Translating neuroscience:

A critical perspective

By

Virginia Brown

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Management, Employment and Organisation Section of Cardiff Business School, Cardiff University

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Summary

In recent years there has been growing interest in findings from neuroscience research beyond the domain of the natural sciences. This study explores the translation of neuroscience research findings into what I describe as 'prescriptions for practice' in organisations. Translation refers to the process by which something is rendered from one language or form to another and Translation Theory (TT) hitherto comprises a range of different approaches which seek to understand and explain the flow of ideas, concepts, and practices in the organisational field. This research augments extant approaches by adopting a critical perspective toward translation in which it is suggested that 'foreign' knowledge is modified or adapted in ways which are commensurate with dominant interests and ideologies in the wider societal context. This perspective includes the significant (and constructive) role of language in translation, as well as the enlightening capacity of critique. Based on a Critical Discourse Analysis (CDA) the research examines the translation of neuroscience findings by interrogating empirical material comprising instances of such translations by way of published articles complemented by interviews with 'translators'. In a CDA both are seen as 'texts' and come to represent micro occurrences of translation.

Analysis shows how at a micro level the texts exhibit discursive features which initiate particular discursive practices employed by translators. These are underpinned by core assumptions and beliefs which can be connected through enacted discourses at a macro level to interests and ideologies in the wider societal context. Further, by establishing significant constituents of 'untranslated' neuroscience research findings the central contention of this study is that translated neuroscience is so appreciably distant from it as to effectively not be neuroscience at all, instead comprising a manifestation of the aforementioned dominant interests and ideologies.

In addition, this research highlights recommendations for further research. Whilst findings from neuroscience research convened for an organisational audience might comprise an extreme case of translation, since they are moved from the domain of natural science to that of social practice, it is likely that other instances of translation in the organisational field are subject to the same dynamic, whereby wider social context levies a significant bearing on its ultimate configuration. This research contributes to the enhancement of translation

theory by showing how a critical perspective on translation can shine a light on the previously unobserved connection between translation and societal context.

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List of Acronyms

Acronym	Full description
ABS	Association of Business Schools
ANT	Actor Network Theory
AoM	Academy of Management
BNA	British Neuroscience Association
BOLD (signal)	Blood-oxygen-level-dependent signal
CDA	Critical discourse analysis
CMS	Critical management studies
CT	Critical theory
CTR	Click-through rate
DARPA	(US) Defense Advanced Research Projects Agency
DDT	Dichlorodiphenyltrichloroethane
DF	Discursive feature
DP	Discursive practice
EEG	Electroencephalography
FDA	(US) Food and Drug Administration
fMRI	Functional magnetic resonance imaging
GABA	Gamma-aminobutyric acid
HCT	Human capital theory
HR	Human resources
HRM	Human Resources Management
IJMR	International Journal of Management Reviews
L&D	Learning and Development
MEG	Magnetoencephalography
MOS	Management and organisation science
MRI	Magnetic resonance imaging
NIH	(US) National Institutes for Health
NIO	Neuro-Tech Industry Organization
NIRS	Near-infrared spectroscopy

NLI	NeuroLeadership Institute
qEEG	Quantitative electroencephalography
OCN	Organisational cognitive neuroscience
ON	Organisational neuroscience
PET	Positron emission tomography
SERP	Search engine results pages
SET	Social Exchange Theory
STS	Science and technology studies
tDCS	Transcranial direct-current stimulation
TT	Translation theory

Chapter 1 - Translating neuroscience: A critical perspective

Neuroscience has become a topic of interest outside its own field, including the organisational domain wherein "scholars have […] begun to explore the neuroscience of organizational behavior" (Senior et al. 2015, p. 1). Further, recommendations relating to its application are commonplace in materials produced for practitioner consumption. For example, a search of The Harvard Business Review for neuroscience material returns in excess of one thousand results[1].

Such materials can comprise written articles, as above, as well as executive education [2] and keynote speeches [3] and other activities or interventions which, together, I refer to as 'prescriptions for practice in organisations' (elsewhere shortened to prescriptions). Prescriptions are, in other words, one means by which advice purporting to be findings from neuroscience research is levied in the organisational domain by academics or, more frequently, by consultants. Underlying them is the presumption that findings from neuroscience research can be translated from one domain – that of the natural sciences – to another – that of the social world of the organisation. However, it is not the case that there is a one to one correspondence between findings from neuroscience research and organisational behaviour (or indeed directly between neuroscience findings and any behaviour, see Krakauer et al. 2017). This disjunction suggests that the asserted relationship between findings from neuroscience research and prescriptions for practice in organisations is merely metaphorical. Attention is drawn to some similarity between two otherwise distinct entities, whilst backgrounding differences that may turn out to be more significant (Morgan 1986). Yet, as will be shown in Chapter 10, those involved in this translation process frequently infer that this relationship is literal, whereby neuroscience research findings can be directly applied to organizations as a legitimate source of prescriptions for practice.

[1] https://hbr.org/search?search_type=&term=neuroscience&term= [accessed 15 May 2023]
[2] https://executive.mit.edu/course/neuroscience-for-business/a056g00000URaaZAAT.html [accessed 15 August 2023]
[3] https://www.a-speakers.com/topic/neuroscience/[accessed 15 August 2023]

That said, through prescriptions for practice, neuroscience is held to offer organisational practitioners relevant information and novel approaches to organisational challenges. For instance, and again from the Harvard Business Review, comes the assertion that "emerging research from neuroscience … makes the link between a thriving workforce and better business performance absolutely clear" (Harvard Business Review 2012, p. 77). Elsewhere the claim is made that neuroscience can help you to work less yet get more done (Comaford 2023), or become a better leader:

> we've all heard about the power of neuroscience – the scientific study of the human nervous system and why it's our brains that define what we do. But how can we use what this tells us how to be a better leader? (Cush 2022)

However, closer examination reveals that prescriptions are commonly disconnected from the original science or, in common with the way neuroscience research is frequently presented in the media, comprised of myths, as familiar false narratives, and whereby "stories and misconceptions about the brain …. [are] so entrenched in everyday talk that large sections of the population see them as taken for granted facts" (Jarrett 2015, p. 1).

Despite the disconnection from the original science, prescriptions purport to be reporting findings from neuroscience research, and I describe this inconsistency as a 'paradox'. Smith and Lewis (2011) define paradox as when "contradictory yet interrelated elements … exist simultaneously and persist over time" (Smith and Lewis 2011, p. 382). In this instance I hold that prescriptions are so altered from neuroscience research findings to render them not just different in degree but different in kind across a range of factors, including their subject matter, level of precision and appropriateness of claims. This paradox is at the centre of my research and leads me to argue that all is not what it seems when it comes to the translation of neuroscience from natural science into prescriptions for practice in organisations. Whilst translation is commonly seen as a neutral process I suggest instead that it is political, whereby some aspects of the translated idea are privileged over others, and that the way in which neuroscience is introduced to a new (organisational) audience is an example of translation as a political process. I will discuss translation in more detail below, and in Chapter 4, but for now submit that it is a process by which information and ideas are moved, perhaps from one language to another (Ciuk et al. 2019), from one person, or one location to another (Yanow 2004) undergoing varying degrees of change on the way.

On the surface, many examples of neuroscience translation, as well as 'translators' themselves, purport to be concerned with the accuracy and legitimacy of translated neuroscience in organisations. Underlying this position is, I suggest, a particular perspective or set of worldviews which point to the political nature of translation. By translation being political I contend that it privileges some interests over others, and is effectively advantageous to some groups whilst disadvantaging others.

I hold that neuroscience is an example of a more general phenomenon whereby ideas from outside the organisational domain, which we might therefore describe as 'foreign' (Morgan 2011) are used as a basis for prescriptions within it. Other foreign ideas might include mindfulness, whereby organisations use mindfulness-based interventions to enhance individual, team and organisational functionality (Urrila and Mäkelä 2022), or organisational wellness initiatives, including incentivising workers to exercise via workplace health promotions (Butcher et al. 2023) or to adopt wearable technologies, such as a personal fitness tracker[4] to provide them with insight as to levels of stress.

The research problem which this study contributes towards addressing is to deepen our understanding of the politically partisan nature of what is ostensibly a neutral process of translating ideas from outside the organisational domain into prescriptions for practice in organisations. I contribute to addressing this problem by focusing in on one substantive example, the translation of neuroscience research findings into prescriptions for practice in organisations. I have selected this example as an extreme case of translation from a very different field of enquiry from the field to which prescriptions are applied. This example maximises the extent of the translation entailed in taking knowledge from one field of enquiry as a source of prescriptions for practice in another. While such prescriptions purport to be to the mutual benefit of both employers and employees, they effectively privilege the interests of the former by highlighting some aspects (of a foreign idea) whilst backgrounding others, ultimately reinforcing, and supporting existing power structures. In particular, this research focuses on the translation of findings from neuroscience research into prescriptions for practice. I use a process of critique to shed light on how and why translation operates as it does and to consider the implications of what I find, and in particular how the translation of findings from

[4] https://www.pwc.com/gx/en/services/people-organisation/leveraging-wearable-technology.html [accessed 20 August 2023]

neuroscience research into prescriptions serves to sustain the status quo, about which I will say more below. Extending our understanding of translation is important because it potentially facilitates broader claims relating to the translation of other 'foreign' ideas into practice in organisations, as described above. Such foreign ideas might also include others with positivistic scientific origins, for instance evidence-based management (Rousseau 2020) which is also emerging in prescriptions for evidence based practice in the organisational domain[5].

My interest in this area was stimulated whilst working as an executive coach and trainer of coaches. Coaching[6] is characterised by the wide variety of approaches underpinning how any one individual practises. For some, these approaches lack a scientific explanation or justification, and to those, me included at the time, the potential for neuroscience to provide that explanation and legitimacy, was compelling. This belief led me to engage directly with the original (neuro)science, and as a I result became more circumspect about both some published findings and the subsequent interpretations of them for a non-scientific audience. Before this direct engagement my expectations of neuroscience were high, in part as a result of assumptions that I held regarding its ability to provide definitive and unarguable information or facts, to the extent that I became involved in co-authoring a textbook for coaches (Brown and Brown 2012). Subsequently I came to understand that, for example, neuroscience studies have been criticised for, on average, using small samples leading to low statistical power (Button et al. 2013) and greatly inflated estimates of correlations (Vul et al. 2009) which in turn exaggerate effect sizes, leading to over-certain claims. More generally, a "reproducibility crisis" in science (Barch and Yarkoni 2013; Begley and Ioannidis 2015), whereby scientific studies cannot be reproduced, or only with extreme difficulty, also raises questions about the integrity of some neuroscience 'facts'.

At the beginning of the PhD, my concern with neuroscience having travelled into practice in organisations was with its (lack of) integrity. What was being presented to the business world was simplified, frequently to the point of inaccuracy, and often with at most a distant

[5] https://www.cipd.org/uk/views-and-insights/thought-leadership/insight/evidence-based-profession/ [accessed 23 August 2023]

[6] Coaching is variously defined, and in this instance taken to be "a facilitated, dialogic and reflective learning process that aims to grow the individuals (or teams) awareness, responsibility and choice". From https://www.associationforcoaching.com/page/WhyCoaching [accessed 7 May 2019]

connection to the original science. For example, an article from Forbes suggests that neuroscience can help managers to bring about change in their organisations, collapsing a range of ideas associated with neuroscience into a proposed "five brain-based methods to lead organizational change"[7]. This initial focus kept my attention squarely on issues related to neuroscience itself, and to critique of the specific neuroscience content. However, as I explain below, this perspective ultimately failed to facilitate sufficient understanding of the particular problem, that in neuroscience presented to practitioners claims to the original science are often tenuous or it is not neuroscience at all, rendering debates about the 'quality' of neuroscience meaningless. Ultimately, an observation from the scholarly literature on fads and fashions helped to reframe the research topic in the form of a distinction put forward by Huczynski (1993) regarding the separation of the critique of an (management) idea, from the critique of the spread or popularity of that idea. Huczynski's suggestion resonated with me and offered a way of separating out the original content (the findings from neuroscience research) from the process by which this content reaches practitioners. As such, a focus on the so-called neuroscience content can offer only the limited possibility of describing that and how it has changed, but not the means to account for why that is so. This can be addressed through a focus on its spread, or translation, which can shine a light on why the product of translation differs from the original scientific material.

In this introductory chapter, first I outline extant bodies of work which look to have some correspondence to the translation of findings from neuroscience research into the organisational domain, then describe the limitations in its ability to address the research problem as described above. Second, I set out the work which has shaped my approach to the study, briefly describing the concepts central to the research. Third, I set out and justify my research philosophy, which I describe as broadly critical, including my axiological orientation and how, together these provide a basis for critiquing and challenging the translation of findings from neuroscience research into prescriptions for practice. Fifth, I give a brief outline of the analytical frameworks which are drawn upon. Finally, I give an overview of the way in which this thesis progresses, setting out how, in forthcoming

[7] https://www.forbes.com/sites/forbescoachescouncil/2019/08/05/five-brain-based-methods-to-lead-organizational-change/ [accessed 15 May 2023]

chapters, I develop and warrant an overall argument that the translation of findings from neuroscience research into prescriptions for practice is shaped by dominant ideas from the social context in which translation takes place. Further, I hold that that prescriptions privilege and normalise these ideas over and above any efforts toward fidelity to neuroscience and as such effectively become a 'Trojan Horse' for them (Karjalainen et al. 2019). By this I mean that not only do the prescriptions bear little or no relationship to the neuroscience findings that they purport to translate, but that they disingenuously serve the interests of the powerful by manipulating workers to assume further obligations and responsibilities from which they are unlikely to personally benefit.

1.1 Extant work concerning neuroscience in the workplace

I now provide a brief definition of what neuroscience comprises, and will say much more about it in the next chapter. The Oxford English Dictionary, for example, defines neuroscience in the following way; "each of the sciences (as neuroanatomy, neurophysiology, etc.) concerned with the structure or function of the nervous system; such sciences collectively"(2023). Rather more substantially the British Neuroscience Association describes it as:

> a relatively new field of science, only emerging as a distinct subject in its own right during the 20th century. However, it has grown rapidly and now covers multiple areas including novel technologies, and research into many brain functions and disorders, as well as applications as diverse as education, artificial intelligence and the law[8].

In essence I hold that neuroscience is a natural science, by which I mean that it is concerned with the natural or physical world, that comprises a range of specialities, with a particular focus on the nervous system including the brain, in both humans and non-human animals, in both health and disease.

Previous work, mostly outside the management academe, has considered the growth of the neurosciences per se or the use of neuroscience concepts beyond their disciplinary boundaries. For instance, neuroscience has extended its reach to the general public through

[8] https://www.bna.org.uk/about/about-neuroscience/ [Accessed 10 August 2023]

increased media coverage (Beck 2010) and has made inroads into other fields, such as education (Busso and Pollack 2015), social work (Gibson 2021) and social policy (Wastell and White 2012). Further, the work of Rose & Abi-Rached (2013; 2014) provides an insight into how modern 'neuroscience', as we now understand it, came into being and induced a neuro-molecular gaze; "an ethos, an approach, a language, a perception" (Abi-Rached and Rose 2010, p. 12) which, it is suggested, shapes the very way in which we see life itself.

In Management and Organization Science (MOS), two strands of literature hold the promise of insight into the translation findings from neuroscience research into prescriptions for practice in organisations. Firstly, literature from *organizational neuroscience* (ON) offers some empirical, but mainly conceptual publications outlining how neuroscience knowledge and techniques can be of value in addressing organisational issues, such as how to identify and develop leaders, albeit with critics highlighting the dangers and pitfalls of such approaches. For example, Balthazard et al. (2012) claim, following research, that neurological imaging helps provide a better understanding of the neurological mechanisms underpinning transformational leadership. Secondly, literature concerned with *management fads and fashions*, including Huczynski (1993), explores the changing, and often fleeting, ideas and approaches to which managers are exposed, of which neuroscience may be one.

1.1.1 Organisational neuroscience

While I use the term organisational neuroscience (ON) to encapsulate this body of work, notably there is not a homogenous approach amongst exponents of neuroscience within MOS. Organizational Neuroscience advocates neuroscience approaches and methods within MOS, for instancing highlighting "the brain processes behind observed attitudes and behaviors" (Becker et al. 2011, p. 934), and so has a physiological focus. Alternatively Organisational Cognitive Neuroscience (OCN), arises from social cognitive neuroscience (Lee et al. 2012) and is concerned with how "biological systems mediate social cognition and behaviour"(p. 4). Despite suggestions regarding the benefits of neuroscience methods (Murray and Antonakis 2019), most publications in this body of work are conceptual in nature, as Lindebaum et al. (2020) attest. They conducted a content analysis based on an online search for articles concerned with neuroscience and management in so-called 4* journals (as ranked by the UK based Association of Business Schools). Further, critics point

both to reductionist applications of neuroscience and to methodological shortcomings in the field of neuroscience itself (for instance see Lindebaum and Zundel 2013). A recent bibliometric review of neuroscience-oriented publications in the management field (Cinici et al. 2021) characterises neuroscience as having experienced a 'spotty progress within management', by which they mean it has spread more in some branches of management research than in others.

