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BUSINESS AND THE BRAIN

DISCOURSES ON NEUROSCIENCE IN BUSINESS IN THE MANAGEMENT CONSULTING INDUSTRY

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Abstract

TITLE	Business and the Brain – Discourses on Neuroscience in Business in the Management Consulting Industry
AUTHORS	Katharina Mündlein & Tineke Zwart
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PURPOSE	The purpose of this thesis is to provide both theoretical and practical insights into the emerging connection of neuroscience and business by revealing the discourse used in the management consulting industry set in a broader discourse.
RELEVANCE	The emerging connection of neuroscience and business is already gradually starting to be applied by management consultants without a clear in-depth and/or broad understanding of its scope, which in turn leads to a lack in conceptualizing the meaning and implications for business.
METHODOLOGY	Our exploratory research analyzes discourses based on a qualitative research design from a poststructuralist perspective. We conducted nine semi-structured interviews and analyzed nine popular business press documents with respect to neuroscience in order to approach the subject matter from a twofold perspective.
FINDINGS	Five discourse themes became apparent: ‘Improve Performance’, ‘Scientific Answer’, ‘Innovation and Progress’, ‘Human Factor’, and ‘New Language’.
CONTRIBUTIONS	We contributed to the holistic picture of the phenomenon by adding a poststructuralist perspective highlighting the challenging yet reproducing discourse, the added value and the arising ethical paradox. Practical implications are still limited; however neuroscience plays out as a selling point for consultants and informant for organizations.
KEYWORDS	Discourse, neuroscience, organizations, management consulting, post-structuralism

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List of Abbreviations

CBI	Conscious Business Institute
CNS	central nervous system
EEG	Electroencephalography
e.g.	exemplī grātia
et al.	et alii
fMRI	functional Magnetic Resonance Imaging
HBR	Harvard Business Review
i.e.	id est
p.	page
PNS	peripheral nervous system
ROI	return on investment

*“The human brain is a most unusual instrument
of elegant and as yet unknown capacity”*
(Stuart Seaton, unknown source)

1. Introduction: Business and the Brain

Outline:

This introductory chapter first presents the thesis subject and describes the thought process we went through to define our topic. Thereafter, the research questions, problem statement and purpose that have guided this study are presented. The chapter ends with a brief overview of the outline of the thesis.

The above quote captures the human fascination with our inner workings and the potential impact that insights into our brain may have on our lives. With the advent of new technologies, neuroscience has contributed novel findings about the human nervous system and the brain. An unexpected source in the development of brain science is the business community. Given that knowledge is one of the driving forces in today’s economy and society, often described as knowledge-intensive (Alvesson, 2004), findings of brain science are becoming increasingly relevant as they complement the understanding of human thinking, behavior and knowledge generation. This view emphasizes the importance of people and their brain power to create successful businesses and, hence, calls for a deeper understanding of their workings.

The reason why the connection between neuroscience and business has only been made recently is because the field of neuroscience has significantly grown and widened during the last ten years due to the development of new brain imaging and measuring techniques (Coe, 2010; Waldman et al., 2011). These techniques have given neuroscientists the ability to largely extend their research, and not limit themselves to mainly medical-related research, but also engage in behavioral-related research, which can potentially contribute to the ever challenging attempt to understand and manage people. Also, it has made neuroscientific findings more visual, which closely resembles consulting’s desire to view and measure tangible results. Hence, this interdisciplinary integration is now rapidly expanding and gaining increasing attention from both scholars and practitioners (Rock, 2008; Hills, 2012). For instance, an article on the link between neuroscience and business was the most downloaded article in the Strategy + Business journal in 2006 (McGregor, 2007). This example clearly shows that scholars and practitioners currently try to make sense of this emerging phenomenon and understand the business implications for the future.

In addition, the relevance of the topic and the need to deepen our understanding become ever more pronounced as governments show increased interest and inject funding into the field of neuroscience. Even world leaders, such as President Obama, who is planning to invest in a decade-long scientific project to better understand the brain's workings and to map its activity, have been captivated. With this effort he is hoping to contribute not only to the medical industry, but also to the economy (Markoff, 2013).

Based on the above arguments, this topic is most certainly very timely and we agree with Senior et al. (2011) that despite the recent advances in the marriage between neuroscience and business, fundamental and exploratory research is needed to gain further understanding on this subject matter.

1.1. Formulation of Topic

The idea for the topic of this thesis germinated when we met the managing director, Gundula Schramm, of HGS Concept, a management consultancy that Katharina had done a few projects for. The conversation started rather broad discussing multiple potential topics, such as change management, identity and knowledge management. We considered all these topics to be interesting; however, as the conversation continued, Gundula started talking about their cooperation with brain scientists. This immediately caught our attention, since we had never heard the words 'brain scientists' and 'management consulting' in one sentence before. Gundula explained to us why they cooperate and thereby introduced us to an entirely new concept in the consulting industry. The idea that findings of neuroscience can help understand and manage organizational activities, such as change and recruitment, excited both of us. Therefore, we wanted to pursue this idea.

Due to the fact that Gundula explained to us that while they are cooperating with brain scientists to gain knowledge on the recent findings of neuroscience, they are not actually applying those findings yet, we initially thought it would be interesting to conduct a case study. We visualized the case study to involve two consultancies; HGS Concept that is interested in findings of neuroscience but is still struggling to apply those, and another consultancy that is already actively promoting to use neuroscientific findings in their services. However, as we commenced doing secondary research, we realized that the field of neuroscience in a business context is still very much in its infancy. This finding led us to two

conclusions. Firstly, it reinforced our decision to focus on management consulting, because their professional services revolve around advising, problem-solving, decision-making and facilitating change (Whittle, 2006; O'Mahoney, 2010), and that is precisely the reason why neuroscience has caught their interest (McGregor, 2007; Vincenti and Jelavic, 2011). Secondly, before we delve into a study of the results of the marriage of business and neuroscience it is important to explore how consultants talk and think about neuroscientific findings, how they seek to bring them into their work context, and also, if and how they apply it into their work. Considering that this phenomenon is still at an early stage, we also thought it would be more interesting and beneficial to involve multiple consultants from different consultancies and countries, and situate them in a broader discussion about the topic. As we sought to study how discourse leads to construction of organizational norms, we saw the importance of including both popular business press and consultants' talk. This would allow the portrayal of a more holistic image of the current situation.

1.2. Problem Statement

To state the problem statement in one clear sentence:

The emerging connection of neuroscience and business is already gradually starting to be applied by management consultants without a clear in-depth and/or broad understanding of its scope, which in turn leads to a lack in conceptualizing the meaning and implications for business.

Recently scholars and scientists made the link between neuroscience, a rapidly progressing field, and business (Waldman et al., 2011; Rock, 2008), and management consultancies already draw on findings of neuroscientific research. As management consultants bring new conceptualizations and ideas to industries (O'Mahoney, 2010), this subject matter is expected to gain further importance. Despite the growing interest and the recognized potential, the conceptualization of neuroscience in business is still in its initial stage. Consultants are not neuroscientists or medical professionals and therefore likely lack sufficient understanding of nuances of making causal connections between the brain and behavior. If consultants wish to be providers of neuroscientifically informed services, neuroscience aligned with business needs to be problematized and scrutinized to understand its constructions and implications for organizations, individuals, and society. Since this is a relatively new topic, there is a need to

learn how management consultants are talking and thinking about it, and what this implies for the business world.

1.3. Purpose of Study

Based on our apprehension of the merging of neuroscience and business and our theoretical beliefs that business discourses impact material life, we engage in empirical research from a poststructuralist perspective. This sensitizes us to issues of power, language and privilege while it also allows us to stay empirically open to surprising findings and will therefore give a more holistic view of this phenomenon. In order to do so, we focus on the discourses used by management consultants in combination with discourses in popular business press to make sense of the entering concepts of neuroscience into business. Simultaneously, we aim to get a better understanding of how they perceive this merger and how they apply neuroscientific findings into the business context, if they already do so at all. This allows us to reflect on how consultants want to leverage the functioning of the brain in organizations and incorporate it in future concepts.

Based on this, we formulated our research questions as follows:

- 1. How is neuroscience characterized by popular business press?*
- 2. How do management consultants talk about the introduction and usage of neuroscience in an organizational context?*

1.4. Outline of the Study

This thesis is organized into six chapters: Introduction, Literature Review, Methodology, Analysis of Discourse, Discussion and Conclusion.

After introducing our topic, we present a summary of our consulted literature throughout the thesis to provide explanations of relevant concepts and portray current academic discussions. The review consists of five main sections, which together shape a framework, specific for the purpose of this study. We introduce the pertinent literature on the emergent interdisciplinary

connection, show where it enters the business domain, and present the scholarly discussion about the implications.

After having outlined the pertinent literature, we subsequently position our research in chapter 3, which is our detailed methodology and methods section. We base our research on the ontological assumption that the world is socially constructed through available discourses, instead of being an objective ‘truth’. Hence, we focus on discourses – the talk and subsequent sense-making – of both management consultants and popular business press towards our research topic. In order to elicit the desired information, we utilize qualitative research methods by involving documents and conducting interviews.

In chapter 4 and 5, we present, analyze and discuss our empirical material. In chapter 4 – *Analysis of Discourse* – the focus lies on the talk exhibited by the popular business press as the Grand, ‘Big D’, Discourse, and the interviewed consultants as the local, ‘little d’, discourse of the consulting industry. We highlight and analyze discursive themes respectively. In chapter 5, we subsequently discuss the previously identified discursive themes and highlight and connect salient patterns to each other and literature.

In the Conclusion, we summarize our findings and the resulting theoretical contributions as well as practical implications. Also, we discuss the limitations of our study and suggest future research opportunities to shed further light on this highly interesting and business relevant topic. Namely, we suggest that the discourse and its development over time would provide the academic and practitioners community with further insights into the progression of the examined topic; that exploration of the impact of neuroscience on particular constructs relevant in an organizational setting, such as leadership, would contribute further to a more specific understanding of what neuroscience can effectuate; that identity is focused on, which may be approached differently, for instance, from the perspective of consultants, whose identity may be influenced by the work with neuroscience as suggested by our data.

2. Literature Review:

Neuroscience and Business

Outline:

The following chapter's purpose is to inform the reader about pertinent literature relevant to our study. The focus lies on neuroscience and its integration into a business context. Hence, neuroscience is introduced, a background on where this concept enters the modern organization is given, and already conceptualized implications are laid out.

"The human brain: one of the last great frontiers. We've learned more about it in the last five years than in the last five thousand years." (History Channel Broadcast, 2008 cited in Lafferty and Alford, 2010, p. 32)

This fascination with the brain is not only constrained to the medical or biological domain anymore, but has recently also been linked to organizations and organizational studies (Ariffin, 2010; Lafferty and Alford, 2010).

Due to the discovery and development of non-invasive imaging techniques, such as electroencephalography (EEG)¹ and functional Magnetic Resonance Imaging (fMRI)², neuroscientists have been able to expand their studies on the brain (Coe, 2010; Eser et al., 2011). These techniques enable a deeper understanding of our brain as they let researchers extensively study the workings inside an individual's brain. This has not only allowed them to increase and advance their studies on the brain from a medical and biological perspective, but also to discover much more about human behavior. Consequently, findings now also relate to how we make decisions, how we are influenced by others, and how we deal with emotions (Waldman et al., 2011). These findings can be linked to everyday organizational life, which is why neuroscience is starting to have an impact on organizations and organizational scholars.

Few scholars agree about what neuroscience essentially implies for our economy and society. While some scholars (Fox, 2007; Kolb and Gibb, 2011) claim that neuroscience is the essence and, hence, helps to explain and deal with all human interactions, other academics (Butler and Senior, 2007; Tallis, 2011) argue that there must be more to us than just a bundle of cells and chemical reactions. The former is based on the critical question of 'Do we necessarily have to be more than our brains and bodies?' (Lee et al., 2012). They reject other opinions, as self-

¹ EEG detects electrical activity along the scalp to measure the voltage fluctuations occurring due to ionic current flows within the neurons of the brain. Activation procedures, such as mental tasks or sleep deprivation, may be used to measure activity (Niedermeyer and da Silva, 2004).

² fMRI is a non-invasive technique to assess brain functions by changes in blood oxygenation and blood flow in response to neural activity. It investigates the functional specialization of brain parts at high spatial resolution. It is used to identify neural activities in correspondence with mental behaviors (Lackie, 2010).

centering the human within the universe, even though they might be very attractive to humans' lived experiences and world views. Lee et al. (2012, p. 15) also discuss the latter view, which is based on the idea that "brain activity is just one part of an incredibly complex puzzle that must be placed into a particular social context for the appropriate interpretation". With this statement, they draw attention to the idea that understanding the human brain does not give us the answers to everything. They portray that other factors should also be taken into account in terms of understanding human beings as well as the context to which the brain responds (Lee et al., 2012). Regardless of the different views on what neuroscience can ultimately do for us as humans and the complexity to find an answer to that question, the fact remains that neuroscience has captured the interest of organizations.

2.1 Reasons for the Connection

Organizations have always striven for continuous improvement and progress, which in today's economy requires them to understand how to maximize the use of their employees' brains. This understanding can be ascribed to several economical and societal changes and shifts that have occurred over the last few decades. Scholars extensively discuss the increased competition (Beer et al., 1990), continuous technological, environmental and political changes (Johansson and Heide, 2008), and the knowledge-intensity that characterizes today's economy (Alvesson, 2004). As a result, many organizations are continuously battling to improve performance in order to remain competitive and survive (Alvesson and Sveningsson, 2008). According to an increasing number of scholars, this requires them to bring about their employees' maximum potential as they consider employees to be an organization's most important asset (Ulrich, 1998; Boxall and Purcell, 2000). Due to technological innovations and developments, such as operational machines, computers and the internet (Castells, 2000), many organizations now have a different set-up in which products that require human hands to be produced no longer play a dominant role, but rather the knowledge and intellectual work of employees (Alvesson, 2004).

The shift from physical-intensive production work to brain-intensive thinking work started in the 1970s, and has led to the creation of the so-called knowledge economy in which organizations mainly sell knowledge services or knowledge-based products (Starbuck, 1992; Alvesson, 1993, Ritzer, 2000). Since this shift is rather recent and still in progress, both organizational scholars and organizations continue to build a body of knowledge around how

knowledge creation, sharing and evaluation can be optimized in order to improve an organization's performance. Even though scholars describe this as challenging since most knowledge is considered to be highly ambiguous as well as tacit³ (Alvesson, 2004; Ciabuschi and Martin, 2012), factors, such as motivation and leadership, have been addressed as important influences. Given that these factors can now be studied more extensively by neuroscientists, organizations and scholars are starting to look at studies of the brain to get more informed answers (Rock, 2008; 2009).

