), for a practitioner perspective]. The situation, or so it can be argued, is now very different from what it was when Ariely and Berns wrote their landmark review of the field back in 2010 and had this to say of the state of the art: "It is not yet clear whether neuroimaging provides better data [than] other marketing methods" (Ariely and Berns 2010: 287).

In the sections that follow, I will take a clear look at the field of neuromarketing, followed by the emerging field of sensory marketing, and address some of the key ethical questions that are now being raised. However, to begin with, it is important to try and define our terms clearly. For, as I will argue below, the answer to the ethical question, certainly as far as it applies to the field of neuromarketing, hinges on the scope and breadth of one's definition. By contrast, defining sensory marketing would seem relatively uncontroversial. Indeed, I am not sure that anyone would disagree (at least not substantively) with Aradhna Krishna when she says that "sensory marketing can be defined as 'marketing that engages the consumers' senses and

[5] According to one industry commentator, "in focus groups, some people want to please, others to dominate—urges that can influence their choices. In interviews, consumers often say what they think the interviewer wants to hear" [Tim Partlin of Lieberman Research Worldwide, quoted in Blakeslee (2004: 5)].

affects their perception, judgment and behavior" (Krishna 2012: 332). By contrast, the scope and definition of neuromarketing seems to have broadened quite dramatically over recent years.

Ariely and Berns (2010: 284) define neuromarketing as "The application of neuroimaging methods to product marketing" (see Editorial 2004b; Fugate 2007, for similarly narrow definitions). Contrast this with the more recent definition provided by Stanton et al. (2016, p. 3). They state that "We consider neuromarketing to be the use of neuroscience and physiological research techniques to gain new insights into consumers' behavior, preferences, and decision making, as well as other aspects of human cognition and behavior related to marketing". The latter authors go on to say: "Neuromarketing seeks information and insights beyond that revealed by traditional techniques such as surveys, focus groups, experiments, and ethnography—with the goals of enhancing marketing theory and practice. . .".[6]

After having attended a recent World Neuromarketing Forum meeting in London (April 2017; http://www.neuromarketingworldforum.com/), my sense is that many of the practitioners in the field have now adopted this much broader definition. In fact, my fear is that pretty much any cognitive/experimental psychology paradigm is in danger of being incorporated into the bag of tricks that neuromarketing companies now consider their own. As such, it soon becomes much harder to try and draw a clear line between those techniques that fall under the neuromarketing umbrella and those that do not (the latter, I call "neuroscience-inspired", instead; Spence 2016a, b).

If the umbrella term of neuromarketing is restricted solely to indirect neuroimaging measures—here I am thinking of techniques such as functional magnetic resonance imaging (fMRI), electro-encephalography (EEG), magnetoencephalography (MEG), and near-infrared spectroscopy (NIRS)—then there is little reason for the consumer to be worried about the dangers. Indeed I, like a number of other commentators (see Stanton et al. 2016), believe that the potential of the approach has been oversold. However, if the definition of neuromarketing is broadened too much, then it feels like the real question becomes one of whether any neuroscience-inspired approach to marketing is ethical. The answer to the latter question has to be in the affirmative, as I would argue that there is really no clear qualitative dividing line in terms of the methods used, or the results obtained between the traditional methods of consumer research (that no one complained about) and the all-singing, all-dancing neuromarketing techniques that are being peddled these days.

[6]It is unclear quite what the "experiments" in the second sentence is really supposed to refer to here, given that both behavioural scientists and cognitive neuroscientists would, I imagine, insist that they conducted experiments. One could, I think, also legitimately claim that certain neuroimaging techniques, specifically event-related potentials, should actually be considered as traditional given that marketing and advertising researchers have been using them for almost half a century (e.g. Krugman 1971; Weinstein 1981; Weinstein et al. 1980).

Here, it is interesting to note how many of the neuromarketing companies[7] that have traditionally (I mean over the last couple of decades) stressed the benefits of indirectly recording the activity of the human brain are increasingly shifting their focus to more implicit behavioural testing methods instead, often using a variant of that most-sturdy of behavioural tasks, the Implicit Association Test (see Greenwald et al. 1998).[8] Corporate clients, it has to be said, are often lured in by the promise of the benefits of brain imaging, only to be palmed off once they have been hooked with some implicit behavioural or psychophysiological measures instead—think eye-tracking (e.g. Juravle et al. 2015; Piqueras-Fiszman et al. 2013), galvanic skin response (GSR) measurement,[9] heartbeat, pupillometry (pupil dilation), or facial micro-expression analysis. Once again, it is not that these latter techniques don't have value; rather it is their incorporation within the umbrella term of neuromarketing that surprises me.[10] In fact, it would seem that the very definition of the term "neuromarketing" is changing in light of the growing realization of the challenges that are associated with commercial neuroimaging for business. On this point, just take the contemporary definition of neuromarketing that we came across earlier.