Overall, this body of literature remains firmly focussed on the neuroscience, with any challenges regarding its suitability for the MOS academe also mainly argued on the basis of shortcomings in the neuroscience itself. I will set out these debates and say more about neuroscience in Chapter 2.

1.1.2 Management fads and fashions

Also of potential relevance is work concerned with fads and fashions within MOS which, broadly speaking is interested in theoretical explanations for the adoption of new ideas (Sturdy 2004), as well as management fashion setters (Abrahamson 1996). For clarity, 'fashions' are held to last longer than 'fads' (Czarniawska and Panozzo 2008), and part of what characterizes a management fad or fashion is its transient and ephemeral nature (Pollach 2021). These terms are often used interchangeably with 'management idea', which is held to be a useful way to describe "an untidy hotchpotch of diverse offerings" (Huczynski 2012, p. 30) including theories, research findings, frameworks, propositions, beliefs, views, saws, and suggestions (Huczynski 1993) often taught to managers on management courses, or learned by them just being 'in the air' (Ghoshal 2005) since they are so dominant and normalised.

In the first instance, scepticism regarding the spread of findings from neuroscience research into the organisational domain was sometimes attributed to its probable status as a 'fad'. However, although 'fashion theory' has been used to examine the status and popularity of particular management ideas, (for instance see Madsen (2019), who explores the uptake of Human Resource analytics) it commonly involves a descriptive analysis of the supply and demand sides, or of the characteristics of the idea itself. As such it is unable to address the paradox at the heart of my research problem, which relates not to the popularity or degree to which findings from neuroscience research have been taken up, but to the tenuous

connection between the original neuroscience and prescriptions for practice which are nevertheless positioned as comprising findings from neuroscience research.

However, as previously mentioned, the recommendation to separate out the idea from the popularity of the idea (Huczynski 1993), as well as further suggestions made regarding the involvement of forces external to the fashion setting market have proven useful, such as those made by Abrahamson (1996) or Huczynski (1993). These authors argue that (in my words) it is the 'dominant orientation of society' which facilitates the growth of certain management ideas at certain points in time. Further, the advocacy of neuroscience as a legitimate source of prescriptions for practice may be a case in point, underpinned by a reification of science in society, otherwise known as scientism (Scruton 2013). By a reification of science in society, I mean the way in which science is, inappropriately, held to be self-evidently the most authoritative – or only – source of true knowledge.

1.1.3 Overcoming the limitations of a focus on neuroscience content

Although both ON and the fads and fashions bodies of work provide interesting and useful insights, in and of themselves they serve to limit focus to the content of the neuroscience derived prescriptions. Such a focus cannot explain why this content is so tenuously connected to neuroscience. To make progress requires a shift in perspective from a critique of the content to a critique of the process by which so-called 'neuroscience' is put forward to organisational practitioners – in other words, its translation.

As described above, I see translation as the process by which ideas or content are moved, including from one place to another. Conceptually translation, as a process, is somewhat independent of any content, which is but one element of it, and involves some regular or normal steps or actions. As such, translation as a process might be analysed separately from its content. That said, the content of any translation is likely tightly interwoven with the process, such that some aspects or characteristics of the content might have a material bearing on the translation process. In this instance, there is a question as to whether characteristics of neuroscience (in particular its epistemological status) impact the translation process. For instance, do 'translators' (which is how I construe those people who produce prescriptions for practice) imbue neuroscience research findings with an authoritativeness, as a result of their epistemological status, which impacts their translation into prescriptions for practice in organisations?

1.2 Approaching the translation of findings from neuroscience research

With a focus firmly on translation, as opposed to the neuroscience, I outline below some of the key perspectives and literatures that I have drawn upon in my research including i) from the management literature, translation theory (TT) which is concerned with the movement of management ideas and concepts; ii) critical theory (CT) as a theory of society underpinned by a number of central assumptions which assert the need to access "the essence of things" rather than just their appearance (Thompson 2017); iii) discourse theory which holds that language is constructive, it shapes and is shaped by the social context in which it appears and so cannot be a neutral representation of the world. In particular I draw on a critical approach to discourse, as I will describe below, much informed by the work of Norman Fairclough (see, for example Fairclough 1989,1992,2001).

1.2.1 Translation theory

Colloquially translation most often refers to the movement of something from one language to another and the terms translation, diffusion and transfer are often used interchangeably in MOS, particularly in the management ideas literature. However, I hold that translation is distinct from 'transfer' or 'diffusion' in that it is more intentional and less passive.

Previous MOS research has considered translation as broadly relating to the changes occurring through the apparent movement of knowledge into and within organisations (Spyridonidis et al. 2016) and predominantly relates it to how management knowledge (ideas, concepts, practices) is inevitably unstable as it moves from context to context. Wæraas and Nielsen (2016), for instance, describe it as being "a process whereby an object changes from one to another as it moves within and across organisational settings"(p. 247). Arguably translation theory's conceptualisation of translation, described above, appears to reify management knowledge (as the object of translation), overlooking a likely lack of direct equivalence and thereby underplaying the intentional nature of translation and how, in turn, intention is shaped and which is central to this research.

As it stands the TT literature highlights various perspectives on translation (Wæraas and Nielsen 2016), with origins in diverse fields including actor network theory (ANT) and Scandinavian institutionalism (O'Mahoney 2016), as further described in Chapter 4. In their role as editors of a special issue reviewing developments in translation theory Spyridonidis

et al. (2016) suggest that whilst this diversity facilitates a richness in translation theory, it also leads to complexity and ambiguity and, as a field, its development has been limited by insufficient critique.

Whilst TT often provides a descriptive articulation of translation, it commonly overlooks either a macro, or societal, level perspective or an explicit consideration of power, or both. These aspects are at the centre of my critical perspective on translation. I hold that translation is not a neutral process but happens for a reason, and is both shaped by contextual structures which critique can render (more) visible, and reinforcing of them. Taking a critical approach to translation allows me to address a 'blind-spot' in translation theory.

1.2.2 Critical theory

Critical theory (CT), as well as being a research philosophy (of which more below), is a particular form of theory (Thompson 2017). Originally associated with the work of the Frankfurt School, many different kinds of theory now assume the banner of critical theory, incorporating a wide range of scholars from diverse disciplinary backgrounds.

In essence, I understand critical theory to be a social theory which asks profound questions about the very nature of society and which seeks to understand the ways in which processes of power (unjustifiably) distort society as a whole. Further, it seeks to move beyond the status quo and to bring about changes which result in a society that is more humane, just, and rational (Scherer 2011).

Critical theory sets itself in opposition to traditional theory and its associated positivism, which, argues Horkheimer (1937/1976), despite its dominance even in the social sciences, can generate only a limited form of knowledge through its "deductive chain of thought" (Horkheimer 1937/1976, p. 207). This means that investigations of complex social problems are reduced to what is observable, and also that the connections between scholar and his or her society are overlooked. Notwithstanding the incorporation of ideas from critical theory into the thinking about organisations during the late 1980s (McAuley et al. 2007), Ghoshal (2005) has subsequently claimed that a positivist orthodoxy continues to shape not just management research, but also the practice of management. This orthodoxy arises both from a 'physics envy', which privileges causal and testable theories, as well as from a

particular ideology whereby 'pessimistic assumptions' (for instance concerning human nature), generate negative problems to be solved (Ghoshal 2005). These perspectives provide an important position from which to consider 'translated neuroscience'. They point to useful questions regarding the translation of findings from neuroscience research into prescriptions for practice (including the role of 'society') as well as a means of researching it, as described further below.

A number of distinctive features characterise critical theory, as I further elucidate in Chapter 3. In advance of that, those most pertinent to my research are the assumptions that:

- The macro or societal context in which we are located both shapes and constrains us
- Most of us are subject to unseen forces which shape the decisions which affect our lives
- Privileged groups have an interest in sustaining their privileged position by maintaining or reproducing the status quo
- Modern society has come to use science as 'the' way in which to understand the world (described above as 'scientism')
- Technical or instrumental rationality appears to offer a value free means of achieving efficient outcomes by privileging standardization of method and efficiency, but serves to further subjugate us

Ultimately, critical theory is about a politics of scepticism which transitions into hope. It sees in us the capacity to discern our own best interests and our being empowered to live more in accordance with them. As such, critical theory has two basic aims:

- Firstly, a process of critique leading to 'critical enlightenment' which highlights who is advantaged and disadvantaged by the status quo
- Secondly, the facilitation of change or transformation, whereby 'critical emancipation' is the means by which we can attempt to gain the power to control our own lives.

Critical theorists argue for the power of reason as a means of exploring and challenging an existing state of affairs, and critique is at the centre of such challenge as an important conceptual tool of critical analysis. Fundamentally critique is concerned with revealing the extent to which things are interconnected. Further, I argue that unseen 'structural factors'

drive translation and privilege certain interests over others, where structure is " the political, social, cultural, historical, and economic forces that influence individual behavior and thus create predictable patterns based on someone's social location" (Paradis et al. 2020, p. 843) and that through a process of critique it is possible to identify the so-called 'deep structure' (Alvesson and Sköldberg 2000, p. 136). Further, I posit that the translation of findings from neuroscience research serves to unthinkingly shore up the status quo, including dominant agendas and worldviews, which includes the ideological adherence to scientism and its expression in management research and practice (Ghoshal 2005).

As outlined above, I hold that TT, despite its heterogeneous approach, is unable to give a full account of translation since it lacks critique. In particular that existing approaches effectively fail to see the role of power and politics in translation by overlooking power at a more macro level, including the effects of societal context. As such, critical theory serves to both justify the need for the research, and shapes its design, as well as defining what sort of knowledge will emerge as a result of it, as further described below.

1.2.3 Discourse theory

A third strand that I have drawn upon in my research is a critical form of discourse theory, and in particular that of Fairclough (1989). More specifically, Fairclough (1989) formulates a multi-level critical discourse analysis (CDA) which facilitates a systematic means of connecting individual events or instances with their societal level context. I describe the different levels as micro, meso and macro whereby i) the micro level comprises individual instances or events (as texts), ii) the meso level comprises 'production processes' around these instances, and iii) the macro level comprises their broader, societal, context.

Discursive work is concerned with the constructive role of discourse and posits that "discourse is much more than language: it is constitutive of the social world that is of interest or concern" (Bryman 2012, p. 528). As such, language is not neutral but, arising from the work of Austin (1975) is performative. By performative I mean language can accomplish specific outcomes or objectives such that Fairclough (1989, p. 9) suggests that "language can be seen as a form of action". Discursive approaches, such as discourse analysis, explore language in use by examining 'texts' which are seen as manifestations of discursive practices (Fairclough 1989), with a focus on understanding both its function (what it is designed to do) and what it accomplishes. More traditionally such approaches are

ontologically constructionist, holding that discourse creates reality, however CDA represents a realist version and as such takes a more materialist position whereby discourse also represents reality (Fairclough 2003). CDA is also seen as a branch of critical scholarship (Leitch and Palmer 2010) in which "the role of discourse in the (re)production and challenge of dominance" is the central focus (Van Dijk 1993, p. 283). Further, CDA is attuned to the aims of CT in that it specifically enables the researcher to uncover underlying assumptions and to highlight ways in which 'texts' serve to reinforce the status quo.

Ultimately, CDA aims to show the connections between language and power (Fairclough 1989), by going beyond a fine-grained analysis of texts by accounting for a broader societal level context. As described above, Fairclough's three-dimensional view of discourse provides such an approach and this will be elucidated in more detail in Chapter 5.

For now it is useful to highlight the central premise which is that an iterative examination of the language use in and around prescriptions for practice enables a connection from the micro level (individual texts) through the meso level (production processes) and to the macro level of broader societal level context. A discourse(s) arises from these three dimensions or levels in combination. And through a dialectical analysis of them I aim to uncover the macro level structural factors which contribute to the production of texts concerned with the translation of findings from neuroscience research which generate prescriptions for practice in organisations.

1.3 Key concepts

Implementing the approach outlined above embodies a number of concepts which I set out now, in brief, and describe in more detail in the glossary in Appendix 1, as well as elaborating on further in forthcoming chapters. I have already described *neuroscience*, how it does not directly correspond with organisational behaviour and how what is effectively *translated neuroscience* occurs in the form of *prescriptions for practice in organisations*. By prescriptions for practice I mean neuroscience information that is aimed at, and accessible to, organisational decision-makers and employees in general, for instance in the way of articles or blogs etc. I see a *paradox* in how neuroscience is translated into prescriptions such that they both lay a claim to be neuroscience yet are so altered from it as to be not just different in degree but different in kind across a range of factors.

In this research I focus on *translation* as the process by which 'translated neuroscience' arrives in prescriptions. I frame it as an opaque political process which involves more than the neutral diffusion of helpful neuroscience ideas and as such it becomes a valid object for *critique.* As outlined above, this is distinct from critique of neuroscience itself which, for example, might point to the prevalence and risk of interpreting neuroimaging research in a way which conflates correlation and prediction (Choudhury et al. 2010), and which remains beyond the scope of this research. Instead, a critique of translation permits the uncovering of what lies beneath it. Alvesson and Willmott (1992) suggest that "critique is made concrete through the presentation and analysis of empirical data" (p. 112) and I use *denaturalisation,* as a form of critique, to challenge and reveal the background assumptions underlying translation and to connect them to structural factors in their societal context.

As alluded to above, the role of *discourse* is posited to be central in the translation of findings from neuroscience research into the organisation domain, whereby discourse is more than just the language, conversation, or dialogue which everyday use of the term implies. Instead, it includes the effects of language use on the basis that "people seek to accomplish things when they talk and when they write" (Bryman 2012, p. 529). From this perspective, language is not neutral as it generates a discourse which in turn produces a material or concrete reality (Chia 2000; Hardy 2001), which reciprocally impacts on the formulation of the discourse. Drawing on this view of discourse, in my research I critically analyse texts associated with the translation of findings from neuroscience research into prescriptions for practice and which are understood to both be a manifestation and reinforcer of particular *structural factors* in their context. I use 'structural factors' as an umbrella term to describe the hidden structures or forces in a societal context which, unseen, shape and constrain us by privileging and normalising dominant ideas and interests and, in so doing, serve to reinforce their dominance.

1.4 Research philosophy

A research paradigm, according to Guba and Lincoln (1994), is the "basic belief system or world view that guides the investigator" (p. 105). It comprises the researcher's ontological and epistemological position, as well as methodological choices and, coupled with axiology, drives the interrogative processes of any research endeavour. Further, from what has gone

before, it perhaps goes without saying that this research is located in a broadly critical perspective. As a research paradigm, a critical approach is one of ontological (historical) realism, in which what appears to us as reality is rather a consolidation of multiple historical forces and structures, combined with epistemological subjectivism (Guba and Lincoln 1994).

I take the position, ontologically, that reality is neither wholly real and natural, nor wholly constructed, by which I mean that the social world is real and does affect those who make it up, particularly through the aforementioned 'unseen forces'. In this way I distinguish between the 'appearance' and the 'essence' of things, as alluded to earlier which, whilst not directly observable can be inferred from its 'effects'. Epistemologically my stance is that knowledge is not always directly observable or independent of my own subjective experience since the complete detachment of any researcher is impossible. This also means acknowledging that the role of researcher cannot be neutral, and as a result reflexivity is both a necessary and a constant challenge, since it serves to make explicit the research choices and assumptions guiding the research and through this transparency might 'counter' any potential bias. I have already alluded to my axiological position in describing how I come to this research following concerns with the translation of neuroscience research findings into prescriptions for practice in organisations and which I ultimately understand to be ethical issues with the lack of transparency surrounding it. In particular this relates to the function of prescriptions and the way that they serve, unseeingly, to attain and sustain the current state of affairs.

Different research positions yield different 'outcomes'. In adopting a critical stance toward the translation of findings from neuroscience research into prescriptions for practice in organisations, I aim to critique the translation process and challenge the 'naturalness' of it by revealing the role of power (and interests) likely involved in shaping it, which I will further elucidate in Chapter 3. Further critique enables a move toward, if not transformation (emancipation), then a transformative redefinition of what is involved in bringing findings from neuroscience research to an organisational audience.

1.5 Research aims

As described above, the research problem which this study contributes towards addressing is to deepen our understanding of the politically partisan nature of what is ostensibly a neutral process of

translating ideas from outside the organisational domain into prescriptions for practice in organisations. I contribute to addressing this problem by focusing in on one substantive example, the translation of neuroscience research findings into prescriptions for practice in organisations. This research is a part of a body of critical management research concerned with the workplace application of practices and interventions originating outside organisational behaviour, and particularly the idea that "they may act as a Trojan horse" (Karjalainen et al. 2019, p. 2), for neoliberal ideologies for example. For instance, Plester et al. suggest that the use of wearable technology, associated with employee wellness and justified on the basis that they serve workers interests, keeping them safe and well, can "obscure processes of surveillance capitalism" (Plester et al. 2022, p. 19), and effectively "overlook larger technological and economic forces, which …. are not necessarily working in workers' interests nor in the interests of social equity" (Plester et al. 2022, p. 18). Similarly, Karjalainen et al. (2019) point to the increasing prevalence of mindfulness programmes in contemporary organisations, ostensibly as a remedy for workplace challenges, and raise concerns about its co-optation in an organisational setting with an implied redeployment for more capitalist ends such as worker mobilization. In these and other instances, perhaps including the translation of findings from neuroscience research into prescriptions for practice, closer scrutiny of the 'foreign' practice or intervention highlights their potential function as a purveyors of dominant interests. This idea is something I will elucidate in Chapter 3.