Mintzberg (1976) already pointed out more than three decades ago that the difference between our left and right brain could be of importance to management. However, it has only recently been recognized by many others (Rock, 2008; Vincenti and Jelavic, 2011; Ringleb et al., 2013). Eser et al. (2011) therefore describe that much of the neuroscientific research is still in its infancy in terms of applying it to business. Also, Lafferty and Alford (2010, p. 33) explain that “debate continues whether this represents a truly new field”. While some scholars argue that neuroscience can help to develop, deepen, enrich and inform existing theories (Waldman et al., 2011), others wonder whether neuroscience in business is really something new or if it is just another management fad (Lafferty and Alford, 2010). Despite this discussion, scholars have already tried to define the joining of the disciplines to allow further discussion. Senior and Butler (2007, p. 8) offer the definition of ‘neuroscience in business’ as “applying neuroscientific methods to analyze and understand human behavior within the applied setting of organizations”.

2.2 Conceptualization of Relevant Findings

In order to make sense of the implications of this potential new field, both scholars and practitioners have tried to understand and conceptualize relevant neuroscientific findings for business. Rock (2009, p. 3) argues that “although a job is often regarded as a purely economic transaction, in which people exchange their labor for financial compensation, the brain experiences the workplace first and foremost as a social system.” Based on this statement, he claims that recent neuroscientific findings can help understand how organizational activities and phenomena influence people in order to manage them more efficiently and effectively

³ The distinction between tacit and explicit knowledge is often made. While tacit knowledge refers to knowledge that is difficult to share or transfer due to its complicated and multi-layered nature, explicit knowledge refers to knowledge that can be or has been codified, articulated or stored in certain mediums so that it can easily be shared with or transferred to others (Cortada and Woods, 2000).

(Rock, 2009). Several scholars join him in this discussion and point to neuroscientific research that can be of use to how organizations influence and manage their employees (Yeats and Yeats, 2007; Lafferty and Alford, 2010; Boyatzis, 2011).

Scholars bring up various neuroscientific studies to connect to business practices. These include the research on brain plasticity (Fox, 2007; Semendeferi and Damasio, 2000; Teffer, and Semendeferi, 2012), threat and reward responses in the brain (Frewen et al., 2007; Rock, 2009; Mühlberger et al., 2011), emotional awareness (Rock, 2009; Boyatzis, 2011), and exercises, such as mindfulness, meditation and yoga (Lutz et al., 2008; Love and Maloney, 2009; Lucas, 2012). This research has been related to several organizational concepts, such as leadership, change management and individual productivity. As a result, we now have different organizational fields to which the prefix 'neuro' has been added. These newborn fields, such as neuroleadership and neuroeconomics, aim to bring neuroscientific knowledge into the organizational arena and change a leader's or a manager's perception of how to understand and manage their employees (Kiefer, 2011; Boyatzis, 2011). In the following paragraphs, we briefly elaborate further on each of the above-mentioned studies.

Scholars perceive the research on brain plasticity, emotional awareness, and exercises, such as mindfulness, as relevant for business since it can all be related to influencing and changing human behavior, which in turn can lead to improved performance (Fox, 2007; Semendeferi and Damasio, 2000; Rock, 2009; Lucas, 2012). While the research on brain plasticity shows that our gray cells in the brain constantly make new neural connections and reorganize as we grow older (see Appendix A)(Semendeferi and Damasio, 2000),which contributes to our mental growth, or in other words, the acquiring of new knowledge and changing behavior, the research on emotional awareness and mindfulness shows how we can actually change behavior (Rock, 2009; Lucas, 2012). Several scholars explain that knowing why we feel a certain way, which in turn affects the way we behave, acknowledging and being aware of it helps to control that feeling or emotion, and therefore also the resulting behavior (Love and Maloney, 2009; Lucas, 2012). The act of actually trying to change a certain behavior, and thus purposely paying particular attention to it by staying emotionally aware, is referred to as mindfulness (Lucas, 2012). However, Lutz et al. (2008) and Love and Maloney (2009) emphasize that mindfulness is generally not something we are born with and therefore has to be nurtured by means of, for instance, meditation. Lucas (2012) suggests that by becoming mindful, you can teach yourself the ability to stop and breath before you react, which should ultimately lead to more thoughtful reactions and behavior.

Another neuroscientific study, which has been related to organizational practices in a broader context, is the research on threat and reward responses in the brain (Rock, 2009). Neuroscientific findings are teaching us that our brain responds to social threats and rewards in the same way as it responds to physical threats and rewards. The response to a physical threat generally is to ‘fight’ or ‘flight’, which are both intense and explosive physical reactions, and therefore require our body to take oxygen and glucose from organs where they are not essential in that particular moment (Arnsten, 1998; Rock, 2008). Oxygen and glucose are also taken from our left part of the brain, which is responsible for processing new information and ideas. This means that the more people feel socially threatened in an organization, the less they are able to think analytically and solve problems (Arnsten, 1998; Rock, 2008). Organizational scholars therefore touch upon the research on threat and reward responses when discussing, for instance, leadership (Rock, 2009). Thus, if leaders create an authoritarian fear-based workplace, they might be achieving the opposite of what they want to achieve. By socially threatening their employees, they can shut down the employees’ part of the brain that is responsible for abilities, such as analytical thinking and problem-solving (Rock, 2009).

2.2.1 Neuroleadership

It appears that the conceptualization of neuroscience in terms of leadership practices has, so far, reached the most attention from organizational scholars. Leadership has already for many years been a widely discussed phenomenon, which is conceptualized in various ways and is therefore seen as highly ambiguous (Alvesson and Spicer, 2011). One scholar, David Rock has now also sought to bring neuroscientific knowledge into organizational areas that are related to or typically involve some form of leadership practice, and has coined the latest term neuroleadership (Rock, 2008; Ringleb and Rock, 2008; Lafferty and Alford, 2010). However, it looks beyond the leader follower relationship with its four main domains – decision-making and problem-solving, emotion regulation, collaboration and influence, and facilitating change – defined by Ringleb and Rock (2008). Just like all the other areas to which the prefix ‘neuro’ has been added, such as neuromarketing and neuroeconomics, neuroleadership also attempts to obtain understanding of human social behavior and interactions to be able to apply this knowledge in the workplace to become more efficient and effective.

Even though the recent advances of neuroscience seem rather promising for the before mentioned domains and have gained increasing interest from organizations and organizational scholars, this field is still in its infancy. Much of its potential is still to be discovered and the

organizational application is viewed as limited until now (Lafferty and Alford, 2010). Fox (2007), for instance, notes that managers confirm that the application of neuroscience in leadership issues is rather limiting since it focuses more on individuals instead of on organizations as a whole. It is believed that in order for concepts of neuroleadership to be applied on an organizational level, we need an agreed-upon model or organizational program, which is yet to be designed. However, future potential is seen supported by Fox (2007, p. 3) quoting a manager: “what’s going to happen over the next decade is a coming together of how people develop better behavior and brain science, which will inform the tools and techniques to do that”. Gordon (2008) raises the same concern and agrees with the previous quote that concepts of neuroleadership require an agreed-upon integrative model in order to be applied successfully. Lee et al. (2012) have questioned this ‘neuro’-addition as practitioner oriented and hence abstain from using it in a scholarly fashion.

2.3 Consulting’s Stake in Neuroscience

According to several scholars, the consulting industry is one of the first organizational stakeholders in neuroscience (McGregor, 2007; Vincenti and Jelavic, 2011). The emergence of the consulting industry is considered to be a result of the earlier mentioned fierce competition and continuous change many organizations nowadays have to deal with (O’Mahoney, 2010). During the past twenty years, the consulting industry has been continuously growing and is still doing so (Canback, 1998; O’Mahoney, 2010). The main areas of expertise of these firms are often considered to be advising, problem-solving, decision-making and facilitating change (Whittle, 2006; O’Mahoney, 2010), and thus management consulting is ultimately treated as a professional service to improve management and business performance (ibid.; Kubr, 2002). Due to this, the previously addressed reasons for the connection of business to neuroscience are relevant to consulting services. As consultants pick up on new developments and transfer them to organizations, neuroscience has already caught their interest and they see the potential to develop a niche market for consultancies (McGregor, 2007). Vincenti and Jelavic (2011) support this view, stating that due to the increasing complexities of organizations, the management consulting practice must expand beyond basic concepts of management. Neuroscience and its theories on human functioning, that can be associated with management, allow consultants to “draw upon

spheres of practice that were generally excluded from traditional management curriculum and professional practice” (ibid., p.23).

As a potential performance improver, neuroscience complements the Western management paradigms that many management consultancies are built upon (Kubr, 2002). Those ideas have been dominating societal thinking and the manner in which organizations are managed (Clarke, 1998). Derived from historical developments like the Enlightenment epoch, Max Weber’s ideas of rationalism and the Puritan work ethic, which accentuates work, frugality and fortune as a display of salvation (Weber, 2001), they mainly play out in the capitalistic system and the idea of progress, in which management thinking is rooted (Nisbet, 1980). In terms of the former, Weber (2001, p. 1) once described the “capitalistic economic action as one which rests on the expectation of profit by the utilization of opportunities for exchange, that is on (formally) peaceful chances of profit”.

This still very salient concept led to our understanding of a constant need to improve performance and to progress as a goal of today’s business world (Effron and Ort, 2010; Kemper et al., 2013). The latter assumption implies that society will move towards an improved situation. Historians and scholars argue that this idea has been and may still be an animating and controlling assumption or idea of Western civilization (Bury, 1960; Nisbet, 1980) and further strengthens the belief in constant improvement. Nisbet (1980, p. 4) even goes so far as to say that "No single idea has been more important than [...] the idea of progress in Western civilization for nearly three thousand years." In management terms, this means that organizational practices are related to a focus on profit, science, clear-cut procedures and innovation (Yazdani et al., 2011). Neuroscience, hence, seems like a promising concept with its scientific validation, innovative thinking and presumed characteristic of improving performance.

2.4 Implications

Most scholars seem to agree that the application of neuroscientific findings in business contexts is still at an early stage, which makes it difficult for scholars to anticipate future implications. Nevertheless, some scholars have tried to foresee what neuroscience in business can ultimately lead to, which has resulted in mixed reviews (Moore, 2005; Fox, 2007; Senior et al., 2011). While some foresee unlimited brain potential, and are getting excited about

'human robots', others expect to learn about the limits of our brain or worry about issues of personal privacy (Moore, 2005; Vincenti and Jelavic, 2011; Senior et al., 2011).

2.4.1 Biologically Informed Understanding

Senior et al. (2011) join in on the discussion about potential implications, but take a rather critical standpoint, and state that organizational phenomena cannot be merely understood from cognitive neuroscience approaches. While cognitive neuroscientists try to understand how organizational phenomena, such as change, influence the individual employee's brain, organizational scientists often try to understand how the top of an organization, such as leaders and managers, can influence the lower hierarchical levels. The latter approach can be clearly seen in existing change models, such as Kotter's 8-step change model (Kotter, 1996). His model focuses on how the top of an organization should implement change initiatives and include steps, such as 'Create a Sense of Urgency' and 'Communicate a Shared Vision'. In order to strengthen this argument, scholars refer to the setting in which brain activity is studied (Kosslyn, 1999; Senior et al., 2011; Lee et al., 2012). Instead of studying human behavior in an organizational context, neuroscientists try to take away any context of human interaction and organizational setting by placing people in, for instance, an isolated fMRI machine. Therefore, they suspect that cognitive neuroscientists "may in fact be studying a type of brain activity that is very different from that which has evolved in response to real-life situations" (Senior et al., 2011, p. 806). Based on this argument, they believe that neuroscience can be used as a tool to add a biological element to the understanding of human functioning in organizations, but they do not seem to foresee any salient further implications (Ibid).

This standpoint is opposed by other scholars seeing the 'hard' evidence of neuroscience as a way to make more biologically informed decisions as an organization, benefiting for individuals and organizations alike (Rock, 2008, Ringleb et al., 2013). Moore (2005, p. 12) even states that, "in the future, brain scanning may well become a routine part of corporate marketing strategies". She thus sees potential future implications for the marketing aspect of doing business, but leaves her opinion on whether brain scanning will have negative or positive consequences out of the picture. Lever (2012, p. 205), however, describes that the increasing knowledge we have about our brain does not only give us "the power to do good, but also the power to harm". The aforementioned brain scanning, for instance, could help to improve an individual's performance, but could at the same time also reveal information

about a that person s/he does not wish to share or that s/he was previously unaware of (Lever, 2012).

2.4.2 More Humane Approach

Kiefer (2011, p. 1) foresees that neuroscience in business “has the potential to replace the engineering-driven, mechanistic approach to managing talents with a more effective, humane way.” Several scholars agree with Kiefer (2011) that many organizations treat their employees as machine-like resources rather than human resources (Legge, 2007; Coe, 2010). They raise attention to the increasing number of demanding jobs that require employees to work long hours (Hewlett and Luce, 2006) and the system and framework-based approaches that organizations use to improve their employees’ performance. Kiefer (2011) explains that what is missing in organizational approaches is something that explains how people work and learn together, which he considers to be crucial in improving performance. Also, he adds that many organizational systems do not accomplish what they were set up for because they are built around the wrong understanding of how to improve performance. Incentive systems nowadays should not be based on the understanding that money motivates, but rather on the understanding that “intrinsic motivation is a key driver of performance” (Kiefer, 2011, p. 1). By drawing on the neuroscientific research on human behavior, he and other scholars, such as Rock (2008), believe that organizations should change or even get rid of some of the current systems that are supposed to increase employee performance, which can lead to a more humane approach of dealing with employees (Kiefer, 2011).

The human aspect in organizations appears to be the central aspect when connecting neuroscience and business, which is why the earlier described question whether humans are more than their brains therefore also become relevant for organizations using neuroscience. While many scholars see the potential of neuroscience to act as an agent for the human (Rock 2008; Hills, 2012; Ringleb et al., 2013), Tallis (2011) takes a more critical stance. He explains this by describing that humans have always had a brain, but that our minds have evolved over time due to continuous processing of information by our brain. As a result, we now have several abilities we previously did not have, such as our ability to communicate extensively, to foresee things, and to be self-aware. Because of all this, he calls for a different understanding of humanity than the direction neuroscience is taking. He is afraid that if we too easily accept neuroscientific findings related to the understanding that we are no more than our brain, people start questioning the purpose of trying to improve themselves and their living conditions, which could potentially have a negative impact on both businesses and

society as a whole. Senior et al. (2011) join this discussion by claiming that applied neuroscience, e.g. in form of screening for leadership traits, would not improve human performance but rather create a toxic environment. Hence, Tallis (2011) agrees with Senior et al. (2011, p. 809) that neuroscience should be used “in a responsible manner when working with organizations”.