3.2.1 Interim Summary

To summarize, I believe that there is little to worry about, ethically speaking, if one takes a narrow definition on neuromarketing because the scare stories regarding the usefulness of the approach have been oversold; see Stanton et al. (2016), for a similar conclusion. And, should one adopt a broader definition, then there would not appear to be anything "special" about the new neuroscience-inspired approaches to marketing (see Nill and Schibrowsky 2007, for a similar conclusion). I have to say that I, myself, favour the narrower, traditional definition.

[7] Of which there are a growing number: According to estimates, there are somewhere between 1 and 200 companies currently selling neuromarketing (see Plassmann et al. 2012; Wall 2013).

[8] Note that it is not that I see no use for the use of so-called "implicit" behavioural tests like the IAT, for business (e.g. Parise and Spence 2012). In fact, we have often used it over the years in our industry-funded research (Demattè et al. 2006, 2007b). It is just that I want to question their incorporation into the gamut of neuroimaging techniques.

[9] According to an analysis conducted by Fisher et al. (2010), GSR is a particularly popular product offering amongst many neuromarketing companies.

[10] As Chris Jarrett (2015) put it when describing a purported neuromarketing study claiming to be able to predict block-busters using heart rate, skin conductance, and breathing, "This wasn't genuine neuromarketing—it was really just wiring people up to some basic physiological measures to see how excited they were by a movie trailer".

3.3 Some Problematic Cases

The real concern in recent years has been with companies conducting experiments on customers without informing the latter that this is what they are doing. So, for example, a few years ago, Facebook started experimenting on its users in order to understand the phenomenon of social contagion (see Kramer et al. 2014). There was a public backlash when its users found out that they had been "experimented on" without their informed consent. Here, the issue was not really about what the company might have found out about the minds of their users but, rather, that the latter should have been informed that they were being "experimented on".[11] By contrast, there is little likelihood that those taking part in a neuroimaging study would not know about it (though see Tovino 2005).

In a much smaller example of the problems that we may increasingly come to face, the realization that they were being monitored also disturbed the customers when a digital advert crashed recently in an Oslo pizza store called Peppe's Pizza (Pettit 2017). The code that appeared where the advert should have been revealed that the customer's age, gender, and facial expression were being identified remotely via a small camera placed over the advert—again without the knowledge of customers. The newspaper covering the story described this as "dystopian face scanning", going on to say: "The Peppe's billboard was created by retail analytics company Kairos, Dinside reports. The company creates recognition software designed to help businesses 'convert more customers,' 'recognise, merchandise, monetize'" (Pettit 2017). According to the broad definition that we came across a little earlier, this would, I think, have to count as an example of ethically questionable neuromarketing. What is more, I suspect that this kind of remote monitoring of our attention/emotional state is starting to become much more common (see Knapton 2016; Lo 2016, for a couple of other recent examples), though, normally, it has to be said customers have been alerted to the technology's use in advance, thus side stepping, in my opinion, some of the more vexing ethical issues. Do we, though, as consumers, have the right to know when this is happening? This feels like the kind of area where ethical guidelines would be beneficial.

In terms of the dangers of neuromarketing, one could easily imagine, should the public be made aware of the potential power of these new marketing techniques, at least as all too often portrayed in, and by, the mass media, that their response would be similar to what happened 60 years ago. According to the media reports, something akin to mass hysteria followed the publication of Vance Packard's *The Hidden Persuaders* back in 1957. The latter best-selling expose documented the various

[11]Facebook teamed up with academic researchers in order to conduct a study in which they intentionally manipulated 689,000 users' mood states without their knowledge or consent. Specifically, the social network controlled the news feed of users over a 1-week period back in 2012. They carefully managed which emotional expressions Facebook users were exposed to. When the peer-reviewed, and ethics board-approved, study came out detailing the findings, the company was subject to a major public backlash. People were angered that the company had not acquired people's informed consent prior to their taking part in the study (see BBC 2014a, b).