In this research I address two broad aims. Firstly, I aim to determine how and why the translation of neuroscience research findings into the organisational domain occurs as it does by investigating how and why translated prescriptions for practice in organisations take the particular form that they do. To reiterate, the paradox at the centre of my research (introduced earlier) is that prescriptions for practice are so altered from neuroscience research findings as to render them not just different in degree but different in kind across a range of factors, including their subject matter, level of precision and the appropriateness of claims made. In addressing my first aim, I seek to account for this paradox. Secondly, I aim to demonstrate how a critical perspective can contribute to our understanding of the translation process by developing such a perspective and using it to address my first aim,

the translation of findings from neuroscience research into prescriptions for practice as described above.

My specific research question is

> How and why do translated prescriptions for practice in organisations take the form that they do in making their key contribution to the translation of neuroscience research findings into the organisational domain?

Further, I am guided by two sub-research questions:

Sub-research question 1 – What factors steer the translation of findings from neuroscience research into prescriptions for practice in organisations?"

Sub-research question 2 – "What does a critical approach to translation reveal about the paradox that translated prescriptions for practice bear little or no relationship to the neuroscience findings that they purport to translate?"

1.6 Analytical framework

In order to realise my research aims, by addressing my research question through seeking answers to my two sub-research questions, I examine translation which I hold to be manifest in 'texts'. In this study, the texts consist of articles concerning neuroscience and written for organisational practitioner consumption supplemented by transcripts from interviews with translators using Fairclough's three-dimensional approach to critical discourse analysis. Together these comprise a 'corpus of texts' (Fairclough 1992, p. 32). The focus of a discourse analysis is on the corpus, as a collective body of texts or 'discourse samples' (Fairclough 1992, p. 226), rather than on individual instances, so as to be able to uncover significant patterns and regularities.

Pragmatically, critical research comprises three main elements or aims; insight, critique and transformation (Alvesson and Sköldberg 2000; Myers and Klein 2011). Myers and Klein (2011) describe how insight can be generated by interpretative research, critique through taking a value position, uncovering, and challenging notions of power and control evident in the current situation, and transformation through the development of a new understanding that enables change.

As detailed in Chapter 5, and in keeping with Fairclough (1989) described above, I conduct a multi-level analysis of the corpus. Firstly, I analyse it at close range (micro level), examining the texts for language in use and including for instance vocabulary, metaphors, and specialised terminology. This enables a detailed description of the ways in which neuroscience has come to be presented. Secondly, my meso level, interpretive, analysis is focused on finding broader patterns in the overall corpus of texts and also going beyond the empirical material to examine intertextuality (the processes and connections around and between the texts) to uncover patterns and stories in the translation of findings from neuroscience research. Thirdly, at a macro level, my analysis is concerned with uncovering assumptions pointing to discourses and connected to the broader societal context which has led to the production of the texts. All three levels are interconnected and interdependent (Fairclough 1989) and a multi-level analysis enables inference from the micro to the macro level, which, although presented in a linear way, is in reality much more iterative.

1.7 Overview of thesis

The remaining chapters of this thesis progressively develop an overall argument which leads me to conclude that the translation of findings from neuroscience research into prescriptions for practice are so distanced from the original, published findings of neuroscience research, as to effectively make them not neuroscience at all; it is not simply the case that translations are different in degree, but that they are different in kind across a range of essential factors. Further, adding a critical perspective to extant forms of translation theory enables the impact of structural factors to be included in accounts of what motivates the translation of ideas from one domain into practice in another.

In Chapter 2 I provide context for this research by setting out the core tenets of the field of neuroscience, including definitions and current debates in the field, as well as describing how it has surfaced in the organisational domain. These serve as a foil to later empirical chapters, by showing the extent to which translated neuroscience deviates from that in originating field. Further, the chapter highlights relevant contextual features which contribute towards explaining why translated neuroscience takes the form that it does.

Chapter 3 provides further elaboration of Critical Theory, building on key concepts set out in this chapter and explaining more fully how I apply them to frame the empirical

investigation. In particular, I discuss critical perspectives on social context (structural factors), power, positivism, language, and emancipation, describing not only how they shape this research, but also how they justify the need for it. Further, these discussions support the argument, put forward in the subsequent chapter, that critical concerns are not adequately reflected in translation theory as it stands.

In Chapter 4 I discuss translation more fully, briefly setting out relevant ideas arising from the domains of translation studies and the translation of science as a means of distinguishing between translation and related concepts, such as diffusion and popularisation. I suggest translation as the most suitable concept for framing this research since it incorporates a number of potentially useful ideas, and discuss extant versions of translation theory, arguing that it currently lacks a version which adequately addresses the critical concerns described in Chapter 3. The chapter concludes with a description of what such a critical perspective can offer.

In Chapter 5 I set out and justify my research methodology, including the methods used for generating and analysing the empirical material, the selection of data sources and the particular sample sought. Further, to provide clarity and transparency in advance of presenting my findings, I describe the inevitable research challenges.

Chapter 6 is the first of three empirical chapters in which I set out my findings arising from the micro level analysis of a critical discourse analysis (CDA) of texts comprising a selection of articles as examples of prescriptions for practice in organisations, supplemented with empirical material from interviews with 'translators' who are particularly involved in the stage of translation which results in said prescriptions. In this chapter I describe the first of three significant discursive practices as properties of the texts and as employed by translators. Further I describe the specific discursive features which initiate the discursive practice, how it renders neuroscience in a particular way, and what can be seen to be accomplished by this particular discursive practice.

In Chapter 7 I similarly set out my findings resulting from the micro level analysis in relation to a second and third significant discursive practices.

Chapter 8 is the final empirical chapter where I describe my findings arising from analysis at the meso and macro levels. The meso level analysis is concerned with the production

processes of the prescriptions for practice, whereby common patterns in the corpus point to how and why these prescriptions for practice are produced. For the macro level analysis I denaturalise the discursive features and practices to uncover background assumptions, which I take to be the hidden influence of the societal context. I identify and describe 3 separate discourses which are enacted by these assumptions coupled with the textual properties, and from here posit the likely influence of a range of structural factors on the translation of findings from neuroscience research into prescriptions for practice in organisations.

Taken together the empirical chapters enable me to demonstrate a lack of fidelity to the original science following translation, supporting the empirical claims that translated neuroscience is so unlike original published scientific findings of neuroscience as to constitute a difference in kind.

Chapter 9 draws the findings together into an overarching discussion to establish the extent to which they address my specific research question as set out above. This discussion supports the theoretical claim that translation theory can benefit from the adoption of the additional ontological, epistemological, and axiological stance that a critical perspective brings. From such a critical perspective translation is scrutinised in light of i) historical realism which points to the role of structural factors, ii) subjectivism which points to the limits of so-called objective knowledge, and iii) emancipation which points to the role of raising awareness amongst practitioners in order that they might choose to question and resist products of translation.

Chapter 10 returns to the empirical and theoretical aims of the research, reflecting on the extent to which they have been achieved and so warrant the empirical and theoretical claims constituting the conclusion of my overall argument, before discussing the limitations of my investigation and putting forward an agenda for future research.

Chapter 2 - Neuroscience: What is it?

This research is concerned with the translation of findings from neuroscience research into prescriptions for practice in organisations including how, on closer inspection, said prescriptions are commonly disconnected from the original science. Whilst the research is not about neuroscience per se, in this chapter I provide further background by setting out more details of neuroscience itself, including some current debates within the field, as well as aspects of the context within which its translation arises. Together these aspects will, in later chapters, enable me to argue that prescriptions for practice do not comprise neuroscience but are instead a paradox, and that fidelity to findings from neuroscience research is less than central to its translation, despite assertions to the contrary.

In order to make the research problem more material, in this chapter I firstly build on what has been said in Chapter 1 about neuroscience itself, including further definitions which allow me to paint a broader picture of it, and then introduce relevant debates and critiques. Secondly, I describe how neuroscience is delineated in both management science and in the practitioner domain and how I see these as two distinct 'movements'. Thirdly, I set out aspects of the societal context in which translation occurs and in particular argue that dominant ideas from Human Capital Theory, neoliberalism and managerialism create a normative environment that impacts on the ways in which findings from neuroscience research become translated into prescriptions for practice.

2.1 Neuroscience

To bring more clarity to my claim that translated neuroscience often does not comprise neuroscience here I build on the description of neuroscience provided in Chapter 1 by offering an additional definition, from the Merriam Webster Dictionary[9] as follows:

> A branch (such as neurophysiology) of the life sciences that deals with the anatomy, physiology, biochemistry, or molecular biology of nerves and nervous tissue and especially with their relation to behavior and learning

From the definitions provided we can say that neuroscience is natural science, that it is multi-disciplinary or made up from a range of specialities, and has a particular focus on the

[9] "https://www.merriam-webster.com/dictionary/neuroscience. [Accessed 17 August 2023]

nervous system in which the brain is a central concern. I would further add that neuroscience is a so-called 'hard science' whereby:

> most usages take the natural sciences to be hard (with physics and mathematics the most firm) and the social or human sciences (e.g., sociology, anthropology, psychology) as soft (Shapin 2022, p. 288).

The hard sciences are commonly held to have a commitment to positivist approaches to knowledge development which involves objective scientific research as follows:

> The presence of "The Scientific Method" is sometimes invoked as a criterion of hardness; so too is the deployment of quantitative tools or the use of controlled experiment. Other criteria stipulated or presumed include the certainty or precision of findings; reliability and reproducibility; power of prediction; progressiveness or the speed of change; degrees of consensus or the extent of insulation from supposed distorting external influences; objectivity; the scope or level of generality; and the fundamental or derivative status of disciplinary knowledge (Shapin 2022, p. 289).

The scientific method is commonly held to be both distinct from methods associated with the social sciences (Knorr-Cetina 1981) and to afford the hard sciences with a higher status (Shapin 2022). Although my research is not about neuroscience per se, it is useful to go beyond the provided definitions and set out sufficient background to facilitate a more complete understanding of the translation of findings from neuroscience research into prescriptions for practice.

Despite its presentation in the management literature and elsewhere, neuroscience is not a homogenous discipline. Rather neuroscience constitutes an eclectic field of enquiry that draws on expert knowledge from a range of disciplines and other fields. It was 'born' only as a multidisciplinary project in 1962 following an explicit move to convene a multidisciplinary effort to:

> close the gap between mind and brain with the eventual aim of describing all mental events as brain events to be explained in terms of molecular processes (Rose and Abi-Rached 2014, p. 4).

These beginnings, argue Rose and Abi-Rached (2014), were followed by the establishment of learned societies, conferences, and journals, such that by the turn of the 20th century neuroscience was an established discipline with the necessary global infrastructure to

continue to develop and grow both in terms of research output and, increasingly, perceived relevance to everyday life.

Others point to the invention and development of technology, which have facilitated the investigation of the nervous system in live human beings, as being central to the development of the field (Gruber and Dickerson 2012). These include axial X-Ray imaging, electroencephalogram (EEG), positron emission tomography (PET), magnetic resonance imaging (MRI), and functional magnetic resonance imaging (fMRI). These developments are coupled with, or perhaps arise from, substantial financial investment in major brain research projects. Such investments include the Human Connectome Project from 2009; $3bn over 10 years for the US BRAIN Initiative from 2013; €1.1bn, over the same period for Europe's Human Brain Project (Kandel et al. 2013); and, in Japan, the Brain/MIND project from 2014 (Yeung et al. 2017b). Together such investments lead Leshner (2013, p. 533) to describe how, in the decades since the 1990s "neuroscience research has progressed at an explosive rate". Investments are also seen to have allowed for more basic research which, according to Yeung et al. (2017b) led eventually to some of the paradigm shifts evident today (and held to be forthcoming) such as research concerned with connectivity in the brain rather than the previous emphasis on localised brain activity. Nevertheless, neuroscience remains "a splintered field, with circa 10,000 laboratories worldwide pursuing distinct questions with a dizzying variety of tools" (Kandel et al. 2013, p. 663), which has never really rallied in a unified way (Leshner 2013).

In Figure 1, below, I have fashioned a brief chronology of the field, depicting key events in the development of a 'coherent' science, and highlighting its explosive growth.

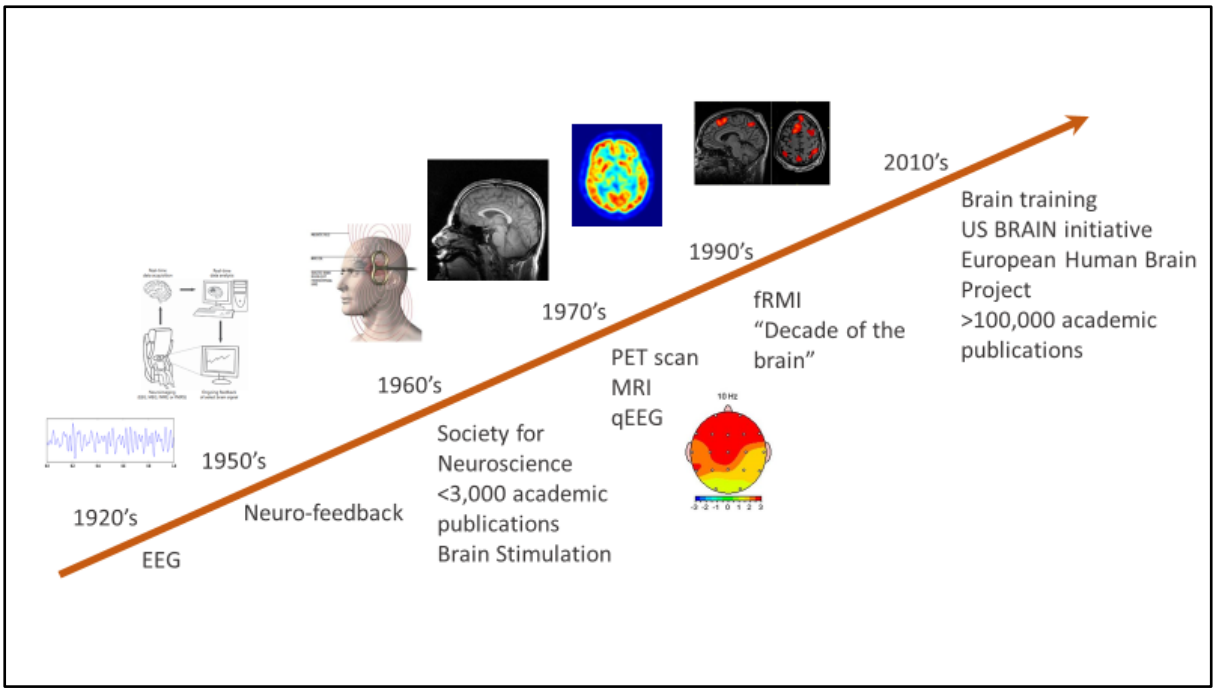

Figure 1. Brief chronology of neuroscience

Rose and Abi-Rached (2014) summarise neuroscience in the following way:

> of course, there was no one neuroscience – there were multiple schools of thought, many sub-fields with different problems, approaches, methods and techniques, whose researchers attended different conferences and published in different journals, often with intense rivalries within and between research fields (Rose and Abi-Rached 2014, p. 6).

This multifariousness suggests that the simplicity of the term 'neuroscience' belies much of the complexity that underlies it and which is not, I suggest, reflected in translation work. Instead, neuroscience is presented as a coherent and unified discipline, thereby missing the entanglements, uncertainty, and contestation which typify neuroscience as a field of enquiry.

2.1.1 Neuroscience research

At this point it is useful to understand something more about the landscape of neuroscience research since, as described above, this enables me to argue later that prescriptions for practice do not comprise neuroscience but are instead a paradox. In what follows I set out the central themes and priorities of neuroscience and also briefly describe the main approaches to neuroscience research, including the various imaging technologies used, which become relevant in future discussions.

Themes and priorities. Given what has already been said about the 'splintered field' of neuroscience, it is no surprise that the US National Institutes for Health (NIH) sets out different branches of neuroscience, including i) developmental, ii) cognitive, iii) molecular and cellular, iv) neurogenetics, v) behavioural, vi) clinical, vii) neurophysiological and viii) sensory[10]. This list provides a sense of the challenge involved in summarising research priorities in the field of neuroscience, a perspective reinforced by Yeung et al. (2017a) who describe it as:

> a broad research field aimed at investigating the relationships among neural structures, functions and behaviors. It comprises many research themes; examples include analytic methods, the acquisition of functional neuroimaging and its physics, computational modeling and analytics, physiology and anatomy, sensorimotor functions, aging and cognitive functions, social neuroscience, and language and learning (Yeung et al. 2017a, p. 2).

Yeung et al. (2017a) go on to identify the top 100 cited articles in the field as a means of providing a comprehensive review of major research topics in neuroscience. Their findings suggest that 78 out of the 100 most cited papers can be classified into five main topics: 1) neurological disorders such as Alzheimer's disease, dementia, or Parkinson's disease, 2) the prefrontal cortex, 3) the brain network, including at resting state, 4) brain mapping and, 5) methodology. Examining citations in this way represents one way of characterising the field, on the basis that higher citations are more likely for those topics in which there is more interest within a field. That said, examining citations is not without shortcomings, for instance, limitations associated with inclusion or exclusion criteria or difficulty with interpreting the nature of the citations.