2.5 Outlook

The potential applications of neuroscience in business seem rather promising for organizational areas although the integration of neuroscientific findings in business also raises many questions and concerns. Also, scholars suggest that we should bear in mind that this is only the beginning of humanities attempt to better understand our brain’s workings via new techniques, such as fMRI and EEG (Denson et al., 2009). According to Denson et al. (2009) there is much more we do not know about our brain than that we do know. However, for the first time, our understanding of organizational phenomena and concepts are not predominantly based on external observations of human behavior, but can be inferred from knowledge generated through the advent of fMRI and EEG, and thus the internal understanding behavioral aspects (Coe, 2010; Boyatzis, 2011). Most scholars seem to agree that neuroscience in business is still in its infancy, and that it requires both organizations and organizational scholars to do further research on how neuroscientific findings can be conceptualized and applied in an organizational context. Scholars argue that, if incorporated well, neuroscience can provide insights and even templates for organizational strategies in accelerating the execution and implication of the strategy (Butler and Senior, 2007; Coe, 2010; Hills, 2012). Organizational scholars’ outlook for neuroscience in business appears to be rather positive than negative, but it also appears to be commonly agreed that salient conclusions cannot be drawn yet from neuroscientific research in terms of what it can ultimately mean in an organizational context.

3. Methodology

Outline:

The following chapter informs the reader about our methodological approach and defines the ontological and epistemological foundations that underlie our research approach. Further, we discuss the research process, including design principles, data collection, and data analysis. Finally, the quality of the research is addressed in terms of reflexivity and credibility.

3.1 A Poststructuralist Stance

Many scholars agree that researchers approach their research with a basic system of ontological and epistemological assumptions – a paradigm – that shapes the methodology and informs and guides the research inquiry (Guba and Lincoln, 1994; Hitcock and Hughes, 1995;

Creswell, 1998; Alvesson and Sköldberg, 2009). We outline post-structuralism as the paradigm in which we situate our work. Ontological considerations refer to the way we understand the world, i.e. our underlying assumptions about the nature of being. While they are reflected in the question: “What is the form and nature of reality and, therefore, what is there that can be known about it?” (Guba and Lincoln, 1994, p. 108), epistemological considerations consider the question: “What is the nature of the relationship between the knower or would-be knower and what can be known?” (Guba and Lincoln, 1994, p. 108). Hence, they are concerned with the nature of knowledge, its possibility, scope, and general basis.

In this particular research, we situate ourselves within the realms of post-structuralism, which is in alignment with the social constructionist approach. Social constructionist theory is critical of objective reality and suggests that it is rather subjectively constructed by the meaning given to it by people (Hacking, 1999). Epistemologically, this entails that our knowledge is socially constructed and hence, ultimately dependent on the nature of our social world and processes (Easterby-Smith et al., 2002). The social constructionist view has been very influential within studies of social life, and various orientations with this fundamental view exist (Alvesson and Sköldberg, 2009). Post-structuralism, as one of these streams, adds a linguistically inspired dimension by ‘turning to language’. It recognizes the power of discourse to shape perceptions of reality and hence, the social construction of the self and the social world (Wright, 2004). Epistemologically, this implies the absence of a break between the objects of discourse and discourse itself (Hitcock and Hughes, 1995). Meaning is socially-constructed within discourse (Gee, 2005). For example, the discourse on management fashion

exerts high influence on the way organizations give meaning to managing diversity, which in turn shapes respective diversity initiatives (Prasad, Prasad and Mir, 2011).

3.2 Understanding of Discourses within the Poststructuralist Setting

Discourse is a highly contested term rooted in multiple academic disciplines, including organizational studies and theology (Potter and Wetherell, 1987; Alvesson and Kärreman, 2000; Gee, 2005; Jørgensen and Phillips, 2011). We refer to ‘discourse’ as line of using reason and language that subsequently constructs a phenomenon instead of ‘just’ revealing it (Knights & Willmott, 1989; Alvesson and Sveningsson, 2003; Gee, 2005). Conceptualizing discourses requires a critical approach to taken-for-granted knowledge and the view that a link between knowledge and social processes exists (Jørgensen and Phillips, 2011).

For our purpose, we are concerned with the investigation of the use of language and how it intersects with subjectivities when talking about neuroscience in a business context. Thus, we study discourse by examining the particular manners of talking that delineate a domain with its own specified vocabulary and sets of meaning (Alvesson and Sveningsson, 2003). In Foucault’s words, we looked for “regulated practice which accounts for a number of statements” (Foucault, 1972, p. 80). In order to grasp the current discourses on neuroscience and business, we applied the concept of ‘Big D’ and ‘little d’ discourses introduced by Gee (2005). While ‘Big D’ Discourses are on a broader societal scale commonly inspired by mass media, little d discourses describe the language in-use in conversations that are often local to a certain group, such as hippies talking about peace or a group of professionals talking about their work. These two, however, should not be seen as completely distinct, as they most certainly are intertwined by informing, amending and/or impacting each other (Gee, 2005). To grasp the discursive meanings of neuroscience, we deployed qualitative research methods for open-ended inquiry, namely utilizing document and interview analysis. This allowed us to look at local management consultants’ discourse (little d) set in, intertwined with and in a constant process of shaping and reshaping with Grand Discourse (Big D) on neuroscience in a business context (as observed, for example, in business media).

3.3 Research Process

Our research process evolved in accordance with our chosen research objective of examining the discourse on neuroscience used by management consultants. Here, we sought to uncover consultants' talk in correspondence with how business media characterizes the marriage of neuroscience and business and consequential implications in an organizational context in an exploratory setting. Seeking an answer to our research questions, we deployed document and interview analysis.

3.3.1 Documents

Since the examined phenomenon is still in its infancy, we studied the talk of neuroscience in business on a broader societal scale that is interdependent with the more localized discourses of the management consulting industry. Hence, we seek to identify the 'Big D' or Grand Discourse by drawing on documents that inspire managers and broader society, whereas we investigate the local – 'little d' – discourse limited to the profession of management consulting with interviews. In our document analysis, we aimed at answering our first research question: *"How is neuroscience characterized by popular business press?"*

In today's dynamic world, news media is abundantly available and many professionals consume knowledge at a rapid pace. Therefore, we decided to scrutinize easily reachable documents via the internet for consultants and their clients to read up on and find help for new ideas for themselves or their organization. To find these documents, we proceeded as we expect managers to proceed when searching for new input:

- Via the Google search engine by searching for words such as "business", "neuroscience", and "brain" simultaneously.
- Via popular business press including Harvard Business Manager and Review, McKinsey Quarterly and Forbes.

Further, in our selection process we favored documents with a high number of views and top positioning on Google search, which subsequently led to nine documents as listed below.

TYPE	SOURCE	TITLE	DATE
Articles	Forbes	Corporate Communication: A Prominent Neuroscientist's Take On The Subtle Ninjitsu of Workplace Conversation	Jul, 2012
	Forbes	What's Better for Business: Logic or Emotion? Answers From Neuroscience	Mar, 2013
	Harvard Business Review (HBR)	Are You Working Too Hard?	Nov, 2005
	Link2Portal	Norman Peires and Donald Trump show genes mean business for entrepreneurs	Apr, 2013
	McKinsey Quarterly	Sparking creativity in teams: An executive's guide	Apr, 2011
	New York Times	Obama seeking to boost study of Human Brain	Feb, 2013
	Tribune	KSBL conference: Business leaders share tip on how to make nations successful	Apr, 2013
Blogs	HBR Blog	This is Your Brain on Organizational Change	Oct, 2012
	HBR Blog	Imagining the Future of Leadership	Apr, 2010

Table 1: Document overview

3.3.2 Interviews

The interview method is interesting to us because it can encourage our participants to tell us about their own experiences in their own words, while we take a prompting and probing position. As rich linguistic interactions, interviews present themselves as ideal to analyze discourses. We see interviews as an “opportunity for the researcher to probe deeply to uncover new clues, open up new dimensions of a problem and to secure vivid, accurate inclusive accounts that are based on personal experience” (Burgess, 1982, p. 164).

Sampling

We engaged in purposeful sampling of management consultants with a work related connection to neuroscience accounting for information-rich cases as suggested by Merriam (2002). Taking this into account, we approached management consultancies with a pronounced interest in the interdisciplinary field of neuroscience applications in business practices (see Appendix B for a sample information hand-out). Hence, we did not limit our research to a certain company as research site, but rather asked consultants working at different consultancies all over the industry to participate in our research. While some consultancies actively portray and sell their knowledge of neuroscience in the business context, others only show their interest in a more subtle manner. By examining individuals' accounts throughout the industry, we can show the discursive resources for management consultants and the arising implications. Further purposeful sampling criteria were different positions of the consultants, such as managing director or consultant, to reach a broader spectrum of the industry. Finally, we did not include considerations about gender as this did

not seem relevant to our study, or nationality as the emerging field is not limited to a certain region.

Data Collection

We conducted nine interviews with participants from the consulting industry. Given the newness of the topic, a limited number of consultants are engaged in the organizational application of neuroscience. Hence, in our purposeful sampling process we also reached some of the thought leaders within the field, which leads to our expectation that their voice will also affect the Grand Discourse.

PARTICIPANTS	POSITION	CONSULTANCY	COUNTRY
David Rock	Managing Director	NeuroLeadership Institute	Australia & United States
Andy Habermacher	Management Consultant	Leading Brains	Switzerland
Peter Matthies	Managing Director	Conscious Business Institute (CBI)	United States
Klemens Hoppner	Freelance Coach/Consultant	CBI Affiliate	Germany
Linda Ray	Managing Director	NeuroCapability	Australia
Geoff Grahl	Senior Management Consultant	NeuroCapability	Australia
Gundula Schramm	Managing Director	HGS Concept	Germany
Andreas Laser	Management Consultant	HGS Concept	Germany
Axel Esser	Management Consultant	HGS Concept	Germany

Table 2: Participant overview

The interviews lasted between 45 to 60 minutes. Personal, face-to-face interviews were impractical due to the fact that the participants were located throughout the world, which is why we conducted all interviews via Skype. We had to account for the disadvantage of no direct interaction and a possibility of increased distortion through the noise of the communication medium (Palmer et al., 2009). For example, technical issues with internet connections interrupted two interviews, so that they had to be continued at another time. Despite these challenges, Skype permitted us to use the opportunity of talking to interesting participants that we would have missed out on otherwise. Considering that teleconferencing, Skype and similar tools of digital communication present an integral part of consultants' work, they were expected and also appeared to feel comfortable with the chosen medium.

In general, our strategy for the interviews was not to be bound by a rigid questionnaire ensuring that the same questions were asked to all respondents. Rather, we designed an aide memoir to capture the consultant's respective language and meanings (see Appendix C). As we believe in the construction of knowledge, we were inspired by Kvale's (1996) metaphor for interviewing of a traveler on a journey. For us, this entailed that we had a two-way

conversation – “wandering together” - with the participant. We aimed to develop trust and rapport with the participants, so that they could lay out their own talk for us. We started out by asking some easy-to-answer introductory questions about their work and position to make them feel comfortable. Then, we continued with the question of how they first got involved with neuroscience and often a conversation started to evolve around this. Following our aide memoir, we focused our questions on what they thought of the general concept, its development stage, potential, application and practices. Also, we looked for specific examples from their individual work context. Yet, our guide enabled sufficient flexibility for us to follow up on interesting lines of conversation using probes, to limit the unintended imposing of our meanings and ideas on the interviewee and to access rather sensitive information (Kvale, 1996).

3.3.3 Data Analysis

Our primary concern is the discursively influenced sense making of neuroscience in an organizational context. With an interpretive poststructuralist approach, we worked with different text, documents firstly, and interview transcripts secondly, investigating their interrelationships, without needing to draw causal assumptions. As aforementioned, the documents’ and interviews’ purpose in this study was to reveal underlying discourses in terms of societal as well as rather localized discourse on the research topic. Discourse is “a particular way of talking about and understanding the world (or an aspect of the world)” (Jørgensen and Phillips, 2011, p.1). Language itself, hence, can be seen as our access to our reality. Therefore, we consider documents as a good basis for our analysis because their format is predominantly determined by the author. To also preserve the structure, the vocabulary and the sayings used during the interviews by the consultants, we transcribed the interviews verbatim.

We focused our attention on patterns of language across the texts and considered the way that the use of language presents different views and understandings of neuroscience in business. To do so, we deployed hermeneutic reading as we deemed interpretation of the part and whole in a circular manner important (Alvesson and Sköldbberg, 2009). We related words to context, parts of a text to the whole text and the texts to each other. Even though we analyzed the documents and interviews separately, we also used a hermeneutical approach to look at them as a whole. An example for including the part and the whole in the interview analysis is that we considered that one consultant’s answers were most likely influenced by the fact that the interview was held late at night due to a nine hour time difference. She confirmed this by

stating that she was tired. Hence, when reading the separate responses of the interview, we considered this factor.

We read all texts to get an overall impression and highlighted recurring common themes, such as metaphors used for explaining the consultants work in correspondence with neuroscience. Following, we used a shared document to compile an overview and codify passages from the texts supporting these preliminary categorizations. This also included further notes along the margins and giving labels to text units. In a complex process, involving mapping out our data on the white board and large papers, we reorganized categories, fused smaller ones and made connections based on additional consultation of literature and our interpretive process. We also attempted to reveal different semantic features, such as vagueness of opinions, clearness, long pauses, and use of utterances.

We used the documents primarily to answer our first research question “*How is neuroscience characterized by popular business press?*”, while we scrutinized the interviews to answer the question “*How do management consultants talk about the introduction and usage of neuroscience in an organizational context?*”.

3.4 Reflexivity and Quality

We agree with many scholars (Ely et al., 1991, Merriam, 2002; Easterby-Smith et al., 2008; Alvesson and Sköldbberg, 2009) that reflexivity is a pivotal part of high quality qualitative research. We attempted to capture discourses, which are concomitant with sense-making and thus reject the assumption of an external objective reality. In such a context, reflexivity, defined by Alvesson and Sköldbberg (2009) as being continuously attentive to the object being constructed, the researcher performing the construction as well as the social context constructing the research object and researcher, becomes indispensable. This is especially relevant to our research, with the focus on analyzing discourses, because critics have voiced the opinion that by holding the assumption that language is constructive, our analysis, too, will be mere construction (Gill, 2000). To us, this is not limiting, but rather highlights the fact of the inescapability of language in our methodology.

In practice, these considerations imply that we were reflective of our role as researchers and of our research to avoid seeing ourselves outside the construction. To account for quality of our research in terms of not only reflexivity, but also credibility and validity of our

conclusions, a balanced picture and understanding of the research situation needs to be given. We did so by applying multiple types of triangulation – referring to data, investigators, and methodology – identified by Denzin (1978). Data triangulation was attempted to be reached by including interviewing different consultants, from different consultancies, different positions and even countries. By working as a team during the analysis and scrutinizing each other's work, we can offer a more balanced research – this addresses investigator triangulation. Methodology triangulation was accounted for by analyzing documents as well as interviews with an in-depth process, as described in sub-chapter 3.3.3. Additionally, we added a second level of reflexivity by constantly probing ourselves and our process. This let us practice what Alvesson and Sköldbberg (2009) describe as “*interpretation of interpretation*” (p. 9, emphasis in original).