ways in which émigré psychologists fleeing the Second World War in Europe had come to revolutionize the study of consumer behaviour through motivational research (Samuel 2010). Extensive mention was made of the psychoanalytic techniques used by colourful characters like Louis Cheskin and Ernest Dichter. The fear then, as now, was that the latest new techniques would give the marketers unprecedented insight into, and control over, the behaviour of consumers (Thompson 2003). The concern, in other words, is that advertising and marketing campaigns based on neuroimaging would become so effective that consumers would lose their ability to resist, that is, that their free will would be compromised, thus infringing their "personal privacy to a totally unacceptable degree" (Editorial 2004b; see also Wilson et al. 2008).

One has to ask the question of why neuromarketing should raise such concerns relative to other consumer psychology techniques. For, as Gemma Calvert, one of the founders of neuromarketing company Neurosense, noted some years ago: "This is a descriptive technique—it describes what the brain is doing. With fMRI you can't modify brain behavior. You can't make people go out and buy something" (Witchalls 2004). Is it the presumed power of such techniques to find the "buy button" in the human brain, or is there something sacrosanct about what goes on inside the head, that is at stake here? Is the fear here that the neuromarketing companies will bypass the consumer's mind by peering directly into the brain—in some sense bypassing their conscious control? Whether or not they were engaged in such practices, for a long time, many large companies were afraid of the consumer backlash should it become public knowledge that they had been engaged in neuromarketing research. And while that corporate concern for reputational damage does feel to have receded somewhat in recent years (see Anonymous 2008), the French government's banning of commercial neuromarketing back in 2011 (see Oullier 2012) has still provided some with the irresistible opportunity to deliberately discomfort the leaders of, e.g. McDonalds in France over their interest in the minds of their customers (see http://www.dailymotion.com/video/xr6cos_neuromarketing-votre-cerveau-les-interesse-1-2_news).

My personal impression, though, from a little over two decades working in the field, is that while we should undoubtedly be alert to the potential ethical concerns (see Eaton and Illes 2007), e.g. regarding the loss of autonomy in the marketplace and being nudged towards less-healthy food behaviours, consumers currently actually have little to fear from the field of commercial neuromarketing. On the one hand, this is because of the very practical limitation that the time required to plan, conduct, and analyse neuromarketing research, and, who knows, acquire the relevant ethical approval, typically falls outside of the timelines of most real-world marketing deadlines (see Spence 2016a, b, for a review). Here, though, we need to make an important distinction between "consumer neuroscience" and "commercial

neuromarketing" (Javor et al. 2013; Plassmann et al. 2015).[12] The former term refers primarily to academic research on business-related issues; the latter, by contrast, primarily concerns the commercial use, and funding of, neuroimaging research to address business-relevant questions. It is more in the latter where the ethical concerns mostly reside.

The consumer neuroscience that appears in the peer-reviewed academic journals operates on much longer timelines than commercial neuromarketing. The researchers involved are also much more likely to have gone to the trouble of gaining ethical approval for their study in advance, most journals insisting that details of ethical approval are included in the final manuscript (see also Joffe 2014). In contrast to the more cautious approach represented by most consumer neuroscience, many of the claims made by those involved in commercial neuromarketing that have appeared in the press have been overblown. On occasion, those who have overstepped the mark in terms of what the data actually show (e.g. see Iacaboni et al. 2007) have elicited a fierce critical backlash from those academics worried about the reputational damage to the field of the misuse of neuroimaging data (Aron et al. 2007; Editorial 2007; see also Oullier 2012).[13] Another infamous example of a commercial neuromarketer getting it completely wrong also appeared as an Op-Ed in *The New York Times.* Marketer Martin Lindstrom suggested that just because the same part of the brain, namely the insular cortex, "lit up" when hearing the ring of an iPhone as in those studies of people who were actually in love, this meant that people literally "*loved their iPhone*" (emphasis in the original)! This, as has been pointed out by numerous commentators, is a particularly egregious example of a failure to understand the statistical properties of reverse inference (Herper 2011; Poldrack 2006, 2011).[14]

3.3.1 Some Outstanding Ethical Issues

Stanton et al. (2016) raise questions about the lack of ethical board oversight over much of the commercial neuromarketing research that is conducted.[15] I must admit

[12]According to Javor et al. (2013: 1), "We argue for a differentiated terminology, naming commercial applications of neuroscientific methods 'neuro-marketing' and scientific ones 'consumer neuroscience'".