Further, Yeung et al. (2017b) endeavour to report overall changes in the landscape of neuroscience literature over the decade to 2016, by way of a bibliometric analysis. Whilst their intention is to examine how the field has changed during the prescribed period, for the purposes of this study an indication of research areas and terms can help us come to a better understanding of the field of neuroscience itself. This understanding is relevant later as we try to comprehend the translation of findings from neuroscience research into the organisational field. In their analysis Yeung et al. (2017b) helpfully distinguish between

[10] https://www.nichd.nih.gov/health/topics/neuro/conditioninfo/areas Accessed 24 February 2023

neuroscience research which uses animal models, and that which uses brain imaging involving humans. They identify the top ten research areas (by share of publication), which include psychology, behavioural sciences, and psychiatry, as well as pharmacology, physiology, and biochemistry. Appearing on the list for the first time are research areas concerned with immunology and gerontology, with research on the latter doubling during the period concerned. Meanwhile, three of the high impact terms they identify relate to Alzheimer's Disease (melatonin, microglia, and neurofibrillary tangle), another three to brain-imaging (default mode network, functional connectivity, and neuroimaging), others to ostensibly methodological developments (systematic review, meta-analysis, and diffusion tensor imaging) whilst 'autism' was almost consistently present as a high impact term.

Finally, the British Neuroscience Association (BNA) celebrate their 50th anniversary by reflecting on past discoveries, reviewing current knowledge, and considering how neuroscience may develop in years to come. The BNA have published of a series of articles designed to provide an accessible resource for those interested in the field of neuroscience[11]. As such, an examination of the topics included might give a further sense of what is considered to be central and important to the field of neuroscience. On perusal such topics include stroke, epigenetics, psychiatric disorders, brain stimulation including ethical issues, memory, and basic research concerning sodium and calcium channels, cell regeneration and receptors, glial cells, and neurotransmitters.

Taken together I suggest these various inquiries into the predominant focus of neuroscience highlight a complex and wide ranging field, concerned with developing both a better understanding of the workings of the brain including investigative techniques to that end, and with developing the means to address disease. Through the examples given and the studies cited, my intention has been to provide sufficient grounding against which we might later consider translation into an organisational setting.

Neuroscience methods. At the centre of the field of neuroscience remain debates concerning methods and ongoing developments in techniques and associated technologies. I will now briefly touch upon these to provide some background for later discussions concerning translation. As a natural science, neuroscience research is conducted according

[11] https://www.bna.org.uk/mediacentre/news/50-years/ Accessed 24 February 2023

to the principles of the scientific method which reflect positivist ontological and epistemological assumptions. As such it presumes the existence of a single and observable reality as well as the possibility of objective knowledge, discoverable through measurement. Further, as we have seen, research might use animal models or, more recently, brain imaging, both under experimental conditions.

With regards to animal models, in the current landscape of neuroscience research the vast majority of neuroscience focuses on a handful of standard model organisms, including the squid, frog, sea slug and rat, chosen to address different scientific problems (Yartsev 2017). Overall, animal models are prefaced on the basis that behaviour or disease is similar in many species of animals to humans, and findings can then be translated into human experiments on a less invasive basis, be that pharmacologically or by use of imaging techniques. Animal models have their limitations, including questions as to the ethics of experimentation. Further whilst historically posthumous study of the human brain has been instructive, new imaging technologies now allow researchers non-invasive access to live brains. It is important to understand that different imaging techniques have their own constraints and advantages, enabling or constraining the claims that are made on their behalf.

Broadly speaking, neuroimaging techniques fall into two categories (Morita et al. 2016). Firstly, approaches which measure the electrical activity of cell groups in the brain, which include electroencephalography (EEG) and magnetoencephalography (MEG). Secondly, approaches which measure changes in blood flow associated with brain activity and which include functional magnetic resonance imaging (fMRI), near-infrared spectroscopy (NIRS), and positron emission tomography (PET). Most neuroimaging findings employed in an organisational context are derived from EEG (or versions of such as quantitative EEG otherwise known as qEEG) and fMRI research. Both categories are used to generate knowledge which – intuitively at least – appears to be relevant in the organisational domain insofar as they are non-invasive and provide generalisable evidence concerning healthy human brains which might then be extrapolated to organisational incumbents.

EEG measures electrical activity in the brain using electrodes attached to the scalp and whilst it measures with high temporal precision (i.e., in more or less real time), it has low spatial precision and is unable to accurately identify location. Further EEG works at a

relatively superficial level of brain activity such that it has difficulties measuring deep brain activity (Morita et al. 2016). Meanwhile, magnetic resonance imaging (MRI) visualizes the structural image of the brain, whilst fMRI adds functional images through measuring blood oxygenation (the BOLD signal), as a proxy which is correlated with brain activity. Although less accurate temporally than EEG, it is much more precise spatially and can measure activity in deeper cortical and subcortical brain structures (Morita et al. 2016) as well as being able to identify functional connectivity between brain regions. It is fMRI which produces colourful images of the brain, ostensibly showing the brain 'lighting up' during some activity or other, and which actually shows a BOLD response. Further limitations of fMRI are associated with the equipment itself – a costly and non-portable scanner – in which research participants must remain still whilst in a restricted space, thus limiting the tasks they can be asked to perform. EEG is much more portable, but still requires sufficient expertise to administer.

Both techniques require complex statistical analyses involving multiple analytical decisions, which has been laid stark by research conducted by Botvinik-Nezer et al. (2020). They asked 70 independent teams to analyse the same dataset arising from fMRI and found that every team opted for a different analytical approach. Such variety in analytical approaches likely leads to substantial effects on scientific conclusions drawn, and suggests that knowledge claims are heavily dependent on the analytical choices made by researchers (Botvinik-Nezer et al. 2020). These observations give some indication as to the possibilities and the limitations associated with EEG and fMRI. It is inaccurate to say that either technique allows us to 'see inside the brain', albeit they provide data for analysis. It is also worth reinforcing the point that such data is in the form of proxies for the phenomena of research interest, both in terms of tasks undertaken by subjects which are proxies for a real-world scenario, and in terms of measures of brain activity as described above. Whilst such shortcomings are familiar to and acknowledged by those working in the field, those outside of the field are unlikely to be equipped with sufficient 'neuroscience literacy' to avoid potential misunderstanding (Illes et al. 2010).

Finally I will say something about research concerned with the chemistry of the brain, by which I mean purporting to measure chemical activity which impacts brain function or vice versa. This type of research examines the presence (or absence) of particular hormones or

neurotransmitters, which are implicated in various neurological conditions, such as dopamine and Parkinson's Disease (Da et al. 2023), or behavioural responses, such as serotonin and responses to unfairness (Crockett et al. 2008). However, the capacity to do so in living organisms continues to be problematic because:

> neurotransmitters are difficult to detect in vivo due to their structural similarity, low concentration, and rapid change (Da et al. 2023, p. 152).

The particulars relating to neurochemical research remain complex and beyond the scope of this study, so the intention here is just to give a sense of this complexity. The brain utilises a range of different chemicals as neurotransmitters which, in simple terms, facilitate communication between neuronal cells through their release into the synaptic cleft between neurons (Bearman et al. 2008). Some chemicals perform other functions in the body or nervous system whilst others are exclusively used by the brain. Some are more familiar to us, having reached common parlance, such as dopamine which is implicated in Parkinson's Disease and in our experience of pleasure (Kondziella 2017). Others, such as acetylcholine, despite their broad role in the functioning of the brain, remain the preserve of specialists in neurochemistry. Some neurochemicals are restricted to particular regions of the brain, whilst others are more widespread, and they vary in the way they are produced, released, and re-absorbed or removed from the synaptic cleft (Bearman et al. 2008). Research in the area of neurochemicals might focus on a specific chemical in relation to a specific disease or condition. For instance:

> the most important neurotransmitters are … acetylcholine (associated with Alzheimer's disease and myasthenia gravis), dopamine (Parkinson's disease), glutamate and GABA (epilepsy and seizures), and serotonin (major depression) (Kondziella 2017, p. 1767).

However, research has also moved beyond such medical conditions to consider human experience more generally in terms of neurochemistry (Rose 2003a). The actual process of researching neurochemicals is, as I have already suggested, problematic since, despite "significant advances in electrochemical sensors and optical probes [which] have brought new possibilities for studying neurons and neural circuits by monitoring the changes in neurotransmitters"(Da et al. 2023, p. 138) it remains:

> extremely difficult to probe the chemistry, namely neurotransmission, of an intact brain (in vivo). Analysis of neurotransmission necessitates micro

> or nano level spatial resolution, which is particularly challenging given the intricate nature of brain tissue. Additionally, the brain is chemically harsh and complex and neurotransmission is dynamic (occurring on the sub-seconds) (Ou et al. 2019, p. 2738).

In other words, chemicals can be fleeting and as yet we lack the technique to accurately measure them, all of which have implications for the claims it is therefore possible to make.

2.1.2 The status of neuroscience

Much has been written about neuroscience findings which purport to be able to account for the status of an individual, (see for example, Farah 2017). Instead here I am interested in the general status of neuroscience and what can account for it. By status I mean the extent to which neuroscience findings are held to be authoritative, particularly by those outside the field, including translators and organisational practitioners.

This is a question that occupies, in part at least, Science and Technology Studies (STS), including the role and popularity of neuroscience in society more generally and whereby:

> Over the last few decades, the neurosciences have expanded dramatically, not only in terms of the resources they command and the authority they wield, but also in terms of the scope and range of problems and phenomena they territorialize (Vrecko 2010, p. 2).

Rose (2012) argues that because neuroscience has been generously funded and likely has implications which extend beyond its own field, it is important that it is not simply left to its own devices. As such there is a legitimate need for a critical neuroscience (Kirmayer 2012; Slaby and Choudhury 2012; Bagozzi and Lee 2017). In Chapter 1 I suggested that whilst 'critical neuroscience' is beyond the scope of this research, it seeks to provide a better understanding of what neuroscience can and cannot offer; a 'reality check' of its possibilities and limitations, and alternative means of operating that might yield more substantial insights. Its proponents explicitly acknowledge that critical neuroscience is not an adherent of the Frankfurt School (Slaby and Choudhury 2012) but instead uses 'critical' in a more general sense and is interested in, firstly, making explicit the assumptions that dominate neuroscience. Secondly, critical neuroscience is concerned with how to overcome the gap between the social and the neural and particularly the challenges that arise from the way that explanations based on the latter are applied to the former. And, thirdly, critical neuroscience is interested in 'unpacking' how brain facts have come to be so salient in

clinical, educational and commercial settings and as well as in the popular imagination (Kirmayer 2012). The underlying intention is to neither celebrate nor condemn neuroscience (Slaby and Choudhury 2012) but, via a close engagement with it, to highlight issues or "matters of concern" (Latour 2004, p. 231).

One notable phenomenon is that of the so-called 'seductive allure' of neuroscience (Weisberg et al. 2008). In their study investigating why the public find neuroscience particularly alluring, Weisberg et al. (2008) found that the inclusion of irrelevant neuroscience information increased participants' propensity to judge as satisfactory an explanation of psychological phenomena. In other words, "something about seeing neuroscience information may encourage people to believe they have received a scientific explanation when they have not" (Weisberg et al. 2008, p. 2). This finding has been successfully replicated (see for example, Fernandez-Duque et al. 2015; Weisberg et al. 2015), and whilst it remains unclear why it might be the case, one suggestion is that it arises from a lay conviction that the brain can offer the best explanation for mental phenomena (Fernandez-Duque et al. 2015). That being the case, it might seem natural for the layperson to afford neuroscience special respect and attention, or at least to embrace the findings of neuroscience research more uncritically than they might other such findings. In this way, part of its allure may rest in its very 'scientific-ness' and as such 'scientism' may play a part.

'Scientism' is not the same as science, instead it is held to be an inappropriately deferential attitude toward (hard) science (Haack 2012). Whereas (natural) science is a method, scientism is best understood as a philosophy or set of beliefs about science. I will discuss scientism in more detail in Chapter 3, as it is a central tenet of critical theory. For now it is sufficient to suggest the possibility that, arising from the (hard) scientific nature of neuroscience (as set out earlier in this chapter) is a lay belief in, amongst other things its superiority, objectivity and generalisability which affords it a status above other forms of knowledge. These beliefs are likely reinforced by the use of neuroscience research technologies, which purport to measure and quantify brain activity, and methodologies which are complicated and difficult to understand for those outside the field. Further, whilst those outside the field of neuroscience perhaps lack a detailed technical understanding, neuroscientists themselves are cognizant of the limitations of such approaches. For instance Carandini (2012) highlights the wide gap between circuits and behaviour, whilst Jonas and

Kording (2017) argue that approaches to data analysis cannot meaningfully produce models of the brain and how it processes information. As it stands:

> the dramatic images may hide as much as they reveal. At best they provide a correlative indication of those regions of the brain that are active when the brain's owner is engaged in some mental activity; they do not mean that these regions are therefore the 'sites' of such mental activity (Rose 2012, p. 55).

From here it is pertinent to consider the role of reductionism, or rather neuroscience's "belief in the reductionist program" (Krakauer et al. 2017, p. 480), whereby the mind reduces to the brain, or is even seen as an 'epiphenomenal product' of it in what is a largely shared commitment to reductionism (Rose 2012). Although reductionists might argue for the benefits of parsimony, economy and simplicity (Kim 1989), reductive neuroscience explanations effectively overclaim the significance of neuroscience information, suggests Gold (2009):

> Of course, it is useful to know that diminished serotonin or norepinephrine leads to depressed mood (assuming that turns out to be true), just as it is useful to know that if there is no gas in your car, it will not run. However, knowing that an absence of gas prevents a car from running tells you nothing about why gas is necessary or what an engine does with it (Gold 2009, p. 511).

This narrative highlights the way in which important aspects of experience and thought are reduced or overlooked as a result of a focus on proxy measures to the extent that neuroscience cannot really account for them in any meaningful way. For Rose (2012), one role of critical theory is to examine the circumstances within which such reductionism has become the dominant mode within neuroscience and discussed in more detail below. Certainly a broader view of the context in which the field of neuroscience has arisen and so successfully developed might also help account for its ongoing success and will be explored in more detail later in this chapter.

2.1.3 Debates in the field

Critique of neuroscience has come in a number of forms. In particular I will highlight critique which seems to be particularly pertinent to my research and which includes questions relating to i) the robustness of neuroscience research findings, ii) neuroscience's reductionist programme, iii) the impact of commercialised science, and iv) the politicisation

of science. Critique relating to these themes would seem to have some bearing on efforts to employ neuroscience findings outside their originating field as I will describe below.

Robustness of neuroscience research findings. For instance scholars have called into question the robustness of (neuro)science facts themselves. The methodological norms of neuroscience have begun to be scrutinized more critically in light of cognitive neuroscience research (Button et al. 2013; David et al. 2013), as well as scientific research more generally (Ioannidis 2005; Nosek et al. 2012). Such scrutiny includes questions about reliability, power (Button et al. 2013) and thus the accuracy of research results, as well as observations that studies are frequently based on small samples leading to potentially inflated effect sizes and thereby opening them to question in terms of their reliability (Vul et al. 2009).

Further, the scholarly literature suggests that neuroscience methods are neither as objective nor as definitive as they might seem (Weisberg et al. 2008) and that the laboratory-based nature of the research can lead to questions about how appropriate it is to generalise such findings to the complex social context of an organisation. This analysis is of particular note when one considers the day to day reality of organisational life vis a vis the controlled conditions under which much neuroscience research takes place, most often comprising proxy tasks which bear only a distant connection to those conducted in the workplace. However, these shortcomings are both perpetuated and invisible to the lay-person who cannot be expected to engage with the intricacies of neuroscience methodologies and accompanying statistical analyses and will anyway be unlikely to have sufficient neuroscience literacy (Illes et al. 2010) as previously highlighted.

Neuroscience's reductionist programme. Reductionism is perhaps the most commonly used critique of neuroscience (including organisational neuroscience as we shall see). In essence, reductionism refers to:

> the practice of describing or explaining a complex (esp. [sic] mental, social, or biological) phenomenon in terms of relatively simple or fundamental concepts (Oxford English Dictionary 2023).

With regards to neuroscience reductionism suggests that an understanding of human behaviour might be best achieved by reducing it back to its more basic biological (or more specifically neurobiological) antecedents, on the assumption that they are indeed antecedents. Not only that, but reductionism here also includes the implicit assumption that

a complex phenomenon, such as human behaviour, is purely the sum of its biological antecedents. This assumption overlooks the influence of other factors, such as social interaction, on human behaviour. Notable here also is that:

> Neuroscience has also not delivered on many basic promises. After decades of effort, we still have only a very limited understanding of the mechanisms linking brain structure and function at the microscopic level to cognition and behavior or to the large-scale patterns of activity we observe in imaging studies. (Markram 2013, p. 145).