In conclusion, we wanted to make sure that our reflexivity is more than just a method to let our study appear of academic rigor – for us, it is a learning cycle. Our primary objective is to deepen the knowledge about neuroscience in business by not just passing judgment about the studied sites, but instead conducting credible and reflexive research, which is ensured by the abovementioned practices.

4. Analysis of Discourse

Outline:

In this chapter we present our findings. The subsequent structure is in accordance with our research questions and the concept of societal, large-scale discourse (in this case based on Western management) versus localized discourse of management consultants.

Starting from our poststructuralist standpoint, the interdisciplinary integration of neuroscience in business cannot be viewed as separate from more general discussions about management and business. This became clear when we analyzed the language use in our documents

and interviews, which we examined as two distinct discourses. The former representing the Grand ‘Big D’ Discourse on neuroscience in business, and the latter the local ‘little d’ discourse. We found that the ‘Big D’ Discourse closely mirrors the dominant discourse of Western management, focusing on profit, progress, and reason, whereas the consultants’ discourse admittedly taps into those, but gets more creative and challenges this at times. They construct neuroscience as a way to improve performance in a more humanistic way as well as a new language that can contribute to better decision-making and problem-solving. However, we show that even though the underlying assumptions appear to be more humanistic, the discourse ultimately reproduces normative and control-based approaches to managing people, while still rather treating them as machines than as humans.

4.1 Situating Neuroscience in Grand Discourse of Management in Western World – A Document Analysis

In our methods section we provided an overview of the documents we analyzed, stemming from popular business press. While examining these documents, which are all related to neuroscience in an organizational context, we aimed to discover the underlying discourse behind the abstract usage of language to examine where the talk of neuroscience in connection to business is situated. We investigated the discursive setting of the topic of the introduction and usage of neuroscience in business, following our research question: “*How is neuroscience characterized by popular business press?*”. It became apparent that many of the underlying assumptions in these publications relate to the general and dominant management discourse of the Western world as addressed in the *Literature Review*. This discourse is very much driven by management’s historical motivation by concerns with profit, progress and reason. In our analysis, we decoded four discourses in relation to neuroscience that are seeped

through the popular business press. They are particularly interesting, because they tell us that neuroscience in business taps into the same functions of profit, progress and reason discourse as other business movements. Next, we turn to sequentially debriefing how each of these four discourses, which we named ‘improve performance’, ‘innovation & progress’, ‘scientific answer’, and ‘human factor’, played out in the documents we analyzed (see figure 1). At first sight, the human factor seems to stand out from the other three discourses as it does not particularly tie in with the Western world’s focus on profit, progress, and reason. However, despite occasionally challenging the profit, progress and reason discourses, the human factor discourse ultimately draws on or is itself a part of those same discourses.

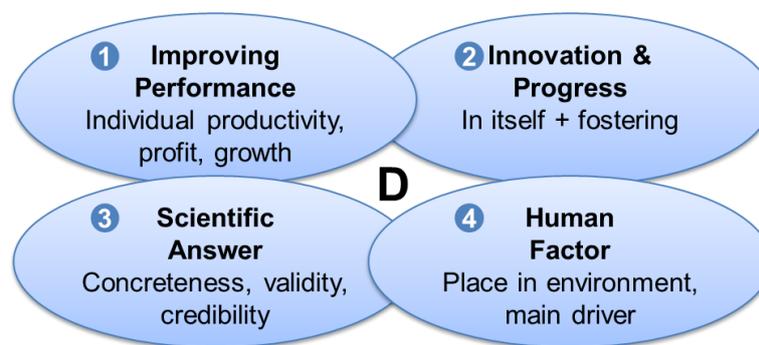


Figure 1: Grand (Big D) Discourse on neuroscience

4.1.1 Neuroscience can Improve Performance

One way that neuroscience is represented in popular business press that we analyzed is as a possible way to increase individual and organizational performance towards optimal economic activity. This fits with the fact that modern business, often driven by a concern for profit and efficiency, has long been interested in developing humans as resources by improving and measuring performance (Effron and Ort, 2010; Kemper, Rausch and Baars, 2013). The documents also often touched upon the topic of improving human performance by emphasizing how the understanding and application of neuroscientific findings can help to do so. One document related this to organizational change and stated:

“...increasingly to our understanding of how to better engage human performance and creativity during change” (HBR Blog, 2012)

Another article uses bold and persuasive language, such as ‘game-changing’, to strengthen the same argument that neuroscience can potentially increase overall performance:

“While we don’t claim to have invented the individual techniques, we have seen their collective power to help companies generate new ways of tackling perennial problems—a

useful capability for any business on the prowl for potential game-changing growth opportunities.” (McKinseyQuartely, 2011)

Hence, they see potential of neuroscience-based methods to increase individual performance, which in turn can lead to growth of the entire organization. Neuroscience can then also become relevant for economies with lacking manpower, as stated below:

“[...] he believed that the scientific study of the nervous system could enhance productivity of individuals and compensate for the failing manpower in Pakistan to create economic and social prosperity.” (Tribune, 2013)

In HBR (2005), a more specific reference to improving individual performance is made by specifically mentioning a technique to do so.

“By bringing the brain to the height of activity and then suddenly moving it into a passive, relaxed state, it’s possible to stimulate much higher neurological performance than would otherwise be the case. Over time, subjects who learn to do this as a matter of course perform at consistently higher levels.” (HBR, 2005)

Based on this, neuroscientific findings can potentially increase business capabilities, leading to increased human performance and growth. It follows that profit orientation and optimal economic activity are considered when suggesting to incorporate neuroscience into business processes. The articles state that firms can and should leverage biological reasoning to improve not only individual, but also team performance (McKinseyQuartely, 2011; Forbes, 2012; Forbes, 2013).

The documents that we analyzed display profit considerations that are reflected in employing numeric quotes to state the case of significance when characterizing neuroscience. When introducing a neuroscience project of similar scope as the Human Genome Project⁴, the New York Times article’s (2012) concern with explicit monetary value becomes apparent as it refers to the Return on Investment (ROI) that the Human Genome Project generated as a comparable figure.

“Every dollar we invested to map the human genome returned \$140 to our economy — every dollar,” (New York Times, 2013)

⁴The Human Genome Project was an international research program, commenced in the United States in the 1990s, to identify and map all genes of the human being from a physical as well as a functional perspective (National Human Genome Research Institute, 2008).

The focus on 140 US Dollar return portrays the Western capitalist emphasis on profit, here specifically the ROI. Also, when talking about the importance of neuroscience for stress management within organizations, monetary value creates a sense of urgency.

“In total, American businesses lose \$300 billion annually to lowered productivity, absenteeism, health-care, and related costs stemming from stress.” (HBR, 2005)

Hence, we found that quantifiable, practical and growth oriented talk is pointing to the assumptions of profitability characterizing the neuroscience discourse. This is intertwined with the next identified discourse on neuroscience, which addresses innovation and progress.

4.1.2 Neuroscience is Innovation and Progress

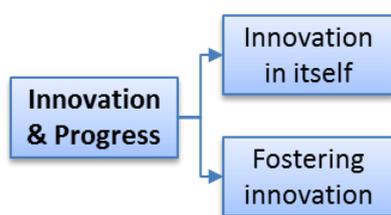


Figure 2: Neuroscience is innovation and progress

In the next paragraphs, we unpack the discourse that revolves around innovation. ‘Neuroscience is innovation and progress’ can be seen in a twofold manner – neuroscience as an innovation in itself and as fostering innovation (see figure 2). The former implies that it is yet a novel concept to bring forth the business world in multiple

ways in the long-term future, while the latter deals with the practical impact of neuroscience on creativity and innovation processes within organizations as of now.

The texts we analyzed treated neuroscience in a business context as a new concept with potential, which is underlined by nouns and verbs emphasizing innovation, such as ‘novelty’, ‘creativity’, ‘enhance’, and ‘generate’. In accordance with our understanding from the *Literature Review*, authors also mention the advent of technology as a major reason to engage in neuroscientific approaches.

“[...] they believe that technologies are at hand to make it possible to observe and gain a more complete understanding of the brain, and to do it less intrusively.” (New York Times, 2013)

This statement clearly constructs neuroscience as a state-of-the-art advancement. Neuroscience itself stands for progress, for example, in artificial intelligence. Hence, it is conceptualized as positive and to strive for in order to advance our living and working conditions.

The second reference to innovation throughout the articles suggests that neuroscientific methods should be used for advancement by enhancing our creativity for innovation.

“Only by forcing our brains to re-categorize information and move beyond our habitual thinking patterns can we begin to imagine truly novel alternatives.” (McKinseyQuarterly, 2011)

The idea of progress purports that we use knowledge and technology (Nisbet, 1980), in this particular case neuroscience, to constantly change to move to a more desired state.

Furthermore, the texts draw conclusions on how innovation may be fostered by means of insights into the workings of the human brain. According to them, multiple means act as a stimulus for innovative thinking, such as through creating different situations for the brain (McKinseyQuarterly, 2011), or phases of relaxation (HBR, 2005).

“Creativity is not a trait reserved for the lucky few. [...] you can dramatically boost their creative output—and your own.” (McKinseyQuarterly, 2011)

The context of this statement revolves around how creativity is often understood as something only certain individuals are born with. However, the article brings forth neuroscientific research on creativity, which has shown that creativity can be very well nurtured with the right understanding and tools.

4.1.3 Neuroscience is a Scientific Answer

“Every new generation must come to terms with the legacies and dynamics of Western rationalism, which have brought about [...] irreversible dependence on scientific and technological world mastery” (Roth, 1985, p. xv). This plays out in the third identified discourse on neuroscience that is in search for a scientific answer. Neuroscience is viewed to give tangible validity to these findings to what multiple sub-disciplines of psychology have already explored about human behavior and thinking. Some articles openly account for this.

“First, let me say that we at the Mind/Body Medical Institute didn’t discover anything new. The American philosopher William James identified the breakout principle in his *Varieties of Religious Experience* in 1902. What we set about to do was explore the science behind what James had identified.” (HBR, 2005)

While the quote above points to one specific finding that has been validated, the one below sees neuroscience rather as disproving previously made assumptions of other fields like psychology.

“Our love affair with the rational world goes back 600 years to the Scientific Revolution, which set in motion not only an epic blossoming of human innovation, but also a series of

beliefs about human nature that in large part are being dismantled by recent neuroscience discoveries.” (Forbes, 2013)

Despite this one statement that neuroscience dismantles old assumptions, the texts mostly confirm that neuroscience adds biological prove to existing research.

In general, it can be noted that the use of scientific language explaining the brain functions is used to attain the readers’ interest and gain credibility.

“So why do so many people equate money with personal satisfaction, even though the research is clear that social satisfaction is more rewarding? Neuroscience provides a possible explanation. It turns out that monetary and social rewards stimulate the same neural circuits in the brain.” (Forbes, 2012)

Above, scientific research on neural circuitry is used to explain reward responses in an organizational setting. Another example reinforcing this finding is the following:

“Molecular studies have shown that the calming response releases little “puffs” of nitric oxide, which has been linked to the production of such neurotransmitters as endorphins and dopamine. These chemicals enhance general feelings of well-being. As the brain quiets down, another phenomenon that we call “calm commotion”—or a focused increase in activity—takes place in the areas of the brain associated with attention, space-time concepts, and decision making.” (HBR, 2005)

This quote merely explains and scientifically validates the Yerkes-Dodson-Curve⁵, already established in the beginning of the 20th century based on findings of psychology. Next to this, citing neuroscientists as well as other credible researchers, such as Harvard business professor, further strengthens arguments.

“Harvard business professor Rosabeth Moss Kanter, considered by many to be one of the 50 most powerful women in the world, recently posted a blog entry about the importance of directly addressing values in the boardroom: “In organizations that I call ‘supercorps’—companies that are innovative, profitable, and responsible—widespread dialogue about the interpretation and application of values enhances accountability, collaboration, and initiative”. (Forbes, 2012)

Even though the texts clearly use neuroscientific language to address business practices and human traits, it also seems to show that neuroscience in business is still in its infancy. Instead of using very detailed language to explain organizational phenomena or human traits based on

⁵ The Yerkes-Dodson-Curve frames the relationship between arousal and performance and indicates that there is an optimum level of arousal between no stress and extreme stress, which maximizes performance. During the investigation leading to the establishment of the curve, mice served as subjects (Yerkes and Dodson, 1908).

neuroscience, the scientific arguments often remain rather vague and lay in supporting opinions. This is exemplified in the following account:

“Entrepreneurship [...] may be a genetic trait validated by neuroscience” (Link2Portal, 2013)

In general, all texts strengthen their arguments with supporting phrases that suggest clear scientific backing, for instance ‘the evidence shows’ or by highlighting studies of neuroscience, which propose an epistemic superiority of science. Often these arguments are used to talk about individuals in firms, which brings us to the last identified discourse that brings in the human factor.

4.1.4 Neuroscience Brings in the Human Factor

The fourth discourse brings the people within a firm to the center stage of the discussion. This discourse on neuroscience as the human factor ties in with the previously discussed scientificity, however, it slightly challenges the Western management paradigm. It draws attention to the neglect of certain human factors in business, such as emotions, and that they need to be incorporated into the organization more thoroughly. While the neurological understanding of the human is already evident in the discourse of the scientific answer, the texts in general start to center-stage the people as the drivers of organizations, which becomes especially evident in the direct way of the HBR Blog (2012) stating “let’s think about people differently”.

Mentioning emotions, unconscious acting and a limited capacity for rationality points the reader to the complexity of people in the workplace. The majority of the text pronounces today’s situation in organizations as suboptimal, for example, in terms of negative stress that it confronts workers with.

“Yet the dangers of burnout are real. Studies cited by the National Institute for Occupational Safety and Health (NIOSH) indicate that some 40% of all workers today feel overworked, pressured, and squeezed to the point of anxiety, depression, and disease.” (HBR, 2005)

The article further elaborates on this statement by explaining that neuroscientific research has shown that certain levels of stress can be good to increase motivation and productivity. However, the levels of stress that many employees are experiencing in today’s organizations are so high that it can become deleterious with time. The articles also conceptualize individual reactions to certain work settings as in the statement below.

“Your unconscious mind might indeed be letting you know there’s a pattern that doesn’t fit. Equally, it could be that the presentation was sound, but that it overwhelmed the limited capacity of your rational mind, while failing to satisfy your biological need to feel emotions like trust, acceptance, and excitement.” (Forbes, 2013)

The discrepancies between human needs and organizational functioning are addressed and seen as reasons to work on ourselves (McKinseyQuarterly, 2011; Forbes, 2013). Some of the texts give practical tips that can be applied individually or on a team level. McKinseyQuarterly (2011) gives advice based on being aware of one’s unconscious perceptions, like immersing oneself, creating constraints to boost creativity or openly challenging core beliefs. Other texts address meditation for managers (Tribune, 2013) and adapted communication models (Forbes, 2012). The so-called Compassionate Communication model is not actually explained in detail in the article, as it rather focuses on catching the reader’s attention by outlining it as a strategy allowing anyone to create a so-called exceptional bond with whomever they are speaking in a distinct twelve step program taking into account the multitude of human communication like body positioning, body language and facial expression.