[13]I have it on good authority that certain of the neuromarketers whose research was discussed in Lindstrom's (2008) book, *Buy-ology*, were less than happy with the way in which their scientific results were "twisted" to fit a particular marketing story!

[14]That said, given the replication crisis that is currently sweeping psychology (e.g. Francis 2014; Ioannidis et al. 2014; Open Science Collaboration 2015), not to mention many other disciplines (Ioannides 2005), one can legitimately question how many of the results that end up making it into the press are really robust.

[15]Though, as Brammer (2004) notes, the absence of any commercial fMRI machines in the UK means that all neuroimaging studies using this technique will likely have had to gain ethical approval prior to the start of data collection anyway. The situation is obviously very different when it comes to ERP research given the much cheaper cost of entry to the field.

that I don't really see this as much of a concern, but expanding on that point is undoubtedly a topic for another day (see Wagner 2003).[16] Certainly, many other researchers out there who conduct experiments would never think of applying for ethics. However, this is really a question about the ethics of seeking ethical approval, and not neuromarketing per se. Another ethical question that has been raised here concerns a lack of peer-review scrutiny over much of the commercial neuromarketing research that is carried out. Here, I agree with Wall's (2013) assessment that this is likely to lead to poor-quality science. However, I personally do not think that poor experimentation is in and of itself an ethical issue. Should the marketing manager wish to waste his/her budget on poor-quality scientific research, so be it![17] Others, meanwhile, have worried about the lack of disclosure when the authors of peer-reviewed academic papers fail to disclose their affiliations with the companies making the products being studied (see Gottwald 2017). This does indeed seem to be a murky area, and while a growing number of journals now explicitly require the authors to make a conflict of interest statement and state where the funding for the study came from, others still do not. So, one of the ethical issues here relates to the need to disclose the sources of funding that may be perceived by others (rightly or wrongly) as giving rise to a possible conflict of interest.

According to Murphy et al. (2008), one other area where ethical oversight might be needed is when neuromarketing is used to target vulnerable populations who may be harmed or exploited by the deployment of neuromarketing. While Murphy et al. have in mind those with some sort of impaired mental capacity (e.g. due to brain damage), one might wonder whether the clinically overweight and/or obese should perhaps be considered in the same category. If so, then there are serious ethical issues around the use of food and beverage-related sensory marketing. To my way of thinking, the real ethical challenge here relates to the fact that various aspects of the food environment would seem to be biasing us consumers towards less healthy food behaviours. At the same time, it is clear that most of us do not realize quite what impact these exogenous cues are having on us (i.e. we are all, in some sense, "vulnerable").

3.3.2 Multiple Uses for Commercial Neuromarketing

Where Stanton et al. (2016) are mistaken, I think, is in stating that there is real value in commercial neuromarketing only if the methods underpinning that research are valid. They state that "The goal of profit maximization might not lend itself thorough

[16]In fact, Wagner (2003: 23) starts his paper: "Few researchers at the beginning of the twenty-first century would submit a report of research involving human subjects without first obtaining review from an ethical review board".

[17]Research ethics wise, there could be issues in some countries where standards of research ethics imply that research will be of sufficient quality to justify any risks to research subjects (otherwise the risk is not justified). However, this depends on the underlying ethical code relied on in the country where the study is conducted.

(sic) scientific practice. Scientific results are worthwhile only if the methods used to collect the data are sound" (Stanton et al. 2016: 7). I would argue that such a view neglects the practical role of the latest expensive, "colourful" science (Barrera-Valencia 2015) in helping convince people and win internal arguments about strategy and the best approach within corporations. I would also say that the press/public fascination with neuroscience means the very connection between a company, or product/brand, and a neuroscience story is sufficient to have marketing appeal, pretty much regardless of what the evidence shows.