Reductionism is a complex philosophical debate which, whilst beyond the scope of this research, nevertheless requires some appreciation. In writing about reductionism in psychiatry, Ian Gold (2009) suggests that high expectations in relation to neuroscience effectively diminish the contribution of extant knowledge, positing that:

> on this understanding of reduction, then, the psychological sciences are relegated to the status of mere placeholder sciences awaiting replacement by neuroscience and molecular biology (Gold 2009, p. 507).

Critics of organisational neuroscience similarly argue that neuroscience is reductive and that neuroscience research cannot account for the workings of the brain within the social contexts that we all inhabit (Lindebaum and Zundel 2013). These criticisms highlight the limits, to any account of the brain, that neuroscience can legitimately propose and as such the practical benefits that it can offer to management and organisation science (MOS), (Lindebaum and Zundel 2013; Lindebaum and Jordan 2014). Further Kirmayer (2012) argues that reductionism is often exploited, most obviously by big pharma who use it as marketing collateral to sell their products. One example of this is arguably 'brain-training' (Simons et al. 2016), as evidenced by the fine levied by the Federal Trade Commission against Lumosity for false advertising claims. Here consumers were 'deceived' by unfounded claims regarding the supposed beneficial effects of Lumosity brain training programmes, the marketing of which was held to prey on consumer fears without "the science to back up its ads" [12]. Further, whilst prescriptions for practice differ from reductionism per se, it is possible to see that reductionism may play some part in the selection and translation of specific findings from neuroscience research into prescriptions on the basis of their marketability.

[12] See https://www.ftc.gov/news-events/press-releases/2016/01/lumosity-pay-2-million-settle-ftc-deceptive-advertising-charges. [Accessed 16 August 2023]

Commercialised science. With regards to the impact of increased commercialisation in science more generally and neuroscience in particular, Krimsky (2004) describes the impact of various aspects of commercialisation on the practice of science and scientific research effectively leading to a 'science in the private interest'. These include the Bah-Doyle act[13], an increasing occurrence in conflicts of interest, journal science (and its inability to deal with conflicts of interest through effective counter measures), and the composition of expert and advisory panels (including U.S Food and Drug Administration (FDA) panels and advisory bodies). Additional effects, Krimsky suggests, include the erosion of ethics and of public trust in university science, questionable objectivity (both of scientific method and interpretation of research) and ultimately a lack of what he calls 'disinterestedness' (Krimsky 2003). Caulfield and Ogbogu (2008, p. 303) argue that "todays research environment is more commercially oriented than it has ever been", with a number of potential implications. Firstly, patenting might lead to secrecy, data with-holding and publication delay. Secondly that the premature marketing of new products can undermine trust, and lead to foundational knowledge that is flawed. And finally, that hype can drive unrealistic expectations.

For neuroscience more specifically, Eaton and Illes (2007, p. 393) observe that:

> although the healthcare market is neurotechnology's major focus, non-medical uses of neurotechnology assessment tools are also proliferating. Such uses concern a range of professionals … and include applications by judicial, government or military authorities as well as in business and sports.

One example is an approach to lie detection based on fMRI and the supposed differences between oxygenation levels of the truthful/untruthful. Another example is the use of fMRI in consumer marketing as a means of assessing unconscious responses to advertising. Increased commercialisation is further evidenced by the activities of such bodies as SharpBrains[14] who describe themselves as 'an independent market research firm tracking health and performance applications of brain science', and the Neuro-Tech Industry Organization[15] (NIO) which describes its mission as 'to accelerate neurotechnology research,

[13] This act effectively enabled individuals and universities to register patents and intellectual properties, in their own names, even for federally funded inventions/developments.
[14] https://sharpbrains.com/ [accessed 16 August 2023]
[15] https://www.neurotechindustry.org/ [accessed 16 August 2023]

development and commercialization' and was founded by a partner at a venture capital firm which invests in technology to enhance human performance.

Arguably such initiatives might result in a shift in research focus, again observed by Eaton and Illes (2007, p. 15) who describe how:

> several start-up companies … began with an initial business plan to develop medical products and services but then redirected R&D when given funding from sources, such as the US Department of Homeland Security or the US Defense Advanced Research Projects Agency (DARPA).

A 'funding effect' (Krimsky 2003) is evidence of the intertwining of commerce and academia, wherein the notion of 'disinterestedness' is on the wane. How, asks Krimsky (2003), can scientists be objective if they stand to gain from the result? Although journals and universities propose 'transparency' as an antidote to this (where conflicts of interest are disclosed), such disclosure just legitimises the practice of mixing commerce with science, implicitly accepts the decline of disinterestedness and potentially leads to an undermining of the public's trust in science (Krimsky 2003).

Politicised science. Finally, Wise (2006) argues that commercialisation ultimately also politicises science. He describes how, in 2004, concerned scientists accused the Bush administration of preventing the publication of science that ran counter to its political agenda by, for example, borrowing tactics from the tobacco industry (which was long able to diffuse claims about its harmful effects), and by the mobilisation of think tanks with commercial sponsorship. From this situation, a rhetoric arose and was used to create doubt surrounding any ('junk') science that disagreed with the 'sound science' conducted by the commercial bodies and relying on the media not recognising the origins of the 'science'. Arguably, one could imagine a similar scenario arising, particularly in the case of neuroscience interventions. For instance in the US brain stimulation equipment is licenced by the FDA, and:

> for the FDA to regulate a consumer tDCS (transcranial direct-current stimulation) product, the product must meet the legal definition of a device … an 'article' that, among other things, is intended for use... in the cure, mitigation, treatment, or prevention of disease (Zettler 2016, p. 319).

Thus the very act of licensing such equipment gives it a status above and beyond that justified by research evidence pertaining to its efficacy (Horvath et al. 2014).

Taken together these common critiques of neuroscience paint a picture that, for the purpose of this research, help build a broader understanding of the background and some of the main debates in the field of neuroscience. Many of these nuances are not visible to the layperson and in the meantime (reductive) neuroscience gives the impression that findings from the field will help us to better understand ourselves and our behaviour. Based on reductive assumptions, described above, whereby complex human behaviour is purely a sum of its (neurobiological) parts, the brain is held to be at the core of our being. It makes us what we are and as such understanding more of it will ultimately elucidate what it is to be us. And not only that, but to change our brains is to invite the possibility of changing ourselves. Further, these sorts of debates are largely absent in organisational neuroscience (ON) as I will describe below.

2.2 Neuroscience and the organisation

As part of the background and context to this research, we now turn to consider neuroscience knowledge within the broad context of the organisation, including scholarly efforts to incorporate it into the academe as well as practitioner approaches to apply it to organisational life. I see the incorporation of neuroscience into the organisational academe and into organisational practice as being two distinct 'movements', and in what follows I will talk initially about academic interest in neuroscience in MOS, followed by practitioner interest in it.

2.2.1 Neuroscience in the academe

In the previous chapter I used the term ON and described how the mainly conceptual body of work seeks to outline how neuroscience knowledge and techniques can be of value in organisational research.

The first articles advocating a neuroscience approach to MOS were seen in the literature, in the highest ranking 4* journals (as judged by the Association of Business Schools (ABS) which assesses the quality of worldwide business and management publications) around a decade and a half ago (see Lane and Scott 2007), with a general upward trend in publications to the start of this decade, and perhaps now stabilising (Cinici et al. 2021). In

addition, an Academy of Management (AoM) special interest group in neuroscience was established in March 2020. ON seems to have attracted a small and interconnected coterie of advocates who argue for its potential methodological contribution, such as the advantages of neuroscientific over psychometric approaches (Waldman et al. 2011), as well as its potential as an alternate lens through which to look at issues of interest to management (Cinici et al. 2021). Organisational neuroscience is broadly seen as emerging research domain:

> within the field of management that integrates organizational behavior with neuroscience (Passarelli 2015)
>
> that integrates organizational phenomena with neuroscience, offers a fresh perspective through which researchers might conceive research issues and measure variables (Wang et al. 2021, p. 596).

Massaro and Pecchia (2016) offer more precision, referring to it as:

> that field using neuroscience theories, findings, practices and/or methods to advance knowledge of organizational and management science, and vice versa (p. 30).

Notably they extend the possibility that management science might have some part to play in advancing neuroscientific knowledge. Amongst academic advocates, it is possible to see the emergence of distinctive research groups, each taking a bespoke approach to neuroscience in organisations, with concomitant publications, differing definitions, and even distinct names. Rather confusingly, for instance, 'Organizational Neuroscience' (ON) is also the preferred term for the perspective of a primarily US research group[16] and sees itself as:

> spanning the divide between neuroscience and organisation science ….best thought of as a paradigm or interpretive framework that sheds new light on existing problems, as well as raising questions that might not otherwise be considered (Becker and Cropanzano 2010, p. 1056).

As clarified in Lee et al. (2012, p. 923), ON is:

> a fundamentally neuroanatomical perspective in that it is concerned with the role that brain anatomy plays in the mediation of organizational decisions.

[16] Comprising publications from key group members such as Becker, Cropanzano, Waldman, Ashkanasy, Ward

Becker et al. (2011) exemplify this physiological perspective. A close reading of their paper confirms multiple references to individual neurons, neuroanatomy, and neurophysiology, as well as suggesting that:

> Organizational neuroscience adds an additional level of analysis. A potential benefit, which is also not without risk, is that this forces researchers to consider additional levels of reduction that deconstruct individuals to discrete brain processes (Becker et al. 2011, p. 936).

It is worth highlighting here how Becker et al. (2011) point to reductionism, as detailed above, declaring it to be a qualified risk, but nevertheless seemingly asserting it as a legitimate epistemological move.

I have already suggested that neuroscience is a 'splintered field' and the management academe reflects this splintering through an alternative to both the broad and specific use of 'ON'. A primarily UK based group[17] suggests 'Organizational Cognitive Neuroscience' (OCN) as a viable approach separate from the neuroanatomical focus of ON and with an emphasis on a cognitive perspective (Lee et al. 2012) and described by Butler et al. (2017) as:

> an applied subfield of cognitive neuroscience, …. concerned with exploring human behavior within and in response to organizations as a set of theoretical layers, of increasing abstraction: from evolved adaptation, to biological/physical brain activity and anatomy, to cognition (i.e., mental), to social, to organizational as a subset of social theory (p. 8).

Again, it is worth highlighting reductive tendencies, albeit in this instance OCN looks to reduce aspects of social practice within organisations to individual cognition. Overall, advocates of OCN point to a range of benefits arising from the use of neuroscience technologies, such as functional magnetic resonance imaging (fMRI) and electroencephalography (EEG). These putative benefits include the perceived objectivity of the data that they generate (Balthazard et al. 2012), as well as access to previously unattainable insights (Boyatzis et al. 2012):

> neuroscience can be utilized more broadly to investigate various facets of organizational behavior and can provide additional evidence…….Simply stated, the brain cannot lie or fake, and its assessment through

[17] Comprising publications authored by Senior, Butler, Lee

> neurosensing methods (e.g., qEEG) represents a highly ecologically valid approach to measurement (Waldman et al. 2017, p. 427).

For simplicity's sake, I will adopt the term ON to refer to that body of work within the MOS academe concerned with neuroscience and organisational behaviour. In Table 1 below I set out some examples of the organisational topics which have been addressed by ON. These examples give a sense of the range of topics addressed by scholars, as well as the ways in which they use neuroscience technologies including the proclivity to reductionism. Notably it is not immediately clear how these topics connect to those described earlier as being the central focus of the field of neuroscience.

Table 1: Examples of organisational topics

Academic Organisational Neuroscience Topics	**Example**
Teams	Wang et al. (2021) use qEEG to measure team members attention, arguing that it provides advantages over traditional methods as it is real time and less subjective than observations of team processes. It does highlight some shortcomings in that they critique qEEG "A limitation of the qEEG headset in our study is that only nine electrodes were used, and thus, this equipment can only produce assessments of brain activity from regions where it is adequately detected" (p. 605).
Decision making	Butler et al. (2016) review work on decision making in organisations and identify 3 key areas: economics; marketing; organisational behaviour.
Leadership	Peterson et al. (2008) consider whether it is possible to distinguish between the brains of different types of leaders, and other studies consider whether electrical brain activity differs for the top performing (Harung et al. 2009), and the role of neurochemicals (Zhe and Yazdanifard 2015).

Academic Organisational Neuroscience Topics	Example
Motivation	Corr et al. (2016) highlight propositions based on a neuroscientific theory of motivation and personality and which, they argue, has a direct bearing on innate drive and workplace performance.
Coaching	Boyatzis and Jack (2018) review findings from a brain imaging study that examines neural differences between two different approaches to coaching, and more broadly discuss how insights from neuroscience can help inform effective approaches to coaching.
Emotions	Massaro (2020) uses an ON approach to investigate the domain of workplace affect and argues that neuroscience can progress research on emotions in organizational studies.

Despite the purported benefits of neuroscience methods (Murray and Antonakis 2019) and whilst advocates describe the benefits of neuroscience measures as overcoming "limitations with traditional methodologies that have been commonly used in organisational research" (Waldman et al. 2019, p. 9) the majority of publications are, as previously described, conceptual in nature (Lindebaum et al. 2020), which suggests limited empirical support for prescriptions for practice. Notably, whilst the explosion in neuroscience is oft attributed to the development of fMRI technology (Gruber and Dickerson 2012), empirical neuroscience research in MOS in the main makes use of the less sophisticated EEG scan, which, as discussed above, is more limited in what it can tell you.

At the same time, critics have pointed to both reductionist applications of neuroscience, as alluded to above, and to methodological shortcomings in the field of neuroscience itself. For instance, see Lindebaum and Zundel (2013) and Lindebaum and Jordan (2014) who point to the shortcomings and negative implications of a slavish promotion of neuroscience in MOS. In addition, the actual contribution of neuroscience to our comprehension of phenomena is open to question. For example, and in relation to two specific examples (cognitive

enhancement and moral neuroscience) Schleim (2014, p. 1) suggests that "there is indeed a gap between promises and expectations on the one hand and knowledge and applications on the other". Whilst cautioning that this gap cannot necessarily be generalised to different examples of neuroscience research, Schleim (2014) asserts that two particular factors make generalisation more likely. Firstly, 'exaggerated expectations' with regards to fMRI as a research tool, and secondly, exaggerated claims in response to 'scarce resources' whereby a competitive funding environment drives hype. These combine to create a 'system' in which:

> the communicated promises as well as the scholarly and public attention given to these possibilities are, in my view, in no way justified by the scientific possibilities (Schleim 2014, p. 3).

These issues raise the question as to whether neuroscience findings are intrinsically useful or can automatically enhance understanding. Taken together, one might characterise the representation of neuroscience in management science as reductive, whereby a simplified form of neuroscience is commonly presented and the concerns, for instance of critical neuroscience, are not adequately reflected. Further the simplified form of neuroscience is itself another form of reductionism, whereby scholars effectively reduce the complexity of the neuroscience field through the selection of a limited range of topics that might superficially appear to have some parallels with practice in organisations. These topics are then further simplified to render the superficial parallels more significant.

I would make one further observation in relation to the ON literature, and that is the way that enthusiasm for the possibilities of neuroscience appear to continue to outweigh its actual impact, as reflected by Cinici et al. (2021) who present a 'retrospective' on the spread of neuroscience in the management field. They conclude both that progress is limited and that "there is cause for much optimism about the future of neuroscience in management" (Cinici et al. 2021, p. 21). I hold that this 'optimism' might be one instance of a trend highlighted by Ghoshal (2005) and touched upon in Chapter 1. He powerfully argues that business-school based research has adopted a narrow form of positivism, with the scientific model increasingly dominant, shaping the worldview of managers and practitioners in a way that ultimately offers only a partial analysis and excludes human intentionality. Overall, ON is characterised by an optimism for what neuroscience research findings can bring to MOS and rarely reflects on its shortcomings.

2.2.2 Neuroscience for practitioners

We turn now to the way in which practitioners approach neuroscience in the management field. This orientation seems unrelated to work produced by the management scholars who promote neuroscience. Indeed, writing in the management literature, Butler et al. (2016) assert that "it is remarkable that practitioners appear to be running ahead of academics, quickly developing services based on neuroscientific technology" (p. 542).

Organisational practitioners are not well defined in the literature, but for the purpose of this research I see them as those professional or practical workers who are actively employed and engaged in organisational life. An alternative term, that of 'end-user', is suggested by Kulik (2020). Although I will persist in using 'practitioners' as a term, I do draw upon the idea of distinguishing between different types of end-users (Kulik 2020) as a basis for showing the range of practitioners relevant to this research as outlined in Table 2 below.

Table 2. Different categories of practitioner

Type of practitioner	**Type of use**	**Example**
Individual	Direct user of a product	Employee with or without line management responsibility
Individual or organisational representative	Procurer or purchaser of a product	Professional function such as HR, talent management, learning and development
Individual or organisational representative	Indirect user of a product (for example for client use)	Consultant or training professional

I see the audience targeted by translators of prescriptions for practice in organisations as encompassing practitioners of all three types. The interests of practitioners typically differ from those of the academe (Kulik 2020). That said the translation of neuroscience research findings sees some individuals operate in both spheres, albeit typically neuroscience rather than business academics engaging directly with organisational practitioners, for instance, Merzenich (2018). Practitioners are typically focussed on putting knowledge to practical use (Kulik 2020) and whereas the academe publishes its neuroscience focussed work in scholarly journals, for practitioners it is textbooks often offering advice, including my own co-

authorship as described in Chapter 1. Further practitioner material is included in practitioner journals and increasingly blogs, YouTube content and other such online material. The difference between such types of publication is neatly summarised here [18]. Practitioner journals, such as *Development and Learning in Organisations* which 'is directed towards practitioners and academics in private, public, and not-for-profit sectors', or the *European Journal of Training and Development* which 'aims to provide all those involved in research and practice in training with ideas, news, research findings, case examples and discussion on training and development' provide practitioners with material, including concerning neuroscience research findings.