“a bond that aligns both brains to work together as one. In this unique state—free from conflict and distrust—we can communicate more effectively, listen more deeply, collaborate without effort, and succeed more quickly at any task.” (Forbes, 2012)

This does not only state the clear focus on humans and their interaction, but is also a good example of the positive mindset that neuroscientific insights enhance our work and even make such a complex process easy. Some argue that these applications could also be used on a broader level. They call for a more systematic shift in the structures of the firm with the help of neuroscience insights, stating:

“It’s time to find a new model — one that incorporates insights from neuroscience research and takes into account 21st century workplace dynamics and realities.” (HBR Blog, 2012)

Another article also supports this shift by acknowledging that there is a journey ahead.

“in a whole new way – with the brain firmly in mind. And the journey has only just begun.” (HBR Blog, 2010)

Hence, through their language use they construct neuroscience to ask for a new paradigm to better accommodate the human in a dynamic environment. The relevancy is engendered by the fast shift to increasing brain-powered knowledge work and fast paced changes in organizations and the environment. It seems as though they want to pull two levers at once –

working on the human perception and behavior to fit the environment and changing the environment to better fit the human capacity and capability.

4.1.5 Chapter Conclusion

Despite the salient dominance of the focus on profit, progress and reason, belonging to the Western management paradigm, in the discourse on neuroscience in popular business media, a subtle shift towards a more human-centered approach can be observed. Slight adaptation challenges towards the dominant paradigm have been made in terms of acknowledging that the way we treat the human in an organization is not ideal. The texts raise attention to the currently widely shared perception that humans are often not treated in morally right ways, but instead rather as machines that can unleash unlimited power and capacity if ‘fixed’ with the right tools. Hence, the discourse on neuroscience can still be seen as situated within, rather than detached, from this overarching world view. In general, it needs to be registered that the discourse is very vague, and even though it postulates concreteness of science, it actually often lacks clear clarification and maturity.

This vague use of terminology underlines the difficulties to articulate the findings and to draw clear boundaries between the disciplines that often reach the same conclusion via different methods. The discussion at the moment seems to be rather practical and on an individual or team level, gaining credibility through neuroscience and concomitant terminology and referenced studies (for example HBR Blog, 2010; McKinseyQuarterly, 2011; Forbes, 2013). The outlook on neuroscience is purely positive, almost like on a tool that will most certainly help to enhance the organization. The general understanding seems to be that even if we are bound to our biology, we can take a certain degree of control over our brain.

4.2 Local Discourse of Management Consultants Tries to Challenge Dominant Business Discourses through Neuroscience

In this section, we focus on the language used by our interview participants in order to answer our second research question: “*How do management consultants talk about the introduction and usage of neuroscience in an organizational context?*”. Through analyzing the interviews, we found three dominant discursive themes in the language that our participants used. In figure 3 we give an overview of these discourses, including key terms that consultants used while talking about these topics.

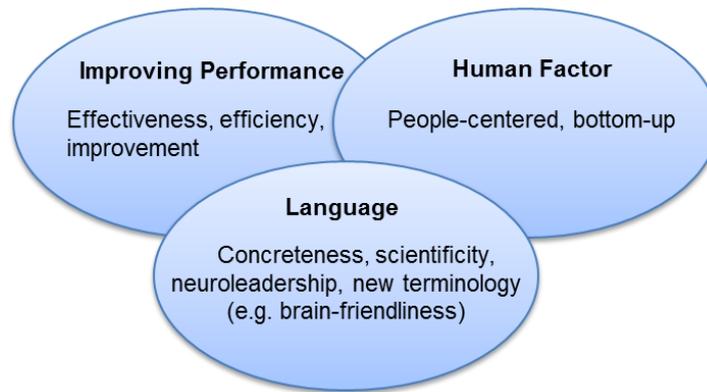


Figure 3: Local (little d) discourse on neuroscience

In the following, we elaborate further on each discourse and show that the ‘little d’ discourse on neuroscience in business is slightly different than the ‘Big D’ Discourse. Much of the language used by management consultants challenges dominant business discourses, which generally focus on profit, progress and reason. However, at the same time, they also reproduce such discourses.

4.2.1 Neuroscience can Improve Performance

In alignment with the ‘Big D’ Discourse on neuroscience in business as well as with dominant business discourses, we identified that the consultants construct neuroscience as a useful tool to improve both individual and organizational performance. In doing so, they focused on the concreteness and richness of the neuroscientific research. This matches with the earlier described dominant Western management discourse, focusing on science and rationality. However, within the local discourse on neuroscience in business, the consultants also challenge traditional ways of how to improve performance. One consultant, for instance, said:

“The more rational and logical a company is, the more they need to work on understanding the social aspect of leadership, and the more they need science in order to help them.” (David, Neuroleadership Institute)

With this account, he seems to imply that rational and logical companies tend to ignore understanding the social aspect of leadership, which can be important for motivating employees, and thus ultimately for improving performance. In order to help such companies to understand this, it appears that he views the concrete and scientific-based findings of neuroscience as a tool to relate to their rational and logical thinking, and thus as a way to make them aware of the significance of ‘soft’ and social aspects. Given the focus on rationality in dominant business discourses, he challenges this view by emphasizing the importance of the social aspect, which generally relates to emotional responses rather than

reason. Another consultant also talked about how neuroscience can improve organizational performance and said:

“There is just a richness in the research that is challenging traditional ways of going about problem-solving and decision-making that I think can really lend itself to improving an organization’s performance at the end of the day.” (Geoff, NeuroCapability)

This quote clearly shows that he is positive about what neuroscience can do for business. When he talked about the richness in the research, he referred to the “concrete and well-backed research” of neuroscience that can help to increase the level of a conversation. He illustrated this by saying that executives often discuss organizational issues on a micro-detail level without actually being able to make a decision or come up with a solution. He explained to us that discussions on how to change employee behavior do not come in on that level, which he seemed to view as crucial in terms of improving performance. Then, he continued and said:

“Neuroscience provides an ability to have a conversation on a more holistic level than at a micro-detail level. Therefore, by changing the level of the conversation you ultimately change the outcome and hopefully – you can’t guarantee that performance is getting improved – but ultimately, you want to improve performance or make a cultural change in an organization.” (Geoff, NeuroCapability)

He very much related improving performance to the neuroscientific research on the earlier explained threat and reward responses, and how this knowledge can help to decide how organizations should be set up in order to be successful. An example that he, as well as other consultants gave, was the use of performance reviews. Based on neuroscientific findings, they argued that performance reviews often trigger a threat response in the brain since they tend to be stressful and frightening, which ultimately does not improve employee performance. Besides performance reviews, another consultant also related neuroscientific findings to how incentive and bonus systems are usually set up. Even though such systems are supposed to motivate employees to increase performance, they are often built around the understanding that “money motivates” (Axel, HGS Concept). He then emphasized that neuroscience has shown that money does not motivate as much as often assumed and, therefore, incentive systems should be built on another understanding of how employees get motivated.

In these examples, the consultants emphasized that neuroscience challenges traditional ways of how to improve performance. However, the majority of them also acknowledged that

neuroscience often does not teach us anything new about individual or organizational functioning, but rather confirms previous findings from other sciences, such as psychology.

“Actually, some of the things we have discovered 20, 30, 40, 50, 60, 70 years ago in psychology or in organizational psychology. [...] But neuroscience over, for example, psychology, ironically, has a greater psychological impact than when we are talking about psychology.” (Andy, Leading Brains)

Interestingly, he seems to agree that neuroscience ‘simply’ confirms previous psychological findings, but he also addresses the power of neuroscience. He further explained this by saying:

“Research has shown that if you talk about brain science, people think it’s much more helpful, they listen more, and so on.” (Andy, Leading Brains)

These quotes show that the introduction of neuroscience into an organizational context gives consultants more power in terms of selling knowledge about organizational issues, such as motivation and innovation. Another consultant also raised attention to the perception that neuroscience often confirms psychological research and said:

“There is another part of people who think that we do not hear something new, because everything was said before and everything was discovered before by the science of psychology, especially cognitive psychology.” (Axel, HGS Concept)

He does not necessarily relate this statement to his own perceptions about neuroscience in business, but rather refers to his clients’ perceptions. Based on these quotes, it appears that the introduction of neuroscience in business gives consultants a certain power to address organizational phenomena differently, but at the same time they have to make sure that organizations can actually do something with that knowledge.

Despite the emphasis that the majority of our participants put on explaining that many organizations nowadays are built around the wrong understanding of how to improve performance, most of them indicated that they have not been able to try and change this. When we asked them about how they use neuroscience in their work context, most of them explained that neuroscience in business is still in its infancy. The positive discourse has not yet informed their actions in terms of applying neuroscience, instead most of them told us that they only hold seminars and key note speeches to raise awareness and build curiosity around the topic. However, some consultants even seemed to struggle with holding seminars. When we asked a consultant how many people visit such seminars, he said:

“Not many. There were 10 at the last one we held, but before that there were only 6. And The Management Circle is holding more and more seminars about neuroscience, so we can see that there is a growing interest. You can also see that the audience is changing – now top managers are coming whereas a year ago there were only HR managers.”
(Andreas, HGS Concept)

He shows that the seminars are not so popular yet, but he also appears to believe that the ‘neuro community’ is slowly growing. Several consultants explained to us that at those seminars and speeches, they mostly give tips and practical ideas to individuals. For example, how leaders can become more aware of their followers or how meditation can help employees to improve creativity. So, this seems to be very much done on an individual level. We further elaborate on this in the following discursive theme of the human factor.

To further explain that neuroscience in business is still at a beginning stage, many consultants explained that, besides David Rock’s SCARF model⁶, there is no model or concept for neuroscience in business yet. This appears to make it challenging for consultants to clarify what neuroscience can do for their clients. Also, since the knowledge on how neuroscientific findings can be applied into an organizational context seems rather limited, clients tend to be careful with getting involved. One consultant explained this and said:

“Our clients just prefer to go to a seminar and listen to the professors, the teachers or the trainers, and then go home and think about it without having this pressure from outside. So they are really careful.” (Gundula, HGS Concept)

Another consultant added to this by explaining that clients tend to initially seem excited about neuroscientific findings, but then start questioning what those findings mean to them.

“What I noticed is that a lot of people were saying: ‘Wow, that’s fascinating! That’s really interesting science. But what’s the ‘so what’? What does that actually mean for us in terms of day-to-day practice?’” (Linda, NeuroCapability)

This ties back in with the previous quotes about that people tend to find neuroscientific talk interesting, but then start wondering what they can do with it.

Together, these findings show that, the discourse revolves around the by consultants identified gap in terms of how organizations should improve performance, but they have not yet been able to close that gap with neuroscientific-based concepts or models. Thus, even though they

⁶ SCARF stands for Status, Certainty, Authority, Relatedness and Fairness. This model is based on the earlier described threat and reward responses in the brain, and explains what drives human behavior and how an individual needs to experience these five domains in order to perform at his/her best (Rock, 2008).

talk about the introduction of neuroscience in an organizational context as a positive development and challenge dominant business paradigms and discourses with it, they seem to fail at using neuroscience and producing new paradigms.

4.2.2 Neuroscience Brings in the Human Factor

In the previous sub-chapter, we showed that consultants' discourse on neuroscience in business in ways that both slightly challenge and confirm traditional organizational efforts in terms of improving performance. This section closely relates to the previous section, but emphasizes the discourse about the 'limited' way in which many organizations nowadays understand and treat their employees. We demonstrate that the talk on neuroscience in business slightly more challenges dominant ways in which organizations treat their employees to bring about their maximum potential. Throughout the interviews, the majority of the consultants raised attention to their perception that many organizations often ignore their employees' emotions and behaviors, and even their bodies. They talked about the neuroscientific research on emotions, behaviors and bodies, and emphasized the importance of taking all these factors into account. Therewith, they suggest new ways in which organizations should understand and treat their employees in their aim to achieve successful employee performance. Even though this tapped into ethical arguments in terms of how to treat employees, it also focused on assumptions of profit, progress and reason in the Western paradigm.

As discussed in the *Literature Review*, several scholars have argued that organizations often treat humans as machine-like resources rather than human beings in their continuous efforts to increase profit and efficiency (Bryson, 2007; Legge, 2007). They claim that organizations generally constantly strive for improvement via their employees and in doing so they tend to ignore their employees' emotions and behavior. The majority of our participants seemed to agree with this and addressed the neuroscientific research on emotions and how to manage employees.

"I can't really believe that they want to discuss emotions, because most of the managers have to deal with figures and analyses, and emotions are something they can't analyze, influence or calculate, so it's something they feel uncertain about. And therefore, they do not want to let emotions come into their business. Maybe this will change because we all know, and neuroscientists are proving it, that emotions play a role in everything."
(Gundula, HGS Concept)

With this statement, she emphasizes the importance of emotions as, according to neuroscience, emotions are relevant in all contexts. However, at the same time, she expresses the struggles that her consultancy has with applying neuroscience to organizations. She explained that they often work with risk managers, whose work usually revolves around ‘hard’ data, and are not fond of bringing in talk about emotions. Thus, despite the concreteness and hardness of neuroscientific research, which relates to the work of risk managers, HGS Concept seems to fail at convincing its clients of the importance to bring in new and more ‘humanly’ ways of understanding how to manage people. Another consultant also addressed the neuroscientific research on emotions and the importance of understanding such in business.

“If you know how emotions influence your way of investing then it is really important to be aware of these emotions and to know how to self-regulate these emotions.” (Klemens, CBI Affiliate)

Even though he emphasizes the importance of emotions in business, it also shows that involving emotions in organizations does not necessarily mean that organizations should accept that emotions exist. Instead, they might try to control them, which would ultimately again lead to ‘taking out’ emotions.

Another consultant went down a different path and explained that organizations are often still built around ‘wrong’ understandings that are not employee friendly.

“We see the command and control approaches embedded in many organizations as the way of leading, but it’s not brain-friendly, it doesn’t work. So why are we still doing that? Why are we going along these old paths? Why are we still doing trench management processes that do not work, that are not brain-friendly?” (Linda, NeuroCapability)

As in an earlier quote in the previous sub-chapter on improving performance, she also appears to refer to the neuroscientific research on threat and reward responses in the brain. Command and control approaches are generally viewed as threatening, or not ‘brain-friendly’, which can block the creative thinking and problem-solving process, and thus should not lead to improved performance. This statement also shows that she challenges the way in which many organizations function nowadays. Throughout the interview, she very much focused on the idea that neuroscience reveals how organizations often do not operate in ‘brain-friendly’ ways, referring to the high degree of stress, anxiety and change many employees nowadays have to deal with.