As a case in point, I would only point to my own group's neuroimaging research on the Lynx effect—Lynx, or Axe, as it is called outside the UK is one of the world's best-known brands. The underpinning science was open, peer-reviewed, and of the highest quality (I hasten to add). Nevertheless, the real value to the marketers funding the research was in gaining access to the magazines with a readership of relevant demographic (i.e. "lads' mags") many orders of magnitude higher than the journals in which we published the underpinning research (see Demattè et al. 2007a; McGlone et al. 2013). At the time, magazines like GQ, and Maxim, had a regular readership of young males in the relevant age group of something like two million every month. The neuroimaging study showed a shift in activation in the part of the orbitofrontal cortex coding facial attractiveness when a pleasant scent like Lynx (or for that matter the smell of roses) was presented rather than when an unpleasant smell of body odour or burnt rubber was delivered to the young female participant's noses. The latter had to rate the attractiveness of a carefully calibrated set of male faces leading eventually to a story about the parts of a woman's brain that men should be targeting.

3.3.3 Dealing with "the File Drawer Problem"

In the world of consumer neuroscience, much stock is placed in those studies where the researchers concerned have been able to use the latest neuroimaging analysis techniques, either in isolation or seemingly more frequently in combination with other methodologies/approaches, to predict some aspect of future consumer behaviour (e.g. see Berns and Moore 2012; Boksem and Smidts 2015; Falk et al. 2016; Kühn et al. 2016; Venkatraman et al. 2015). And while I certainly do not wish to cast doubt on the difficulty of obtaining such impressive-looking results, I do wonder about just how much weight is, or should be, placed on the findings. Note how these findings are typically published long after the predictions were made. Much more convincing, at least to my way of thinking, would be cases where predictions concerning future sales patterns, or consumer behaviour, are made public in advance of the relevant data being collected. The problem with the current state of affairs is that one never knows how many failed predictions are sitting in the filing cabinets [see Rosenthal (1979), for an early statement of the file drawer problem, and Simonsohn et al. (2014), for a possible means of assessing its prevalence in a given research field]. Now, while the file drawer problem is certainly not unique to the field of neuromarketing, I do worry that it may nevertheless hinder the uptake of these

approaches in the minds of the marketing managers, whose jobs are on the line with seemingly every decision that they make. In fact, the evidence suggests that they are much more tempted to rely on "gut feel", as apparently they have always done (Blakeman 2017). And, according to an online survey of a little over 1000 marketers conducted back in 2014, 49% of them reported "trusting my gut" when it came to deciding where to invest their marketing budgets (Anonymous 2014).[18] Thus, even if the neuromarketers' predictions about the future success of the neuromarketing techniques that they employ were to be believed, that still does not necessarily mean that the marketing managers would take their findings/recommendations on board anyway.

3.3.4 Ethical Concerns with the Use of Sensory Marketing

Sensory marketing can be thought of as a *sensory* equivalent of the *informational* nudging championed by the behavioural economists over the last decade or so (see Thaler 2016; Thaler and Sunstein 2008). While some concerns have been voiced around the patrician undertones of many nudging interventions, it has to be said that it hasn't raised anything like the same level of public concern as has neuromarketing. It is not that people think that nudging is ineffective as a technique of behaviour change, but rather, given that it involves informational influence, I suppose the view is that we are all able consciously to make our own minds up about how to respond to such nudges, as when we are told how many of the previous guests in our hotel room chose to reuse their towels, say.[19] By contrast, there is, I think, a very real danger with sensory nudging that the influence on our behaviour may pass under the radar of consciousness as it were. Indeed, elsewhere, I have argued that a number of examples of sensory marketing, such as the red star on the front of the bottle of San Pellegrino, can be thought of as *functionally subliminal* in the sense that everyone knows it is there, but few realise what signals it may be sending to the customer's mind until they are told about it (see Spence 2012, for a review). It is also worth noting here that nudging, while potentially an effective means of getting us to buy more healthy food and beverage products, doesn't necessarily mean that we stop buying the unhealthy stuff. In effect, nudging can actually lead to increased food purchasing, at least under certain conditions (Kroese et al. 2016).[20]

[18] And the marketers are by no means exceptional in this regard: According to psychologist Gerd Gigerenzer, "I've worked with large companies and asked decision makers how often they base an important professional decision on that gut feeling. In the companies I've worked with, which are large international companies, about 50% of all decisions are at the end a gut decision" (quoted in Fox 2014).

[19] Here, it may be that the majority of the published examples of nudging would seem to be targeted at societally desirable behaviours, such as donating our organs or saving more for our retirements. By contrast, much of the discussion around neuromarketing has focused on corporate greed.

[20] Kroese et al. (2016) conducted a study in three snack shops located in train stations. They assessed whether the customers could be nudged towards healthier food choices simply by moving the fruit