Prescriptions for practice in organisations. As we have seen, neuroscience research findings (or at least ideas which are described as neuroscience) have moved beyond the boundaries of the neuroscience field and into the general business domain. For instance, commercially oriented topics are frequently prefixed with 'neuro' as in 'neuro-economics' (Cassidy 2006), 'neuro-marketing' (Harrell 2019) and 'neuro-entrepreneurship' (Cookson 2008). My specific interest, as described above, is neuroscience research findings as they relate to organisations or organisational behaviour. These do not have such a neat descriptor but are premised on the idea that an understanding of the brain is likely to be useful, on a number of levels, in an organisational setting.

In Chapter 1 I described how I conceptualise findings from neuroscience research are translated for organisational practice as prescriptions for practice in organisations. In essence these prescriptions take the form of various materials including written articles in business oriented newspapers such as the *Financial Times* or the *Wall Street Journal*, or in specialist business publications such as the *Harvard Business Review* or produced by professional publications such as *Coaching at Work* or those of the Chartered Institute for Personnel and Development. Other relevant materials include blogs and white papers hosted on an authors' own website or that of other professional organisations such as

18 https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjBpISdlLz5AhUKh1wKHWrLBzgQFnoECAkQAQ&url=https%3A%2F%2Fwww.manchester.edu%2Foaa%2Flibrary%2Fnew_library%2FArticles%2FWhatDeDiff.pdf&usg=AOvVaw0m94YXiJxQspOUgqxU6ZRF

consulting firms or industry bodies. Further 'resources' concerning neuroscience can also be accessed on the internet, including video presentations and podcasts, whilst prescriptions also come in the form of conference presentations and the content of training courses, including university run management education, as well as in books. Whilst not an exhaustive list, the intention is to provide some sense of how translated neuroscience research findings manifest and can be attended to by organisational practitioners. In Table 3 below, I provide some examples of prescriptions for practice, to give a sense of both the range of topics and the range of practitioner outlets which provide such materials.

Table 3. Examples of prescriptions for practice

Practitioner Neuroscience Topics	**Example**
Decision making	Campbell et al. (2009) set out neuroscience findings which explain flawed decision-making and provide steps to take to keep your own judgement clear.
Coaching	Sets out "five key neuroscience concepts every coach should know" https://www.forbes.com/sites/forbescoachescouncil/2020/02/25/five-key-neuroscience-concepts-every-coach-should-know/#3d7f01de20c5
Performance management	Suggests "we can learn a few things about managing rock-star employees from the world of neuroscience". https://www.fastcompany.com/90837435/high-performing-employees-need-science
Leadership	Goleman and Boyatzis (2008) show how leaders can improve group performance by understanding the neuroscience of empathy.
Brain fitness	Gilkey and Kilts (2007) draw from neuroscience (and psychology) research to identify four steps to cognitive fitness.

Practitioner Neuroscience Topics	Example
Peak performance	Hallowell (2010) provides fives steps, described as coming from brain science, which help people focus on achieving peak performance.

Notably, in many instances authors lack a background in neuroscience themselves and not infrequently draw upon sources who have their own commercial interests in neuroscience-based products or solutions. For example, of those authors involved in producing the materials set out in Table 3 above, (10 individuals in total), only one has a neuroscience background, with the others predominantly associated with business schools. I will make this specific point again, in Chapter 8, with regards to the empirical material analysed as part of this research.

2.3 The context of translation

Thus far this chapter has, by way of background to my research, provided detail on various aspects of neuroscience. These aspects include definitions and debates in the field, as well as how neuroscience has come to be incorporated into the business academe and practice. I now turn to consider more contextual aspects of the translation of findings from neuroscience research, on the basis that:

> the facts, theories and practices that emerge from brain research are always cultural and historical products, with particular political and economic trajectories (Vrecko 2010, p. 4).

As highlighted in Chapter 1, I postulate that translation is a political process and argue that unseen 'structural factors' from the societal context drive translation, privileging certain interests over others and consequently advantaging some groups whilst disadvantaging others. In this section, I will describe in more detail what I see as some of those factors. In particular I set out my ideas about how translation does not emerge in a lacuna but rather happens in a space that has, for a while, been occupied by human capital theory, neoliberalism, and managerialism. I suggest that, in combination, these factors set a broad societal (macro) level agenda, including assumptions, taken for granted knowledge and

implicit knowledge which I hold are likely to play a role in how and why neuroscience research findings come to be translated as they do.

This position is consistent with the critical approach that I adopt (further described in Chapter 3) which holds that it is important to understand how a phenomenon, in this case translation, is embedded within larger structures of power, domination, and exploitation as I will now briefly explicate. Firstly, critical theory contends that power is embedded in the structure of society (rather than purely in the agency of individuals) such that structural factors in a societal context (including economic, political, and social conditions) serve to shape and constrain individual behaviour. Secondly, domination refers to the primacy of one group over another such that the dominated group tends to comply, accepting this subjugation as natural. Thirdly, exploitation refers to the way in which some (people) are taken advantage of in the sense that through the effects of structural power in society they come to accept even what is against their own best interests (Jermier 1998). These elements interrelate and reinforce one another such that extant structural factors come to dominate, as I argue below, which in turn serves to reinforce the power of those who dominate and leads to some sections of society being advantaged over others. Further, I will suggest in Chapter 4 that existing (non-critical) versions of translation theory lack an account of how either power or structural factors at the level of societal context have a bearing on translation.

In what follows I argue that a number of contextual factors are connected to the translation of neuroscience research findings and in particular that Human Capital Theory (HCT), neoliberalism, and managerialism provide strong normativity. This normativity shapes the work of translators in that it has constructed particular and regular ways of thinking. These ways of thinking take for granted as natural the primary economic role of citizens (including practitioners in organisations), and in the establishment and perpetuation of neoliberal capitalism supported by managerialism (Wallace et al. 2023). I argue that these particular ways of thinking, in the environment in which translation takes place, inevitably shape it. For instance, from HCT arises a focus on employee skill, capacity, and productivity. From neoliberalism arises the use of neuroscience as a resource to increase individual competitiveness. From managerialism arises the idea of using resources efficiently, including the brain. I now explore each of these in turn, summarising their potential impact on the

translation of findings from neuroscience research into prescriptions for organisational practice.

2.3.1 Human Capital Theory

The idea of human capital goes back to the 1800's and Adam Smith, who described it as 'the acquired and useful abilities of all the inhabitants or members of the society' (Rindermann 2018). More recently, the concept of human capital has its origins in economics literature. For instance, Theodore Schultz' work, including his 1960 presidential address to the American Economic Association (Schultz 1961), saw him proclaiming that people should be viewed as human capital, and that human capital would revolutionize Western capitalism and the fate of developing nations (Brown et al. 2020). The World Bank defines it as follows:

> Human capital consists of the knowledge, skills, and health that people invest in and accumulate throughout their lives, enabling them to realize their potential as productive members of society. [19]

Simply put, human capital refers to any ability or quality that makes people productive and it effectively renders human behaviour in economic terms (Millei and Joronen 2016). Conceptualised in this way, human capital is an asset, like any other, which has the potential to yield valuable outputs over time. Yet it also differs from traditional forms of capital in that people cannot be separated from their abilities and qualities in the same way as they can be separated from physical forms of capital (Wright and McMahan 2011). Whereas traditional economic theories stress the relevance of political, institutional, geographic, and historical factors in economic growth, human capital theory suggests that growth is driven by the competence of human capital.

Human Capital Theory (HCT) has been conceptualised and operationalised in different ways (Ployhart et al. 2014). The economic view defines it terms of such things as knowledge, skills, and abilities, often using proxy measures, such as educational attainment, as an indicator. However, according to Wright and McMahan (2011) psychologists tend to view knowledge, skills and abilities as individual characteristics, measurable through psychometric assessment. Further, the economic view of human capital extends beyond the individual to a multi-level analysis which purports to offer unit level insights, such as how aggregate

19 https://www.worldbank.org/en/publication/human-capital/brief/the-human-capital-project-frequently-asked-questions#1.

human capital (measured by educational level) can account for the economic activity of a firm or even a nation. Human capital can also be differentiated by whether it is general or specific. In other word, how generalisable it is across organisations, as some firm-specific knowledge is only likely to be useful for those particular firms, whilst other knowledge is more broadly useful.

Facets of human capital. The human capital of an individual incorporates several aspects. According to Rindermann and Thompson (2011) "cognitive ability is the decisive factor of human capital" (p. 754), as evidenced by research in which they measure the wealth of 90 nations, arguing that the cognitive ability of a nation's top 5% is most predictive of its wealth. Cognitive ability comprises intelligence, relevant knowledge, and the intelligent use of this knowledge (Rindermann 2018).

'Mental capital' includes not only cognitive ability but also emotional intelligence, which combine to determine how well an individual is able to both contribute to society and experience a good quality of life. (Beddington et al. 2008). Mental capital is distinct from mental well-being, although it too is implicated in a nation's wealth, albeit negatively. For instance, Berndt et al. (2000) argue that issues such as depression negatively affect an individual's ability to accumulate human capital. At an individual level Beddington et al. (2008) assert that we must make the most of all our resources to prosper and flourish in a rapidly changing world. Smith et al. (2021) in their so-called 'Grand Strategy' provide an explicit focus on 'brain capital'. They put forward the idea of 'brain plasticity' as an argument that both the possibility of and the need for the optimisation of our human cognitive performance has never been more pressing. Smith et al. (2021) set out a range of ideas, including brain fitness, as a means of restoring the status of the nation (in this case US), specifically encouraging employers to cultivate their employees' cognitive capacity.

It is worthwhile clarifying that cognitive capital is distinct from 'cognitive capitalism', which is concerned with the shift from industrial capitalism to knowledge-based work (Vercellone 2005) . Smith et al. (2021, p. 3) suggest that "our current economy is a brain economy, where most new jobs demand cognitive, emotional and social, not manual skills".

In the workplace, human capital is held to be the sum of workers' skills, experience, capabilities and tacit knowledge (Seleim et al. 2007). As such, the greater the collective

human capital the better a firm is expected to perform. Further, because it is critical to organisational success, reliable and valid measures of human capital are deemed to be crucial (Wright and McMahan 2011). As previously mentioned, these can be subjective measures (such as surveys), proxy measures (such as educational attainment) or direct measures (such as psychometric measures of individual characteristics).

Investing in human capital. If human capital is defined as everything within a person that helps him or her be productive in the economic arena (Rindermann 2018), and is a dynamic rather than a fixed capacity (Chapman et al. 2019), it is no surprise that Becker (1962) talks about investing in human capital as a way of influencing future income and national wealth (Rindermann and Thompson 2011). For Becker (1962), there are many ways to invest in human capital, including education and on-the-job training, with differences in terms of their relative return vis a vis their cost and likely outcome. However, a question arises as to who stands to gain from the investment and therefore who should pay?

HCT predicts that investment in education and skills development is the key to improving productivity and economic growth. Any increase in human capital translates, through increased productivity, into increased pay for the individual (Von Hayek 1975) and increased productivity and wealth for a nation (Rindermann and Thompson 2011). At an individual level there are choices to be made – particularly with regards to education levels and likely benefits (Wright and McMahan 2011). As a consequence, HCT has also been considered to be a useful way of explaining how employees enhance their own value, improve their level of skill, autonomy and socio-economic wellbeing (Fleming 2017).

HCT has become a dominant way of thinking, both as a result of the normalisation of the notion of human capital and the assumptions underlying it, as well as its purported explanatory power (Brown et al. 2020). However, it is not unproblematic. It has a dark side argues Fleming (2017), in that it has resulted in the 'radical responsibilization' of employment whereby responsibility for all the costs and benefits associated with being an economic actor now rest with the individual. Further, the costs of labour, which were once covered by the employer are pushed onto the employee. This situation serves to individualise the workforce and, he suggests, lays the ground for increased precarity and insecurity amongst workers. Employability is a fleeting notion, whereby we must constantly ensure that we are more employable than others, says Cremin (2010). But employment is

being fundamentally individualized, driving precarity in the labour market and the need for 'flexibility'. This flexibility results in growing economic insecurity, low productivity, diminished autonomy and worrying levels of personal debt (Fleming 2017).

In focussing on skills, HCT fails to take into account issues such as motivation (Wright and McMahan 2011), since productivity stems from human behaviour and not just the possession of skills. Not only that but the traditional conceptualisation of human capital, whereby to learn is to earn, is inappropriate (Brown et al. 2020), since it cannot completely explain the relationship between education and earnings. This inadequacy arises because of its focus on 'supply side' issues despite the impact of 'demand side' actions, including those of employers, on employment and earnings (Strober 1990). Further, it even appears that growth contracts in economies that endorse human capital theory; the resulting precarious jobs, including low skill zero hours contracts, eventually hurt industry more generally since employees can ill-afford to invest in themselves and might even come to need state subsidy (Fleming 2017).

Human capital theory and the translation of neuroscience research findings. Above, I suggest that HCT produces a strong normative position. I now argue that translated findings from neuroscience research are in many ways an artefact of HCT, in particular in the way that translations emphasise some things and diminish others. Further, I see that HCT has a bearing on the translation of findings from neuroscience research in at least three ways.

Firstly, it is possible to see how, if cognitive ability is the most important thing, interest in the brain and neurosciences has arisen for organisational practitioners. Human capital makes neuroscience research findings a legitimate topic of interest for organisational practitioners and, in turn, neuroscience research findings reinforce the central ideas of HCT. For instance, findings relating to the 'plasticity' of the brain suggest both that human capacity is not fixed and that there are ways in which we can change and modify the neural connections in our brain (Millei and Joronen 2016). These ideas underpin efforts aimed at cognitive enhancement, whether by neurofeedback, brain training or through the use of brain stimulation techniques, as well as approaches to workplace learning more generally:

> the notion of brain plasticity (the ability to change brain capability) can be applied to workplace training by utilizing various brain-based learning activities to enhance employees' cognitive and affective functions of the

> brain. Training programs boosting brain functions will improve employees' creativity and decision-making capabilities while doing daily activities through faster cognitive speed and higher accuracy. These improvements are expected to result in better work performance in organizations (Lim et al. 2019, p. 636).

In this way findings from neuroscience research are held to facilitate the idea of ourselves as capital, as assets to be developed. Secondly, one can see the intuitive appeal of new, supposed neuroscience or brain-based measures, such as cognitive capacity, as an addition to other measures of human capital. Thirdly, the specific topics from neuroscience research findings which are translated for organisational practitioners are potentially those which are primarily consistent with ideas arising from HCT. For example, beyond plasticity, translated neuroscience findings are likely to exclude or minimise those which might serve to undermine HCT, including limits to and difficulties with invoking plasticity, the role of unconscious processes and methodological or technological weaknesses such as proxy measures and the use of proxy tasks as described above.

Further, I argue that a particular, neoliberal, version of human capital sets the scene for the translation of findings from neuroscience research. In what follows I briefly describe neoliberalism and set out its relevance to this research.

2.3.2 Neoliberalism

The rise of neoliberalism is commonly seen to date from the late 1970s-1980s and in particular during the course of the Reagan and Thatcher governments, although arguably common usage of the term only took off in the early 1990s (Flew 2014). However its roots go back further since neoliberalism is commonly associated with the Mont Pelerin Society in the 1930s (Knafo et al. 2019) and key thinkers such as Hayek and Friedman. As a concept, neoliberalism is "oft-invoked but ill-defined" (Flew 2014, p. 49), and is effectively employed in many different ways to the extent that its use in scholarly papers and articles may offer few clues as to what is specifically meant by it (Boas and Gans-Morse 2009). Even so it pervades our thinking as the common-sense way many of us understand the world (Harvey 2007).

There remains some debate about what neoliberalism actually is. Steger and Roy (2010) suggest that it is helpful to conceptualise it as three intertwined manifestations, i) an ideology, ii) a mode of governance and, iii) a policy package. I concur with Wallace et al.

(2023) who argue that neoliberalism is an ideology and that "the concept of ideology implies a configuration of ideas embodying assumptions, normative beliefs, and values, representing a view of the social world and how it should be" and that "ideologies promote a group interest and its acceptance by other groups through relations of domination; power is structured into enduring relations of authoritative control by some groups over others" (Wallace et al. 2023, p. 27). I will say some more about ideology in the next chapter (see 3.1) in relation to critical theory, especially since "the exercise of power, in modern society, is increasingly achieved through ideology" (Fairclough 1989, p. 2), and particularly through the "workings of language" (Fairclough 1989, p. 2), which serves the interests of powerful groups who espouse and enact a particular ideology. As such neoliberalism is a political economic ideology which claims that human well-being can only be enhanced through individual economic freedom in society (Bal and Dóci 2018) and which is held to be maximised through the operation of markets underpinned by competition. The ideas of neoliberalism have come to dominate and are normalised in what is described as "the neoliberalization of everyday life" (Fine and Saad-Filho 2017, p. 697).