When we asked another consultant about the potential effects of applying neuroscience-based models and concepts to organizations, he seemed to agree with her statement and said:

“I like to think that organizations will become more human, which will mean that we will use the power of human beings much more effectively.” (Andy, Leading Brains)

He appears to be careful in formulating clearly defined potential effects, yet he is positive that neuroscience could improve performance. In explaining how the power of human beings can be used more effectively through findings of neuroscience, he raised attention to the neuroscientific research on the connection between the brain, mind and body, and how the three need to be in balance for a person to perform at his/her best.

Embodiment

The importance of the interrelation between the brain, mind and body as a topic became apparent in several interviews. A few consultants stressed that we focus too much on the brain in many of today’s knowledge-intensive economies, and therewith ignore the body.

“I believe that our culture is very cerebral, so we are working in our heads. We basically have been educated to work from the waist up and then to the right, but we are not whole body beings anymore.” (Peter, CBI)

He further explained this by relating it to how school systems and organizations are generally set up nowadays. We are taught to create, apply and evaluate thoughts to improve our performance in order to ultimately move forward as humanity. This can be seen as a worrisome development since the body and the signals it sends form a powerful language, which often says more than words. Furnham (2010) refers to this and claims that in order to be perceived as, for instance, a professional, both spoken and body language needs to be coherent. One consultant related this to neuroscience and put it into a nice statement by saying:

“You have the capacity to through your mind change your body and your brain” (Linda, NeuroCapability)

With this statement, she touches upon the earlier discussed topics of awareness and brain plasticity. By becoming (more) aware of your body, your mind can steer it in a different way. To give an example of this, we can relate it to people that have to present in front of an audience and are nervous. It often happens that they then put their hands in their pockets or fold their arms without being aware of it. With that, they communicate a certain body language, which can only be changed by realizing how their body responds in such a

situation, so that they can then actively try to manage their body in a different way. Another consultant added to Linda's quote by saying:

"So it is not just about looking at the brain itself, but also taking the other parts of the body into account; how they interact, how to be more present in a room, how to be more present in a conversation with business partners, and also how to be more in touch with myself." (Klemens, CBI Affiliate)

The consultants emphasized the importance of becoming more aware of your body and connect your body, brain and mind through the earlier described exercises, such as yoga, meditation and mindfulness. In doing so, they very much related this to themselves and explained how such exercises helped them to deal with burnouts and high levels of stress and anxiety. This finding of the discourse relating to neuroscience as a way to personally develop attracted our attention, even though it is outside the aim of this study, as it can be nicely tied to studies on the demanding and time-consuming work of consultants. Some of our participants also explained that they use these exercises to train their brain to, for instance, stay focused for longer or to make better thought-through (behavioral) decisions.

When we asked the consultants who talked about exercises, such as meditation and mindfulness, how they use this neuroscientific research in their work context, they explained that they mostly use those findings in coaching practices. In the interviews, we found that many consultants gave examples of organizational situations in which they applied neuroscience on an individual level rather than on an organizational level. A few of them explained that they are trying to help individuals in organizations by means of the aforementioned exercises as well as trying to change their belief system to be able to better deal with organizational phenomena, such as change, in order to ultimately improve their performance. This finding is consistent with the earlier described understanding of Senior et al. (2011) that cognitive neuroscience approaches are bottom-up instead of top-down. This would thus call for a new conceptualization of the way in which many organizational phenomena are understood and handled nowadays.

Throughout the above paragraphs, it becomes clear that consultants seem to view the introduction of neuroscience in an organizational context as a way for employees to deal with stress and anxiety, and thus to feel better and overcome embodied difficulties. However, even though they recognize the failure of bodies, they are looking at neuroscientific-based exercises as a way to prevent this. By introducing neuroscience to organizational contexts,

they seem to aim to bring in scientific-based answers in order to deal with decision-making, change, stress and anxiety that will help minds and bodies not to fail.

Ethical Concerns

As shown in the previous paragraphs, the majority of the consultants view the introduction of neuroscience in business as a way to consider the ‘whole’ human instead of just a ‘part’. Given this positive outlook, we were curious to find out how our participants would respond to questions about ethical concerns. Since organizations are essentially driven by humans, we expected that the medical background of neuroscience would lead to some ethical discussions. Surprisingly, almost none of the consultants brought up ethical concerns by themselves. The majority appeared to be excited and positive about neuroscience in business, and mainly saw it as an opportunity to bring in more of the human into organizations, rather than, for instance, manipulate or control the human.

“If you look at the big picture of neuroscience, it’s about the brain with the human beings so it’s actually about finding the best comforts for the human being rather than the best forms of manipulation, because that’s not best for all people.” (Andy, Leading Brains)

He does not seem to worry about (future) techniques that could potentially control or manipulate human behavior. Instead, he views neuroscience as a way to help the human being in organizations. Another consultant also addressed her positive thoughts on neuroscience in business and said:

“I think that most of the possibilities have a positive result on the performance of organizations, and the well-being of people working in the organizations.” (Gundula, HGS Concept)

She also believes that neuroscience can improve performance and help employees to better be able to deal with organizational pressure, which often results in stress and anxiety.

The main ethical concern most of our participants addressed, which they often only started talking about after we asked probing questions, was related to the introduction of techniques, such as neurofeedback. Neurofeedback is a certain technique, which measures brain activity and blood flow and gives real-time information with regards to the state of your body and/or mind. It can, for instance, show the levels of stress you are experiencing and gives feedback in the form of ‘beep’-sounds that can change brainwaves in order to help regulate or control stress. However, other than simple biodots, which are small stickers that you can put on your hands and change color depending on how stressed you are, none of the consultants indicated

to use neurofeedback tools so far. Even though everyone seemed to be excited about the positive potential that neurofeedback can have, they could foresee organizational situations in the future where organizations discover information about their employees that they do not wish to share or that they were previously unaware of.

“If we were going to look at mechanisms that measure biofeedback activity, that actually might give us extra information that a person doesn’t want to share with an organization, which could raise ethical concerns.” (Geoff, NeuroCapability)

This statement relates back to what we discussed in the *Literature Review* about the power of neuroscience. It does not only have the power to do good, but in the hands of the wrong people, can potentially also have the power to harm (Lever, 2012). Another consultant raised a similar concern and said:

Today, you can tell somebody: ‘I think this and that and that, and I will do this and that’, but maybe in the future, you can make visible that people are lying to you.” (Gundula, HGS Concept)

Only one consultant addressed additional ethical concerns and talked about taking drugs or placing electronic devices in the brain to enhance performance.

“As far as I understand from the modern neuroscience, you could eventually not only take drugs, but also put electronic devices into the brain and artificially enhance the brain.” (Klemens, CBI Affiliate)

Also, he went down another path by mentioning that personal freedom could become an ethical issue in the future.

“Another area, I think, that is worth considering is when a company starts trying and realizing what neuroscience can do, and then starts to require their employees to do certain things, which will likely standardize your employees. How far can you go? Where is the personal freedom to say I don’t want to do this technique, I want to stay with my anger, for instance?” (Klemens, CBI Affiliate)

Paradoxically, one consultant brought in a metaphor of “humans as cars” by saying that we only work on “two out of four cylinders” (Peter, CBI). Despite the fact that he aims to create people-friendly organizations, one may raise the concern that this metaphor again sees people as machine-like. Upholding this view, neuroscience would simply be a tool to fix our incapability.

Even though the majority of the consultants talked about neuroscience in business as a way to take more factors of the human being into account and be more ‘brain-friendly’, several of them still referred to how neuroscience can help control human factors, such as our body and emotions, or used machine-like metaphors to describe human functioning. So, despite the finding that they challenge traditional ways in which many organizations function by stressing the importance of bringing in all human factors, they end up reproducing, rather than changing, ways that essentially still revolve around normative and control-based approaches to deal with human beings.

4.2.3 Neuroscience is a New Language

In the previous sub-chapter, we discussed how our participants use neuroscientific-based knowledge to challenge traditional ways of understanding and managing people. We assessed that the neuroscience in business discourse emphasizes the importance of human emotions and feelings, in contrast to the focus that dominant Western management styles put on rationality. We found that in order to bring in knowledge on rather unaccepted ‘soft’ topics to organizations, the consultants use the business-accepted scientific and concrete terminology of neuroscience to address such. Hence, they believe that this language can help organizations to better understand organizational phenomena, such as change, leadership and motivation.

Some consultants referred to neuroscience as a new language very clearly and directly, whereas others described it more indirectly by saying that neuroscience can “improve the level of the conversation” (Geoff, NeuroCapability) or that it “adds new terminology” (Linda, NeuroCapability) to better make decisions or solve problems.

“I think neuroscience is a language. I think that what we are building at the NeuroLeadership Institute is a new language for leadership and organizational change.”
(David, NeuroLeadership Institute)

In context of this statement, he compared the importance of having a neuroscientific language in business to the importance of speaking, for instance, Italian when going to Italy. He then continued:

“When you start to understand only a bit of the language you are much more effective. We are all in the language of social interactions and trying to influence each other. And in that ‘country’, we don’t have a lot of language for how, for example, motivation actually works.” (David, NeuroLeadership Institute)

He seems to view neuroscience as a useful tool to better understand how humans function. Another consultant indirectly joined him in the discussion on neuroscience as a language and said:

“We just filled organizations up with systems, processes and facts, and we have got to have the balance sheet and the profits and losses, and all those things. It is a very concrete world, so neuroscience lends itself really well for having a good quality conversation around what can be done, what triggers, what leaders can be pulled in, in terms of how people operate that will get them a better performance outcome.” (Geoff, NeuroCapability)

He taps into the rational, logical and hard characteristics of organizations and seems to believe that the neuroscientific language can contribute to a better understanding of how people operate, which will ultimately lead to improved performance. Another consultant also added to the topic of neuroscience as a language, but came from a different angle and said:

“There is something new that can explain leadership, motivation, and all these concepts that psychology is dealing with, and people think that we can now really get our hands on that.” (Axel, HGS Concept)

He thus appears to view the introduction of neuroscience in business more as a way to incorporate new science into existing concepts, such as leadership and motivation.

Despite the enthusiastic and promising manner in which our participants talked about neuroscience as a new language, they again referred to the fact that it is still at a beginning stage. They explained to us that before organizations can actually use this new neuroscientific language, it needs to be further developed and understood. Throughout the interviews, it became clear that the majority of our participants give themselves the role to translate the relevant, but rather difficult, neuroscientific research into understandable language through, for instance, concepts and models. In order to do so, they work together with cognitive neuroscientists and stay up-to-date on the latest information and findings by reading neuroscientific journals.

Due to the lack of neuroscientific-based models and concepts, we noticed that many consultants currently appear to view the introduction of neuroscience in business as a challenge for them to bring in and relate the neuroscientific research to business phenomena. Besides giving seminars and key note speeches to raise awareness and build curiosity, the majority indicated that they have not yet been able to actively use neuroscience in business. As mentioned earlier, only David Rock’s so-called SCARF model exists. However, another

participant mentioned that he is progressing in terms of relating neuroscience to business practices. Together with two business administration professors, Andy designed the so-called SCOAP model, named after its basic elements of Self-Esteem, Control, Orientation, Attachment and Pleasure, which is now in the testing and analysis phase in order to become approved. Both the SCARF and the SCOAP model are the result of cognitive neuroscience research on what motivates people in order to boost creative-thinking, the ability to deal with change and influence others, emotional regulation, problem-solving and decision-making.

The discursive theme of neuroscience as a new language fully ties in with many organizations' focus on rationality, efficiency and effectiveness. The rather objective scientific backing of neuroscience does not only allow for a more concrete and scientific-based language to discuss organizational phenomena, but also as a door opener for many consultants. This refers back to managers' desire for tangible outcomes and quantifiable terms. One consultant stated this very clearly and said:

“Now we have scientific proof for what we've been trying to do all along; change behaviors.” (Peter, CBI)

The scientific evidence of this new language gives consultants a certain power since it provides them with increased credibility and gains listeners' attention. Given the cognitive research that this new language is based on, our participants related the use of neuroscientific language to many different organizational areas, ranging from performance management to stress management, and included all levels of an organizational hierarchy.

While we analyzed the interviews, we also recognized the power of business discourse to become normalized and codified. One of the questions we asked our participants was where they get their information on neuroscience from, through which we found that consultants from the same consultancy tend to be exposed to similar literature and information they receive from the neuroscientists they collaborate with. As a result, those consultants often used similar terms, such as 'brain-friendliness' or the earlier discussed neuroleadership, used the same examples and concepts, such as brain plasticity and emotional awareness, and had a similar perception of neuroscience in business. However, the majority showed that they view neuroscience as a new language that can function as a selling bridge or as a tool to scientifically validate old concepts to improve selling information on topics, such as motivation or leadership. Even though the consultants are, at the moment, among the only users of this new language, they aim to integrate this neuroscientific language into different

organizational areas so that they can use it as a more useful tool to better understand and manage their employees.

4.2.4 Chapter Conclusion

In this section, we identified three discursive themes in management consultants' talk about neuroscience in business. The themes of Improving Performance and New Language almost directly tap into the discourse on Western management focusing on profit, progress and reason. The consultants addressed the potential of neuroscience to more effectively and efficiently increase both individual and organizational performance by incorporating neuroscientific findings into organizational systems and practices. The new language of neuroscience can thereby help to discuss organizational issues in a more concrete and 'objective' way that can help to improve decision-making and problem-solving. On the contrary, the theme of Human Factor challenged dominant business discourses, but ultimately appeared to fail to complete this challenge, and also to some extent reproduced the discourse. As challenge, the consultants raised attention to the flaws of current organizational systems, which often revolve around normative and control-based approaches to improve human performance. By emphasizing neuroscientific research, the consultants explained that these systems are often not 'brain-friendly' and effective. Although they seemed to try to bring in all human factors, including emotions and behavior, they instead ended up on the same path by emphasizing that emotions need to be included in order to regulate or control them.

Throughout the entire *Analysis of Discourse*, we showed that both the 'Big D' Discourse and the 'little d' discourse on neuroscience in business slightly differ from each other. We identified seven discursive themes, where two – 'Improve Performance' and 'Human Factor' – overlap in both Grand Discourse and local discourse. In the following chapters, these will be combined, so that five themes remain. While the language used in the documents is almost identical to dominant business discourses that focus on profit, progress and reason, the consultants somewhat challenged, but yet reproduced, such discourses. Even though the documents and the consultants addressed organizational functioning by coming from a different angle by using neuroscientific research, they ultimately aim for the same outcome of improving performance through profit, progress and reason.

5. Discussion

Outline:

In this discussion, we elaborate on the overall discursive themes that we identified, discuss the newness and added value of the interdisciplinary connection and address an interesting paradox observed about the ethical considerations on the discourse.

In this thesis, we have analyzed the emergence of a new discourse concerning the introduction and integration of neuroscience into business. The connection – still in its infancy – has only been established recently, but has already captured the attention of scholars, researchers

and practitioners, highlighting the “current preoccupation with interdisciplinarity” (Barry et al. 2008, p. 21). Hence, one can say that the once purely medical domain of neuroscience is spilling over into the social domain, which in the case of this thesis is business. The poststructuralist undertaking of identifying and discussing the language about this subject matter adds an exploratory and critical perspective to already existing literature, and allows for better insights to conceptualize the neuroscientific research as the integration continues.