Harvey (2007, p. 2) provides a much-used definition, writing that:

> neoliberalism is in the first instance a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade.

As such it involves the extension of competitive markets into all areas of life, including the economy, politics, and society (Springer et al. 2016), inevitably impacting the workplace and individuals' experiences of it (Bal and Dóci 2018).

This is not to say that neoliberalism manifests in either an entirely homogenous way or in a way which is consistent over time. Gershon (2011) for instance highlights how neoliberalism is never implemented in a vacuum, pointing to differing experiences of it in Latin America and Eastern European countries, in the former as economic policies taken from the Global North and in the latter as an alternative to socialism. Further, even in the 'Global North' Harlow et al. (2013) suggests that Sweden, with its strong social democratic tradition might be expected to be more hostile to 'the incursion of neoliberalism' when compared to the UK where, along with the US, neoliberalism is prevalent (Flew 2014). In other words "distinctive

material cultures … [give] rise to the (variegated) neoliberalization of everyday life" (Fine and Saad-Filho 2017, p. 685). Further, different 'versions' of neoliberalism also point to its historical roots and its ability to continually 'renew itself'(Fine and Saad-Filho 2017). For example, Wallace et al. (2023) point to how a UK Labour government's 'version' of neoliberalism differs from a predecessor Conservative government, whilst Springer et al. (2016) point to a common theme amongst the contributing authors to the Handbook of Neoliberalism, that of a historical lineage to the development of neoliberalism. In sum:

> neoliberalism is distinctive but not homogenizing. Instead, it fosters diversity and differentiation underpinned by common aspects (Fine and Saad-Filho 2017, p. 687).

Advocates paint a positive picture of neoliberalism as an indispensable tool for the realization of a better world (Steger and Roy 2010), resting on the belief that unregulated markets deliver efficiency, growth, opportunity, freedom and, therefore, prosperity for all (Berglund et al. 2017). However, it is also a term that is frequently used pejoratively (Springer et al. 2016), or even mostly used by those critical of the free market phenomena to which it refers (Boas and Gans-Morse 2009). Such are its implications, that apparently "virtually no one self-identifies as a neoliberal" (Boas and Gans-Morse 2009, p. 140). A number of core principles underlie neoliberalism, including:

- The idea of all humans as 'homo economicus' who act rationally, strategically, out of self-interest and the desire to maximize utility (Bal and Dóci 2018)
- The assertion that the 'self-regulating market' is the main engine powering the individual's rational pursuit of wealth (Steger and Roy 2010), and the best way to advance human well-being (Dean 2014)
- That individuals have the freedom – and associated rights and responsibilities - to succeed or fail based on their own hard work (Dean 2014)
- And so individual initiative, property rights, unfettered capitalism, and limited government become a central focus (Caterino and Hansen 2019)
- Alongside a focus on profit, efficiency, and competition (Dean 2014)

Taken together these principles highlight how “the ideology of neoliberalism assumes people to be individualistic, self-interested, competitive, possessing unequal ability to achieve their purposes and unequal access to resources” (Wallace et al. 2023, p. 28). In other words, suggests Gershon (2011), neoliberalism has a particular conceptualisation of agency such that a ‘self’ has become a “flexible bundle of skills” which, as described above (see 2.3.1) must be actively enhanced and developed as though a business in its own right.

Bal and Dóci (2018) suggest that neoliberal ideology has had a profound impact on the workplace. It should be noted that whilst they see neoliberalism and managerialism to be equivalent terms, I hold that they are separate albeit sharing some commonalities which I will discuss below. Bal and Dóci (2018) argue firstly that neoliberal ideology has impacted the workplace through instrumentality, which refers to how people and resources are valued as a means to an end. The business case, they suggest, is one manifestation of this instrumentality whereby every venture on the part of an organisation should contribute to its competitiveness and must be properly examined and justified through a business case on that basis. Further, instrumentality is closely aligned with the principle of commodification which:

> presumes the existence of property rights over processes, things, and social relations, that a price can be put on them, and that they can be traded subject to legal contract (Harvey 2007, p. 165).

This point is consistent with HCT and indeed the advent of neoliberalism in the 1980s is also seen to have facilitated the prevalence of HCT (Brown et al. 2020). In neoliberalism, “everything becomes instrumental to generate profitability” (Bal and Dóci 2018, p. 539) including labour and people in organizations. Secondly, neoliberal ideology impacts the workplace through individualism where “each individual is held responsible and accountable for his or her own actions and well-being” (Harvey 2007, p. 65). The individual is expected to self-interestedly pursue the maximization of their own desired outcomes and must also take responsibility and be self-reliant. The individual must ensure their own well-being, education, employability, and wealth. Thirdly, neoliberal ideology impacts the workplace through competition. For instance employees must become competitive in the labour market to ensure their continuing employment in light of others also seeking employment.

Others are explicit about the negative effects attributed to neoliberalism (Springer et al. 2016). For example Caterino and Hansen (2019, p. 142) point to how, in their view:

> Neoliberalism promises prosperity and freedom but has created its opposite – a state of constant social insecurity and unfreedom. As the conditions of work in neoliberal society have become casualized and contingent, individuals have lost their stable mooring in the social world. This new "flexible" world in which people are required to constantly adapt to labour markets and changing conditions benefits few. The modern economy has taken on a "winner take all" character. The winners get big rewards, the losers little or nothing.

On top of that, a neoliberal ideology permeates the workplace to the extent that it is seen as a natural state of affairs (an 'invisible doctrine' [20]) whilst a lack of awareness of its effects, suggest Bal and Dóci (2018), may serve to legitimize a (normative) neoliberal ideology.

Neoliberalism and the translation of findings from neuroscience research. I see neoliberalism, coupled with HCT, as pervading the process of translation in the following ways. Firstly, instrumentality legitimises the use of neuroscience research findings which become tools or commodities which can drive productivity and profitability. Secondly, it legitimises ideas relating to both individualism and humans as 'homo economicus' who must maximise their value in order to increase their competitiveness and provides the imperative for self-development or even enhancement. Thirdly, the specific neuroscience content translated likely reinforces ideas of individual responsibility, competitiveness, and employability and includes such notions as cognitive agility or flexibility (Rindermann 2018), emotion regulation and managing stress (Smith et al. 2021).

2.3.3 Managerialism

A third contextual factor in the translation of findings from neuroscience research is, I argue, managerialism. As seen above, it is not unusual to see neoliberalism and managerialism being treated as the same or equivalent (Harlow et al. 2013; Bal and Dóci 2018), or to see neoliberalism treated as becoming manifest through managerialism (Knafo et al. 2019).

[20] https://www.theguardian.com/books/2016/apr/15/neoliberalism-ideology-problem-george-monbiot

More convincing to me are those who argue that whilst they are not one and the same, they do share some commonalities (Delbridge and Keenoy 2010; Klikauer 2015).

It is helpful to understand the respective backgrounds of neoliberalism and managerialism, which point to their differing affinities and guiding principles (Klikauer 2015). Whereas neoliberalism has its background in economics and is guided by notions relating to the free market, managerialism is an outgrowth of management and managerial techniques provide the guiding principles. Although the 1970s was seemingly a 'pivotal decade' in the emergence of managerialism with significant shifts in corporate power, Doran (2016) suggests that it is during the last the last 25 or so years that managerialism has risen to a position of dominance, with a broad impact on social policy and impacting both public and private sector decision making.

Knafo et al. (2019) highlight the different historical lineages of neoliberalism and managerialism, tracing contemporary managerialism back to post-war innovations in the US Defense sector, linking them to the RAND corporation and in particular its approach to systems analysis, and subsequent developments in game theory and other managerial techniques including cost benefit analysis and approaches to budgeting. For them, managerialism relies on managerial techniques and processes which together represent a distinctive approach to managerial governance. Locke and Spender (2011) chart a similar set of affinities for managerialism, albeit from the practical mechanics of Taylor's Scientific Management (Taylor 2003), and then the emergence of the M-form model of a corporation which effectively imposes a new form of instrumentality through measurement and standardisation.

In common with neoliberalism, there is no generally accepted definition of managerialism (Doran 2016), although again there is some debate as to whether it is best seen as a set of practices, a dominant discourse or an ideology. As a set of practices, managerialism advances belief in and the use of systems, procedures, and initiatives such as quality control and performance management systems, driven by managers (Flory et al. 2016). As a dominant discourse or orientation (Delbridge and Keenoy 2010), managerialism drives for increased performance, efficiency, and effectiveness (Harlow et al. 2013). As an ideology, managerialism couples its origins in management with managerial techniques and a drive to

'expand' these beyond the organisational sphere (Klikauer 2015). He offers the following definition:

> Managerialism combines management's generic tools and knowledge with ideology to establish itself systemically in organizations, public institutions, and society ..... Managerialism justifies the application of its one-dimensional managerial techniques to all areas of work, society, and capitalism on the grounds of superior ideology, expert training, and the exclusiveness of managerial knowledge necessary to run public institutions and society as corporations (Klikauer 2015, p. 1105).

The relationship between managerialism and neoliberalism is complex. Whilst it may be the case that neoliberalism has in some way helped to create the conditions for managerialism to thrive, in my view managerialism is its own distinct project or ideology:

> based on the belief that optimisation of the productivity and outcomes of all organisations can be achieved through the application of managerial expertise, theories and techniques (Doran 2016, p. 81).

Further, it might even be the case that managerialism has been enacted in support of neoliberalism (Wallace et al. 2023), instrumentally harnessed by proponents of neoliberalism to create the conditions which are supportive of it. In this way it is possible to see managerialism as:

> the organisational arm of neoliberalism. It is the mode of governance designed to realize the neoliberal project through the institutionalising of market principles in the governance of organizations (Lynch 2014, p. 1)

Managerialism and the translation of findings from neuroscience research. What a managerialist perspective levies on the translation of findings from neuroscience research is a potential focus on how the science might improve the efficiency and effectiveness of organisational systems and processes, such as performance management (Costea et al. 2008) and approaches to organisational change (Diefenbach 2007)**.** Once again this perspective likely shapes the choice of content to be translated. Further, since managerialism also encourages quantification, the idea that neuroscience research findings might bring with them increased or new ways of (objectively) measuring employee or organisational phenomena is likely to be seen as beneficial.

2.3.4 Synthesis of contextual factors

Taken together, these elements weave a normative environment in which a free-market mentality allows individual workers the freedom, and responsibility, to maximise their market value and employability. Whilst they must bear the associated costs they also stand to gain as they compete with others for opportunities, income, and status. For organisations, labour is increasingly procured from workers like any other commodity, and as such they both compete for the best talent and advance more flexible working arrangements which require less commitment on their part. As well, they increasingly quantify employee performance, agreeing targets and measuring productivity. At all levels (employee, employer, nation) there is a focus on making the most of any available resources and the instrumental application of any relevant technique or approach which might facilitate resource maximization.

2.4 Conclusion

The title of this chapter poses the question 'what is neuroscience?' and in the chapter itself I set out a more detailed account of the field of neuroscience for two reasons. Firstly this account provides necessary additional background to demonstrate the extent to which prescriptions for organisational practice depart from neuroscience findings which are purported to be their source. Secondly, the detail provided enables me, later on, to make a hard distinction between neuroscience research findings and prescriptions for practice in organisations.

So what *is* neuroscience? On the account presented in this chapter neuroscience amounts to a far from wholly coherent field of enquiry. Neuroscience is complex and wide ranging, with multiple investigative technologies and associated analytical techniques. Further, this complexity is typically underplayed and likely not fully understood by those outside of the field itself who lack neuroscience literacy. I have shown how a range of debates characterise the field of neuroscience, not least the prevalence of a reductionist programme, coupled with both commercialisation and methodological challenges. However, and despite these debates, there is growing interest in neuroscience research findings outside its own field of enquiry. This includes the organisational domain where both academic and practitioner questions can purportedly be addressed by findings from neuroscience research despite

their concern with topics which bear few (if any) parallels with topics that are the central focus of the field of neuroscience.

Finally, in the chapter I put forward a range of contextual factors and show how they produce a strong normative position which likely has some bearing on the way that findings from neuroscience research are translated into prescriptions for practice. In particular I argue that ideas arising from HCT, neoliberalism and managerialism shape thinking, and therefore translation, in a pervasive yet opaque manner, including the selection of specific neuroscience findings for translation. Neuroscience (or rather translated neuroscience research findings) might then partly be a manifestation of these contextual factors.

In conclusion, this chapter serves to highlight how an empirical investigation centred on prescriptions for practice and their translators can contribute to an understanding of the translation of neuroscience findings, and also to the wider phenomenon whereby other foreign ideas are translated into prescriptions for practice of their own. I do this by providing some background to neuroscience as a foreign idea and showing how much of that background likely becomes obscured in prescriptions for practice, and by pointing to how translators typically lack literacy in the original science but inhabit an environment with strong normative ideas. Further, elucidation of matters related to the field of neuroscience reinforces the notion of paradox, whilst the consideration of contextual factors begins to point to possible factors which steer translation, both of which are central to the aims of this research.

In the next chapter I will build on the account of critical theory put forward in Chapter 1 as a means of framing the empirical work including the way I analyse and interpret the findings. I suggest that a number of central concepts from critical theory are particularly pertinent with regards to this research, including the ways in which societal context, introduced in this chapter, serves to shape, and constrain behaviour. From this elaboration I argue that critical theory both justifies the need for this research and informs a fruitful means through which it can be approached.

Chapter 3 - A critical approach

In the previous chapter I elucidated relevant elements of neuroscience as a field of enquiry, as well as aspects of the context which have 'allowed' for its move into the organisational domain. In this chapter I will elaborate further on the account of critical theory provided in Chapter 1. My intention is to show how critical theory both justifies the need for this research and informs an empirical investigation, through key concepts which shape a framework for the research. Further, this chapter sets the scene for a critical version of translation theory which I develop in chapter four.

In what follows I firstly elaborate on Chapter 1's overview of critical theory by providing additional background plus my formulation of what it is to 'be critical' which, I suggest, justifies the need for this research. Secondly, I describe in more detail the key concepts from critical theory that are particularly relevant to this research and explain the ways in which they are applied. Thirdly, I briefly outline the way in which I have come to use critical theory as a framework for my research. This account necessarily excludes any methodological detail, (for which see Chapter 5) but merits inclusion here for two reasons; i) because critical theory is not a primarily empirical endeavour (Alvesson and Sköldberg 2000) and has a particular stance towards positivist forms of knowledge generation (see Horkheimer 1937/1976) it is important to elucidate how I use it to inform my empirical work; ii) because it forms the basis of a critical version of translation developed in the next chapter.

3.1 Critical theory

Critical Theory has come to be associated with various theorists (Morrow and Brown 1994), and crucially "does not form a unity; it does not mean the same thing to all its adherents" (Held 1980, p. 14). These theorists, for Held (1980), include the Frankfurt School and in particular the work of Horkheimer, Adorno, Marcuse and Habermas, as "the central figures of critical theory" (Held 1980, p. 15). Further, it is even the case that:

> critical theory attempts to avoid too much specificity, as there is room for disagreement among critical theorists (Kincheloe 2011, p. 287).

Whilst there may be differences between individual theorists leading to diversity within critical theory, there nevertheless exists a certain 'unity of purpose' (Held 1980); a key

concern with the examination and critique of society so as to improve the circumstances of those within it. It is this unity of purpose which underlies my research. Since 'critical' does not mean one thing (Parker and Thomas 2011) an all-encompassing definition of Critical Theory (hereafter CT) is an impossible endeavour. Therefore in what follows I will instead set out the way in which I have come to understand CT and its relevance to my research. For instance, when I use the term CT, like Alvesson and Deetz (1999), I refer to ideas and concepts primarily drawn from the aforementioned Frankfurt school and its associated writers.

CT arose at a time in history (in Europe) when the limits and implications of existing, 'rational', approaches to thinking, governing, and organising society were beginning to show (Connerton 1976). Modern rationality was seen as increasingly instrumental and CT emerged as a social theory intended to challenge and critique such rationality. As described in Chapter 1, CT is a distinct form of theory (Thompson 2017) with the intention to be a radically different form of knowledge from traditional theory and modern rationality. This contrast is especially apparent in the notion of critique itself, about which I will say more below. For instance whilst a rationalist approach holds firm to the belief in the all-encompassing power of the scientific method as a means of testing knowledge, critical theorists instead argue that critique is the essential activity of reason, and more fully incorporates a means of reflecting on knowledge (Connerton 1976).

Horkheimer (1937/1976) sets out how traditional theory, with its empirical and positivist nature, results in a limited form of knowledge and shapes a particular way of thinking, all the while presenting itself as an objective and rational form of knowledge development. Traditional theory, he argues, has become privileged and permeates society in a way that obfuscates and excludes other forms of knowledge. This dominance, suggests Alvesson and Sköldberg (2000, p. 124) leaves "modern man as manipulated, objectified, passive and conformist in relation to the machinery of society and the dominant forms of rationality". CT proposes an alternative conception of social science, one in which the nature of society as a historical totality can feature. Further, any analysis cannot take the form of an indifferent, value free contemplation of social reality but should instead engage consciously with the process of its transformation (Morrow and Brown 1994). In general, critical theorists argue

for the power of reason as a means of exploring what appears to be any rational experience of the world.