5.1 Discourse Challenges Yet Reproduces

We have shown in our *Analysis of Discourse* that the discourse on neuroscience in business, from a popular business press and management consulting perspective, is mainly in line with dominant management paradigms. These are ultimately derived from profit, progress and reason, and the discourse on neuroscience in business only challenges this at times. The prospect of neuroscience appears to be exciting for the consulting industry that seeks to understand human interaction, the dynamics in organizations and change processes. The consultants do so in line with dominant Western management discourse and their professional goal to make an organization more effective and efficient in order to improve performance (O’Mahoney, 2010). However, the talk on neuroscience also challenged traditional ways of viewing the human as a mechanical resource and setting up organizations only based on streamlining (Kiefer, 2011).

Some of our participants used neuroscience to talk about their desire to make organizations a better (e.g. stress-reduced, brain-friendly and satisfying) place for the human. This challenge, yet, remained incomplete as the importance of organizational objectives to improve performance through humans’ reasoning abilities outweighed the aim to bring in, and actually accept, other human factors. Even though the consultants appeared to initially take another

route to improving performance by bringing in more human factors, such as emotions, they ended up on the same path of regulating and controlling emotions to be able to make more informed decisions. Therefore, we believe that neuroscience is not a groundbreaking new concept or tool that will change our economic systems, but we rather agree with Waldman et al. (2011) that neuroscience can enrich, inform and deepen existing theories. We expect it, at most, to generate slight changes in management discussions of how to improve performance as it provides a concrete as well as an additional biologically informed way to talk about the human mind and body in an organizational setting.

In the discursive theme of the New Language, we also identified a slight challenge towards traditional management thinking. Some consultants appeared to have the belief that science does not provide all the answers for business interactions, but wanted to use neuroscience anyways, because the overall management discourse tends to revolve more around ‘hard’ facts than ‘soft’ interpretations of the human. This mirrors arguments found in literature, such as Coe’s (2010) stating that “when we tell change leaders in organisations that the traditional leader-led, top-down initiated-and-deployed plans for change have a low probability of sustained success, we now can tell them scientifically why. Those plans pose the threat of uncertainty and the promise of little or no reward to most people in the organisation”. Senior et al. (2011) and the consultants also touched upon this and appeared to describe neuroscience approaches as more bottom-up. While Senior et al. (2011) were more critical and said that it is impossible to understand organizational phenomena from the bottom-up, the consultants were more optimistic and suggested that an individual first has to have the right mindset before (s)he is ready to be able to implement an organizational change initiative. The consultants referred to their understanding that neuroscience can help to change people’s mindsets through, for instance, helping them understand what happens in their brain in change situations and by doing exercises, such as meditation and yoga.

In agreement with the abovementioned, neuroscience can improve a consultant’s confidence level when arguing for their professional services and can also gain greater support from the (potential) clients, such as senior management in the industry. McGregor (2007, p. 68) noted that “most newfangled trends that capture the minds and checkbooks of executives, neuroleadership may hold promise for managers, but it also may mean profits for some people plugging it”. This can be nicely intertwined with our argument of challenging yet reproducing as consultants might initially want to challenge a pure profit orientated goal of organizations,

but ultimately also earn money with the fact that this scientific evidence serves better for the target group of their services.

5.2 New Value of Neuroscience in Business

When answering our research questions of “*How does popular business press characterize neuroscience?*” and “*How do management consultants talk about the introduction and usage of neuroscience in an organizational context?*” with the five identified discursive themes, the value of the liaison of neuroscience and business repeatedly came into picture and hence we would like to draw the reader’s attention to the discussion revolving around this.

In the literature review, we already outlined the academic discussion whether neuroscience adds value to the organizational context or merely reproduces previously existing concepts developed in the realms of psychology or other social sciences. According to Boyatzis (cited in Hesselbein et al., 2011), “some of this knowledge has been out there for a while, but the scientific evidence makes it – and the case for neuroscience – very compelling.” Our interviewees and some of the analyzed texts shared this view. However, the discourse suggests that the evidence that neuroscience produces is exactly the value needed in the business world. Hence, without producing new critical findings or insights, the neuroscientific approach can still add value by backing up concepts of the psychological or cognitive arena and offering a cognitive frame to put the spotlight on concepts of motivation, leadership, change and other human interactions that would otherwise be understood and treated differently. Therefore, the consultants especially addressed the potential of neuroscience to increase the quality of a conversation when it revolves around how to understand and manage human aspects in an organization.

It appears that despite this glorified concreteness of the science and perceived improving capability, the novelty of the neuroscience/business interconnection also leads to uncertainty or even ambiguity of what it potentially means or even changes for organizations and/or its employees. We identified a high degree of vagueness in the talk about the actual reshaping potential and specific practical application of neuroscience within organizations. Throughout the entirety of the discursive themes, the positive potential is highlighted, but the lack in clarity about applications and implications indicates that results and practical concepts are still awaited.

With this in mind, the debate continues as to whether this represents a truly new field – a question raised by many scholars (Coutu, 2008; Lafferty and Alford, 2010). Our research suggests that neuroscience in business certainly adds a new viewpoint to the organizational content, but, in discussion, cannot stand on its own. We thus have to agree with Senior et al. (2011) that neuroscientific research takes away too much real-life organizational context in order for it to become a dominant science in organizations. Instead, we argue that it is the mixture of research from neuroscience, psychology, cognitive sciences, organizational sciences and related disciplines that together contribute new research and confirm existing research to continue building and validating the body of knowledge on human behavior and organizational functioning that eventually informs organizations. The ‘neuro-trend’, however, seems to be rather useful in terms of bringing the discussion about the human in the organization on the executives’ as well as the academics’ table. We expect neuroscience to become integrate into the organizational norm, without being a truly separate field.

5.3 Ethical Paradox

The increased talk about neuroscience in business pointed to an ethical paradox that should be addressed. As portrayed in the analysis of the discursive theme of the ‘Human Factor’, which was found in both the documents and the interviews that we analyzed, the discussion on neuroscience predominantly revolves around the human within the organization. By consultants, neuroscience is clearly perceived as a way to allow for a higher quality conversation on emotions, stress and the overall place of humans within an organization. Even if this may be a genuine belief of the consultants, by the way they talk about and use neuroscience, they still tend to reproduce the human as a resource that can be ‘fixed’ with the right tools as discussed in the previous sub-chapter. However, with the conceptualization of this ethical paradox, we essentially target another consideration. Despite the fact that neuroscience may be used to make organizations more ‘brain’ or human friendly, it also raises ethical questions of what actual practices, such as neurofeedback or fMRI studies of managers and employees, mean for the individual. Some consultants voiced the concern that these practices could easily drift into the domain of manipulating the human or ultimately looking at the human as a capacity and not as a being. As addressed by Level (2012), personal freedom could potentially be limited by technology forced sharing of sensitive information. Although, these seemed to be important ethical concerns and limitations of the usage of neuroscience, we noticed a rather positive outlook in the consultants’ responses and an overall

lack of discussion in the analyzed documents. We expected the ethical considerations to be much more considerate of the negative impact of those practices than it turned out to be. However, this could very well be the result of our chosen sample group. The consultants we spoke to see the positive potential of neuroscience and thus focus on understanding how neuroscience can change organizations in a positive way, and do not pay particular attention to how to use neuroscience in, for instance, a manipulative way.

In short, the discourse on neuroscience in business brings in the human to make the organization more ethically aware, but at the same time opens up an ethical discussion of the implications that the use of neuroscientific techniques on employees or managers could have. Yet, the latter discussion is rather hypothetical and only appeared after distinct probing of the participants.

6. Conclusion

Outline:

In this final chapter, we summarize our research process and our findings. Further, we conclude our study by discussing our theoretical and practical contributions, elaborating on limitations, and suggesting potential future research.

The human fascination of the brain has long existed. However, the unexpected liaison with business has only emerged recently, which is the subject matter of this thesis. We engaged in qualitative research from a poststructuralist

standpoint to scrutinize the current discourse on neuroscience in business highlighting the different themes embedded in the language of management consultants and the popular business press.

This study originated from a meeting with Gundula Schramm, managing director of HGS Concept, who introduced us to this development when discussing topics of interest to the consulting industry. After delving into the research on the phenomenon of neuroscience in business, we realized that it is not very well understood yet as to what neuroscience can essentially imply for business. The literature is predominantly introductory and explanatory and lacks perspective. Also, we found the need to problematize and scrutinize neuroscience in business to understand its constructions, if consultants increasingly desire to be providers of neuroscientifically inspired services. Next to this, the fact that management consultants bring new ideas and concepts to organizations (O'Mahoney, 2010) led to our decision to focus on this local discourse. To get a more holistic understanding of the introduction of neuroscience in business, we also included popular business press articles that invoke and shape the Grand Discourse on neuroscience of broader society.

Based on the novelty of the topic as well as our interpretive poststructuralist worldview, through which we acknowledge the power of discourses, we designed the following two research questions:

1. *How does popular business press characterize neuroscience in business?*
2. *How do management consultants talk about the introduction and usage of neuroscience in an organizational context?*

6.1 Main Findings

In this thesis, we analyzed the language use to talk about neuroscience in business, which led us to identify the following major discursive themes of neuroscience in an organizational context.

Neuroscience can Improve Performance

Both the popular business press and the consultants described neuroscience as a way to improve individual performance in order to ultimately increase organizational performance, and hence profit. By addressing the neuroscientific research on human behavior, they suggested that traditional organizational efforts to improve performance often do not achieve what they aim to achieve and therefore they want to incorporate neuroscientific findings to better tap into the human potential.

Neuroscience Brings in the Human Factor

Besides improving performance, both groups also discussed neuroscience as a way to bring the inner human workings to the center of discussion within organizations. While most organizations are driven by rationality and tend to not factor in other human factors, such as emotions, the documents and consultants pointed towards the importance of awareness of mind and body of the employees in organizations. Especially the consultants emphasized that many employees nowadays experience high levels of stress and anxiety, and that by ignoring emotions and bodily signals, our bodies and minds are more likely to fail, which can potentially lead to, for instance, a burnout.

Neuroscience is Innovation and Progress

Based on the documents, we identified that popular business press characterized neuroscience in business as innovation and progress in a two-fold manner. Firstly, they used language to highlight the novelty of neuroscientific research in itself. Secondly, they focused their attention on neuroscientifically informed approaches in organizations, which can lead to increased creativity and innovative thinking.

Neuroscience is the Scientific Answer

The ‘hard’ discipline of neuroscience adds an additional biological and scientific level of understanding and managing people in organizations. Even though the documents as well as the consultants addressed that neuroscience often confirms existing ‘soft’ science from other

fields, such as psychology or organizational science, they viewed the ‘hard’ contribution of neuroscience as reasoning positively. Hence, it is seen as epistemically superior to organizational studies and should therefore inform those.

Neuroscience is a New Language

In the study at hand, the consultants extensively talked about neuroscience as a new and more concrete language that can provide a platform to talk about human interactions from a different angle. In doing so, they emphasized that the richness of the neuroscientific research can contribute to improving capabilities, such as decision-making and problem-solving and overall make human behavior and emotions at the workplace within organizations more easily graspable. By being able to use a more comprehensive and concrete language, employees and managers can be more effective in discussing organizational activities and phenomena.

6.2 Theoretical Contributions

With our poststructuralist perspective on this phenomenon in its infancy, we added a new way of conceptualization in terms of neuroscience in business. We allowed the reader to view the concept from an angle that is detached from merely focusing on positivist to-do’s to implement neuroscience, and rather critically assess the discourse that shapes the idea of practically connecting neuroscience to business.

We illustrated in the *Analysis of Discourse* and the subsequent *Discussion* thereof that the discourse on neuroscience in business mainly draws on the same repertoire as dominant management discourses – focusing on profit, progress and reason (O’Mahoney, 2010). However, the talk on neuroscience also breaks with these assumptions and ideas by challenging traditional ways of viewing the human as a pure labor resource. The talk generally points towards an idea where organizational designs are not mainly based on profit-orientation, but rather on creating a ‘better place’ for the human. Although this idea emerges in the discourse, an overbalance of improving performance for the organizational objectives and scientific reasoning for efficiency could be analyzed in the talk. Despite this discussion, from a management consulting perspective, neuroscience remains an exciting prospect as it seeks to understand human interaction, the dynamics in organizations and the change processes, around which their services revolve.

Having identified the direction that the discourse on neuroscience in business is taking, our study confirms the infancy of the discussion on neuroscience in business that most scholars describe (Coe, 2010; Eser et al., 2011; Rock, 2008; 2009). However, we have also shown that both popular business press and consultants are optimistic about neuroscience in business and foresee further potential. Therefore, the question asked in literature about the longevity of this phenomenon and its establishment as a separate field (Coutu, 2008; Lafferty and Alford, 2010; Senior et al, 2011) remains to be answered. Scholars discuss whether neuroscience in business really represents something completely new or merely a new perspective to look at and advance existing concepts. Our study contributes to this scholarly discussion as our findings indicate that neuroscience in business should not necessarily be represented in an entirely new field. More so, neuroscience in business adds value in the sense that it supports the social sciences or slightly corrects current understandings. Here, this study backs Senior et al.'s (2011, p. 807) argument that “without the multidisciplinary nature of (organizational cognitive neuroscience), neither cognitive neuroscience (a bottom-up approach) nor organizational science (a top-down approach) is able to convincingly address such issues”. This multidisciplinary, including other fields of social sciences, will add value in terms of improving organizational design, not neuroscience exclusively translated to the business context. Hence, our study further strengthens Waldman et al.'s (2011) argument that neuroscience can help to develop, inform and enrich existing theory.

When discussing neuroscience in business and its actual informative potential, ethical considerations automatically came to our mind. Kiefer (2011) described neuroscience in business as potentially contributing to a more ethical examination and debate about the human within organizations. Our study underlines this notion to ‘think about the human differently’, as this was mentioned throughout the discursive theme of the Human Factor. However, the study also drew our attention to a paradox within the ethical discussion of our empirical data. While underlining the importance of neuroscience for advancing the well-being of the individual, participants also pointed to concerns, which were not touched upon in our consulted literature. They voiced concerns about their perception that neuroscientific practices can also negatively impact the individual in terms of privacy, being limited to neural activity or even manipulation.

6.3 Practical Implications

Although our research mainly focused on adding to the body of knowledge to gain a deeper understanding of the infant connection between neuroscience and business, the discursive themes on neuroscience also reveal a number of practical implications of the continuing scholarly development. As we pointed out throughout our study, the interdisciplinary marriage of neuroscience and business affects all humans, no matter at what level or position within an organization. The local discourse of management consultants further added consequences for that specific industry that will also be briefly discussed.

The discourse on neuroscience reproduces and strengthens the view of humans as a resource that can be enhanced with the tool of neuroscience to be more creative, adaptive, accepting and to, ultimately, increase the human resources' performance. However, as it portrays the way of human performance improvement as not having been brain-friendly, the discourse also takes on a more humanities engaged direction. Practically, this suggests that the integration of neuroscience will not have groundbreaking implications on the manner organizations are set up, which is in line with results by Lafferty and Alford (2011), who view the broad organizational application as yet very limited.

Despite this, the introduction of neuroscience can still be seen as a selling point for consultants and, in practical terms, functions as a door opener, to bring in new concepts from the consulting perspective. Based on the perceived epistemic superiority of science, individuals are more open-minded to focus on increasing their internal capacities and therefore consultants increase their power in the client-consultant relationship. Respectively, managers can use scientific evidence to seek buy-ins for activities, such as emotional awareness and mindfulness, within organizations.

Once these practices are accepted in organizations, which most likely can only be achieved through a scientifically sound argument, managers can ultimately use these to increase performance via practices, such as mindfulness, yoga and meditation, to prevent the failure of our body and mind. Therefore, the aforementioned ethical paradox is not only interesting on a theoretical level, but also has practical relevance for how organizations treat their staff because managers need to be aware of contradicting considerations.

6.4 Limitations

While conducting our study, we encountered some limitations, which were related to the broadness of the topic. As we set out this study to explore the recent phenomenon of neuroscience in business, we did not want to limit our research to one business concept. This led to a rather broad interpretation of our findings, which we, due to time limitations, could not analyze into further detail. Even though we contributed to a more in-depth and broader understanding of neuroscience in business, our contribution could have been more specific if we would have had the opportunity to study one concept, such as for instance change or leadership, into more detail.

6.5 Implications for Future Research and Outlook

Based on the current beginning stage of neuroscience in business, we expect that this will further develop over time. The expanded research on the brain has only just started with the advancements of new techniques, which means that the field of neuroscience will most likely discover much more about human behavior, which in turn can have an effect on our understanding of organizational functioning. We would like to encourage organizational scholars to continue building the body of knowledge around this topic area to be able to better understand what neuroscience in business can and will ultimately mean for both humans and organizations.

As discussed, our contribution to the research on this subject matter is rather broad and touches upon several organizational phenomena and concepts, including change, leadership and motivation or identity in the workplace. At this point, we would like to emphasize that neuroscience in business also needs to be studied with a more specific approach of, for instance, identity. This was not a main focus of our study and hence was neglected, but repeatedly caught our attention when analyzing the empirical data. It is an interesting topic to dive into based on two different perspectives. Firstly, consultants spent a great amount of time talking about their own involvement and personal development in relation to neuroscience, hinting to their own identity construction, and secondly, applied neuroscientific practices ultimately give individual insights into their inner workings, which based on our lay interpretations of our interviews, could have an interesting impact on their identity.

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Appendix

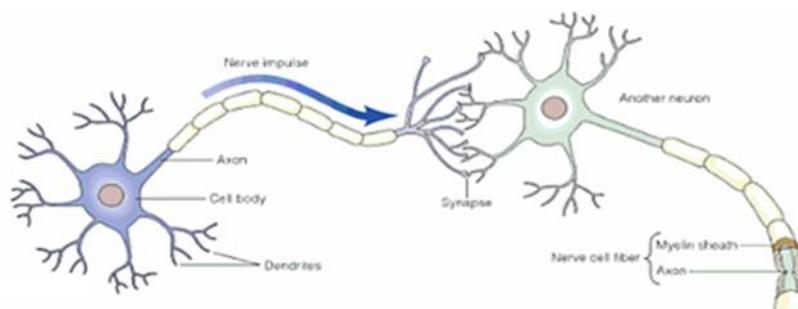
Appendix A: Neuroscience Background

Following, singled out information about the nervous system and impulses, the brain and its plasticity. This text only scrapes the surface of neuroscientific findings and there is a lot more to talk about, such as localization, synapse reactions, sensory organs, interactions of the brain with other organs, and much more. At this point, we emphasize that these explanations cannot at all be seen as comprehensive, but rather act as an introduction to the basic principles and relevant background understanding when making sense of the discussion and argumentation of our research study.

The nervous system and the nervous impulse

The nervous system is subdivided into the central nervous system (CNS) that is effectively the center of the system, consisting of the brain and the spinal cord, and the peripheral nervous system (PNS) that is spread throughout the human body. The former processes the information received from the latter via neurons (Brodal, 2010).

The neurons are the basic units of the nervous system (Figure 1). Even though they come in various sizes and shapes, most neurons have the same elementary



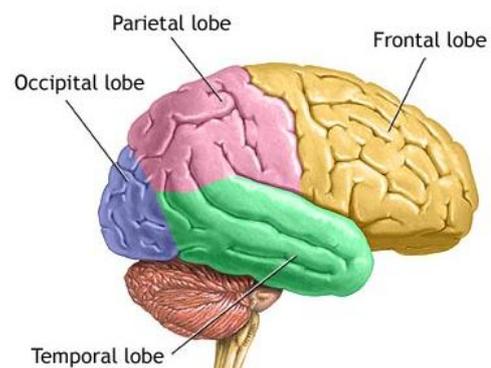
structure consisting of four parts: the nerve cell body, dendrites that branch out from the nerve cell body, synapses at the end of dendrites that receive sensory information, and one axon that leads away from the nerve cell body contacting one or more other neurons (Sigelman and Rider, 2011; Tallis, 2011). Due to these basic anatomical facts, a substantial number and variety of inputs arrive at a neuron, which subsequently assimilates all the information, generating a single main output. This output is passed on to the next neurons via the axon. Neurons may come in various configurations suited to precise applications depending on their location within the nervous system (Eichenbaum, 2011).

The nervous impulse is a wave of excitation passing along the neuron that is set off by an external stimulus or a previous neuron. Inactive neurons, which are negatively charged, get

excited through an influx of positively charged sodium ions leading to a so called depolarization. Following this, repolarization occurs by efflux of positively charged potassium ions as well as a recommencement of active transport of sodium ions to the outside (Tallis, 2011). There is no such thing as a strong or a weak impulse. The chemical rearrangement and hence communication via neurons underlies the ‘all-or-none’ principle. The only way strong stimuli can be distinguished from weak ones is by the frequency of impulses that they generate. These excitations are passed on from neuron to neuron via joints called synapses (Brodal, 2010). Here a highly complex chemical reaction takes place to transmit the ‘signal’ to the next neuron. Neurotransmitters, released to pass on the ‘signal’ may either be excitatory or inhibitory, so they either facilitate or hinder neuron activity. The complex process of summing up and subtracting these neurotransmitters alters the behavior of the synapses which in turn has been linked to concepts such as learning and memory.

Parts of the brain

The brain consists of billions of neurons. On a larger scale, however, it is subdivided into multiple parts, i.e. the cerebrum, thalamus, hypothalamus, pituitary gland, cerebellum and brain stem. Each of these parts is responsible for a different function. The cerebellum, for instance, coordinates muscle functions such as maintaining posture. The



cerebrum, the largest part of the brain, is responsible for our consciousness and hence most relevant to our present interest. Each cerebral hemisphere, right and left, has four lobes named for the bones of the skull that cover them: frontal, parietal, temporal, and occipital (Figure 2). These lobes, in turn, are responsible for functions including concentration, understanding speech, recognizing objects, memory, and so on (Brodal, 2010).

The circuitry

Current biological understanding is that our brain activity is located and shaped in discrete circuits. It is not the single neurons but the connections that make up the brain. The brain is a multifaceted linkage of circuits and singling them all out has yet to be achieved by neuroscience (Brodal, 2010).

The plasticity

Our brain is very fluid - brain plasticity is greatest during early development, but it does span throughout the entire human life. We, humans, have few fixed relationships between

sensations and behavior within our brain, subsequently allowing us to choose from different responses based on context and experience. Studies have shown that new brain cells occur due to exposure to environmental context and existing neural connections may be 'rewired' (Gage, 2002; Holtmaat et al. 2006). The term 'brain plasticity' captures the brain's responsiveness to individual experiences and its development in multiple ways (Kolb and Wishaw, 2008; Sigelman and Rider, 2011). Neural connections might be down-regulated or up-regulated according to the context and stimulus. Repeated activity in a certain neural pathway, for instance, may lead to increased ease of crossing that synapse and thus change in behavior. This means that less information is lost in the transferal (Tallis, 2011). Plasticity can also be examined on a more macroscopic level of the brain parts. Schwenkreis et al. (2011) give a fitting example of an individual who learns to play the violin. The part of the cerebral cortex, representing the hands, is expanded. Here it is interesting to note, that the representation of the hand that is fingering, the more complex task when playing the violin, is expanded to a greater extent to the representation of the other hand.

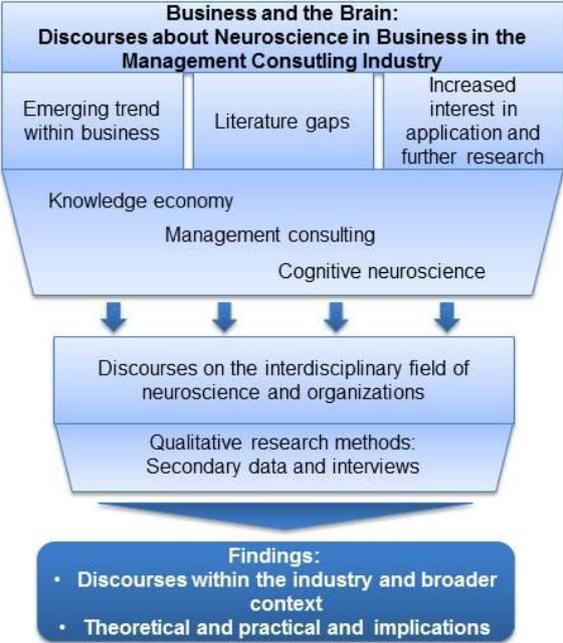
Appendix B: Information for Contact to Consultancies

We aimed at presenting our case well at the consultancies that we contacted. Therefore, we designed a brief overview of our study in Microsoft Power Point and PDF format. This allowed managing directors to evaluate their interest in the study or refer us to other consultants of their consultancies.



Business and the Brain: Discourses on Neuroscience in Business in the Management Consulting Industry

Master Thesis Outline:



The flowchart illustrates the structure of the master thesis. It starts with a title box: 'Business and the Brain: Discourses about Neuroscience in Business in the Management Consulting Industry'. Below this is a box divided into three columns: 'Emerging trend within business', 'Literature gaps', and 'Increased interest in application and further research'. These three columns point to a larger box containing 'Knowledge economy', 'Management consulting', and 'Cognitive neuroscience'. From this box, four arrows point down to a box: 'Discourses on the interdisciplinary field of neuroscience and organizations'. Below this is another box: 'Qualitative research methods: Secondary data and interviews'. Finally, a large arrow points down to a box titled 'Findings:' which contains two bullet points: 'Discourses within the industry and broader context' and 'Theoretical and practical and implications'.

We are:

- Tineke Zwart and Katharina Mündlein, Master students from Lund University
- Available at:
E-mail: k.muendlein@gmail.com
Phone: +46 (0)70 344 6993
Skype: i.katharina

We are looking for:

- One expert or experienced consultant in organizational applications of neuroscience
- 1 hour Skype or phone interview
- Available documents on neuroscience in an organizational context (control, performance, change management, etc.)

24.02.2013 Lund University School of Economics and Management

Appendix C: Aide Memoir

To conduct our semi-structured interviews, we formulated an aide memoir to guide us through the interview with predefined topic areas and questions. We invited our participants to talk freely about their perceptions about and experiences with neuroscience and asked all our participants to let us know if we are missing something that they deem relevant. The aide memoir was used in a loosely manner allowing for flexibility and adaptation to the course of conversation.

Topic	Conversation / Questions
Introduction / Small Talk	<ul style="list-style-type: none"> ✓ Thank you for your time ✓ Questions concerning time frame, recording and confidentiality ✓ Does the participant have any questions? ✓ Brief researcher and topic introduction
General Information on the topic	<ul style="list-style-type: none"> ✓ Personal Background <ul style="list-style-type: none"> - How did you start at the company? - What is your position? - How are you involved with brain research/neuroscience? - Are you personally interested in neuroscience and its application within organizations? ✓ To start with, could you describe what comes to your mind when you think about neuroscience in your work context? ✓ What do others (peers, colleagues, literature, and media) think about neuroscience for business? Please elaborate!
Introduction of neuroscience to business	<ul style="list-style-type: none"> ✓ Where, specifically, do you think is neuroscience relevant? (a few areas that we expect, managing people, resistance, recruitment, change communication/involvement, ethics?) ✓ How do you perceive the importance of neuroscience in your work context? ✓ How does your consultancy use neuroscience? Is it a main selling point? What do you think about this? ✓ Do findings of neuroscience influence your client projects? ✓ What do clients think about the feasibility? Do they need to be convinced? Do they seek neuroscience as a way for business? ✓ Has the working with neuroscientific findings affected you in some way? ✓ What do you, personally, think are possible connections to make between neuroscience and organizational structure/performance/change?
Generation of knowledge on neuroscience	<ul style="list-style-type: none"> ✓ Where do you get your information on the topic? Do you read the neuroscience literature? ✓ What are your expectations that you will become a 'neuroscientists'? Or your company? How do they anticipate garnering legitimacy or authority in the field? (for instance, do they bring in scientists to have on staff, etc.,?) ✓ How do co-operations look like? Whom do you follow?

Application	<ul style="list-style-type: none"> ✓ Do you have any examples of one of your projects where you personally applied neuroscientific findings? ✓ How is neuroscience involved in your daily work/in specific tasks? ✓ What could be the possible effects of brain research for management purposes? (When looking at the future?) ✓ Do you see potential? Where? ✓ Do you see limitations/constraints/concerns? Where? Ethical? ✓ How do they pitch the topic/concept to clients? What would be their top three selling points to a new or established client? ✓ If you do not pitch it yet, would you pitch it more openly in the future? ✓ How would you (your consultancy) package and sell it? ✓ Where do they anticipate getting resistance? ✓ Are there any practices/techniques/ideas you would like to try or integrate in your work?
Implications for organizations	<ul style="list-style-type: none"> ✓ What is your experience with clients? How far along is the implementation of neuroscience? ✓ What are the practical implications for your clients? ✓ What is their feedback?
Outlook	<ul style="list-style-type: none"> ✓ Are you going to expand your work with neuroscience? ✓ Do you think it is a trend or 'here to stay'? ✓ Ask about statement: "consciousness boils down to neural activity" ✓ Ask them if there is anything that we have not touched upon, that they deem important or that they would like to discuss with us?
Finish	<ul style="list-style-type: none"> ✓ Let them know about the further process and coordinate if they want to see the results ✓ Ask them if they would be available for further questions via Skype or mail if necessary. ✓ Thank them again!