In Chapter 1 I described how critical theory has a number of distinctive features. I now elaborate on these features, informed by Kincheloe (2011) who puts forward a reconceptualised critical theory which:

> questions the assumption that societies such as the United States, Canada, Australia, New Zealand, and the nations in the European Union, for example, are unproblematically democratic and free. Over the 20th century, especially since the early 1960s, individuals in these societies have been acculturated to feel comfortable in relations of domination and subordination rather than equality and independence. (Kincheloe 2011, p. 288).

Steinberg and Kincheloe (2010) put forward 'eight features of a reconceptualised critical theory:

Firstly, that *'critical enlightenment'* is necessary to highlight who is advantaged and disadvantaged by the prevailing situation on the basis that privileged groups have an interest in maintaining the status quo.

Secondly, that individuals are subject to forces which shape the decisions which affect their lives and that *'critical emancipation'* - emancipation from domination - is a means of attempting to gain the power to control one's own life.

Thirdly, critical theory *rejects the economic determinism* posited by Marxism. Whilst there is agreement that economic factors are important, there is disagreement that they alone dictate the nature of all other aspects of human existence because there are other factors which also shape everyday life.

Fourthly*, CT critiques technical or instrumental rationality* as a form of 'hyper-reason' (Kincheloe 2011) which, for example, privileges standardization of method and efficiency at the expense of moral dimensions of human action.

Fifthly, CT is interested in *unconscious processes* which operate outside of awareness (such as desire) and the complexity of the human psyche, arguing that these are shaped by the powerful, often with destructive and oppressive outcomes.

Sixthly that Bourdieu's term *'habitus'* (Bourdieu 1984) is an important critical concept and a useful way of describing the cultural situation or conditions in which individuals are located, their 'embodied culture', which both shapes and constrains them.

Seventhly, CT is about the *nature of democracy* since so-called democratic societies are not as democratic as thought because citizens are regulated and constrained by the aforementioned habitus which restricts their capacity to think and act freely.

Eighthly, CT is about a *politics of scepticism which transitions into hope*. Through challenging and raising questions about the prevailing situation, CT holds the possibility of our being able to discern our own best interests and being empowered to live more in accordance with them.

Based on this reconceptualization, I have come to understand CT in the following way. CT highlights the problems and limitations of prevailing positivist approaches to knowledge in society, especially because of ontological assumptions concerning (historical) reality, in which societal context and structural factors shape things whilst remaining unseen. The influence of structural factors in a societal context can make a powerful contribution to reinforcing the status quo, and as a result of power asymmetries, help the powerful effectively remain powerful. Further, and as alluded to in Chapter 1, communication through language is an important means by which this reinforcement happens, again typically without our conscious awareness. Finally, critique, or 'the power of reason' is a means of raising critical awareness, en route to emancipation (Connerton 1976), which remains a possibility. In effect the above description represents my formulation of Herd's (1980) asserted 'unity of purpose'; the central goal of this formulation is to facilitate critique, raise awareness and offer a route to 'emancipation' following which, to paraphrase Alvesson and Sköldberg (2000), people today might be less manipulated, objectified, passive and conformist.

In the context of this research, I contend that a critical perspective offers two things. Firstly it reflects my scepticism with regards to the translation of findings from neuroscience research into prescriptions for practice in organisations as highlighted in Chapter 1, and raises questions about the role of unseen factors. Secondly it offers a means through which it might be possible to account for the paradox also described in Chapter 1. As such, a

critical perspective justifies both the need and a possible approach for this research. In Chapter 5 I will set out my methodological approach more fully, and in what follows I highlight the role that specific critical concepts play, but before I do that it is pertinent to say something more about the concept of ideology, since it is central to critical theory (Alvesson 1987) which effectively contends that society is based upon ideologies.

The concept of ideology has also been extensively drawn upon in management studies since the 1950's, inspired by different waves of social theory and exhibiting 'semantic pluralism' (Seeck et al. 2020). As such the conceptual boundaries of what is meant by 'ideology' are somewhat blurred, particularly in relation to other concepts such as discourse (Purvis and Hunt 1993), culture and legitimation (Seeck et al. 2020). This is one reason why, despite its central importance to CT, I do not draw directly on the concept of ideology in any significant way in this research, preferring instead to use alternate concepts which better elucidate the translation of neuroscience findings into prescriptions for practice which I describe below. However, for completeness I here set out the basis on which I arrive at this position.

The conceptualisation of ideology in social science typically divides into two basic categories (Alvesson 1987) where it is seen as either i) a set of assumptions and values about the world (a 'worldview') or ii) as consisting of false beliefs held by a 'victim' who is deluded into believing them. The first category holds ideology to be 'neutral' or descriptive, whereas the second holds it to be 'negative' or is 'pejorative'. As an example, Purvis and Hunt (1993) highlight a 'sociological' and a 'critical' conception of ideology, rooted in differing epistemologies and whereby the latter adds the contention that ideology exhibits a 'directionality'; it always works to the advantage of some and the disadvantage of others.

Of particular relevance to this research Purvis and Hunt (1993) aim to draw a distinction between the concept of ideology and that of discourse. They suggest that whilst a 'sociological' conception of ideology tends to conflate the two concepts, a critical conception facilitates a distinction between them and further can benefit from "the advances secured by discourse theory" (Purvis and Hunt 1993, p. 473). As such a sociological conception sees ideology as "the outcome or result of the specific social position of classes, groups or agents" (Purvis and Hunt 1993, p. 478) with a focus on the construction of social consciousness. In contrast a critical conception of ideology is:

> concerned to explain how the forms of consciousness generated by the lived experience of subordinate classes and social groups facilitate the reproduction of existing social relations and thus impede such classes and groups from developing forms of consciousness that reveal the nature of their subordination (Purvis and Hunt 1993, p. 478).

As a result, ideology is not reducible to discourse.

Further to this, critical theory "does not confine itself to a strictly defined concept of ideology" suggests Alvesson (1987, p. 149). This assertion is reinforced by a more recent review of the ways in which ideology has been conceptualised in management studies whereby Seeck et al. (2020) find seven different views of ideology. Of these, three might readily be understood as 'critical'; i) ideology as domination (based on Marxist assumptions), ii) ideology as legitimation (based on Weberian assumptions), iii) ideology as object of critique (based on Habermasian assumptions).

Ultimately, Alvesson (1987) argues that the approach of the Frankfurt School, which informs this research, views ideology as "an obstruction for the rational discussion of how the unrepressed social life could be organized" and goes on to suggests that "it is the task of critical theory to investigate ideology in order to increase the possibilities of individuals to emancipate themselves against the constraining forms of beliefs, induced by present social arrangements and the dominating class and groups" (Alvesson 1987, p. 147).

Building on the above, and in relation to my research and its aim to demonstrate how a critical perspective can contribute to our understanding of the translation process (as set out in chapter 1) I make the following further comments concerning ideology:

Firstly, that this thesis shares the main assumptions of the Frankfurt School in relation to ideology such that they are powerful, have a function (Seeck et al. 2020), are not neutral but are beneficial to some and not others (Purvis and Hunt 1993) and that it is difficult, in critical research, to avoid overlap between the different senses in which ideology is held (Alvesson 1987). Secondly that CT itself has strong ideological content, for instance in the way it is sees ideology as effectively a shackle to be broken by CT (Thompson 2017) in pursuit of emancipation, as well as the position it takes on positivism as described below (see 3.2.3). Thirdly, that in critical research it is difficult to avoid overlap between the different positions or senses in which ideology is held (Alvesson 1987). Fourthly, that ideology and discourse

are distinct and that, to paraphrase Fairclough (2003), whilst ideology does not reduce to discourse, an "analysis of texts (including perhaps especially *assumptions* in texts) is an important aspect of ideological analysis and critique, provided it is framed within a broader social analysis of events and social practices" (Fairclough 2003, p. 218). This is an approach I adhere to and which is described in more detail in chapter 5.

Taken together, in this thesis rather than drawing explicitly upon the concept of ideology instead, and as described below, I talk of societal context, deep structures, and structural factors, as well as structural or systemic power and terminology relating to discourse and discursive approaches. In denaturalising (or critiquing) the translation of neuroscience research findings I investigate with the intention to include ideological aspects (such as those present in the context in which translation takes place, as described in chapter 2) in what is uncovered with the potential to highlight emancipatory possibilities.

3.2 Critical concepts

The focus of this section is explicitly on those critical concepts or notions included in the above discussion which have a particular part to play in this research and so warrant a more detailed explication. Paradis et al. (2020) frame CT as an umbrella term and the concepts delineated below are effectively under this 'umbrella' as follows: i) societal context, ii) power, iii) positivism, iv) language, v) critique, and vi) emancipation.

3.2.1 Societal context

Various labels are given to societal context. Horkheimer (1937/1976, p. 213) for instance, refers to 'society' or 'society as a whole', whilst Paradis et al. (2020) describe 'social structure' and 'structural factors', and Connerton (1976) 'historical factors'. As described above Bourdieu (1975) uses the term 'habitus' as a useful way of encompassing and characterising societal conditions, social context, or environment. This is an important concept for critical theorists whereby social reality has effectively arisen historically, and over time has been shaped by power asymmetries and the interests of privileged groups (Alvesson and Sköldberg 2000), even though it might appear to us as reality, As these structural inequalities coalesce, they underlie what we take to be reality and effectively regulate the ways we think and behave, albeit often unconsciously (Paradis et al. 2020). In

Chapter 1 I introduced the term 'structural factors' as a key concept in this research and I will now further elaborate on it.

As previously described, CT takes the position that most of us are subject to unseen 'forces' which "masquerade as reality" (Connerton 1976, p. 20) and shape our lives. It is this idea which underlies what I conceptualise as 'structural factors', and which are described by scholars in different ways but which share some central notions. Firstly is the idea that structural factors are hidden (Deetz 2001), or "not visible to the naked eye" (Adler et al. 2007, p. 152) since they are "deep structures" (Alvesson and Sköldberg 2000, p. 136) and wherein "the deep structures which constrain human behavior are impossible to observe easily" (Duberley and Johnson 2009, p. 349).

Secondly, that they take the form of 'forces' (Steinberg and Kincheloe 2010), 'structures' (Duberley and Johnson 2009), 'structural conditions' or 'mechanisms' (both Jermier 1998). Thirdly, that they have some sort of effect(s) since they exert themselves and are "forces that insidiously shape who we are" (Steinberg and Kincheloe 2010, p. 143) or "contemporary mechanisms of control" (Jermier 1998, p. 235) or "prevailing structures of domination" (Adler et al. 2007, p. 4).

Such forces or structures include "the political, social, cultural, historical, and economic forces that influence individual behavior and thus create predictable patterns based on someone's social location" (p. 843; Paradis et al. 2020). In this research I use the term 'structural factors' as an umbrella term of my own to encapsulate the above. I use it as a way to refer to the unseen factors which shape and constrain the agency of actors (in this case, translators) and through which, as I will further elucidate below, exert considerable (albeit not total) influence over the way in which power can be both established and sustained. Further, CT is interested in revealing these structural factors, particularly through critique, which I will also say more about below.

I alluded to some structural factors in the previous chapter, arguing that the translation of findings from neuroscience research takes place within a broad context in which certain ideas and interests are privileged and which likely influence prescriptions for practice.

3.2.2 Power

The second critical concept, power (and interests) is at the heart of a critical approach. In Chapter 2 I described how CT sees power as embedded in society. Because power is a much used term I will build on that description to provide what is intended to be a clear conceptualisation of power in the context of this research. Scholars have suggested that power is still an 'essentially contested concept' (Fleming and Spicer 2014), but beyond contention is the idea that power is inescapable. Power is a fundamental part of (organisational) life, but is not easily identifiable (unless direct force or violence is involved), and so its presence and effects must be inferred (Fleming and Spicer 2014). When it comes to conceptualising power a number of distinctions are frequently made as I describe below. Prior to that, and common to all conceptions, is the idea of power as an effect which shapes "the capacities of actors to determine their circumstances" and which is "produced in and through social relations" (Barnett and Duvall 2005, p. 39).

Further to this broad conceptualisation, one fundamental distinction with regards to power is between those who see it as an attribute of the individual (Lukes 2004) and those who argue that power is constrained or facilitated by aforementioned structural factors (see Hayward and Lukes 2008). For example, French and Raven (1959/2014) suggest that power arises as a result of the specific resources of individual actors and in particular:

- Coercive power – forcing someone to do something against their will
- Reward power – giving benefits to someone for doing something
- Legitimate power – derived from a position or set of formal relationships
- Referent power – derived from an individual's perceived worth, value, or attractiveness
- Expert power – derived from an individual's skill, competence, and experience
- Informational power – derived from an ability to control the flow of information

Weber (1978) too tends to an understanding of power as something that individuals hold. For him it is "the probability that one actor within a social relationship will be in a position to carry out his [sic] will despite resistance" (Weber 1978, p. 53). Lukes (2004), in his agent-centred conceptualisation of power constructs a 'three-dimensional' account of power whereby it derives from, i) resources (hire, fire, reward, punish, expertise), ii) process

(agenda setting, include, exclude) and iii) meaning (ways of representing the world, language, rituals, symbols). An agent-centred conceptualisation, he argues, enables 'the powerful' to be held responsible for the limits they impose, wittingly or not, on the freedom of other actors.

However critics, such as Clarissa Hayward (Hayward and Lukes 2008), argue that conceptualising power in an agent centric way effectively draws attention away from structural factors. She argues that when agents act, they act within limits that are set in part by the actions of other agents, and in contexts that are structured by rules, laws, and norms. These limit what agents can do and what they can be. Whilst structure does not completely determine action, it does shape it by rendering some forms of action, in some contexts, costly or difficult, while rewarding or encouraging others.

Hardy (1996) goes some way to incorporating both perspectives by adding a fourth dimension to Lukes' three-dimensional model, whereby 'the system' is held to be beneath the surface and unknowingly shape what we see, notice, and think:

> …….It lies in the unconscious acceptance of the values, traditions, cultures and structures of a given institution and it captures all organisational members in its web (Hardy 1996, p. S8).

Interests. Instead of conceiving of power in terms of one person or group exercising control over another, Deetz and Mumby (1990, p. 32) see it as a process through which:

> competing interests exist interdependently, simultaneously vying for a privileged status in the whole constellation of interests that characterize institutional life.

A way of conceptualising 'interests' is also relevant to this research, particularly given the critical perspective which sees 'interests' as shapers of social reality as described above. Interests are defined by the Cambridge Dictionary[21] as 'something that brings advantages to or affects someone or something'. Further a vested interest is an interest in influencing something in order to benefit from it. Although this definition might imply that interests are consciously held and deliberately pursued, Deetz and Mumby (1990) suggest that this is not necessarily the case because:

[21] https://dictionary.cambridge.org/dictionary/english/interest?q=interests [accessed 22 August 2023]

> structurally, interests relate to the individual like grammar and culture - they are often invisible, yet they form the bases for particular forms of expression and action. Further, like grammar and culture, the individual's attempt to describe them may be quite in error, even though they are used with great efficiency. As individuals rarely know all the rules of the grammar they use, they often hardly "know" all of their interests (Deetz and Mumby 1990, p. 30).

Although it is real people who embody interests, they are not developed from the psyche of individuals but instead from historically derived structural positions and situations (Deetz and Mumby 1990). As such, interests are not solely possessed by individuals, or in relationship between them, but also as a result of structural qualities whereby:

> an interest is not a property of someone, but a structure that anyone could take on as his or her own, to his or her benefit or detriment. Of course, a particular position cannot be taken on by just anyone, since our historical context gives a particular position to particular people and not to others (Deetz and Mumby 1990, p. 30)

This perspective on interests is in accord with critical theory which, say Haugaard and Cooke (2010), sets out to critique normative conceptions of power. These normative conceptions tend to be agent-centred and take singular episodes of power as paradigmatic, which points to a second enduring distinction between conceptualisations of power; those that see it as episodic (i.e., directly exercised) and those which see it as systemic (i.e., from enduring societal or institutional structures) (Fleming and Spicer 2014). Agent-centred views of power most commonly tend toward an episodic view, whereas structural perspectives would tend toward the systemic.

CT bases its conceptions of power and domination on sociological insights into complex structural and systemic forces. However, and despite an intention to critique normative conceptions of power “there remains a tendency to revert to an agent-centred, episodic view of power” according to Haugaard and Cooke (2010, p. 2). They point to instances where this is claimed to be the case, such as Honneth’s account of recognition. I draw attention to this tendency only to highlight the normativity of an agent-centred account of power, even amongst those who explicitly reject such a perspective. In Table 4 I summarise two ways that power is conceptualised, as described above. This distinction between two conceptualisations of power becomes particularly apposite in discussions about differing approaches to translation in the next chapter.

Table 4. Conceptualising power

Conceptualisation of power	**Key proponents**	**Central concepts**	**Overlooks**
Agent centred Episodic	Lukes (2004) French and Raven (1959/2014) Weber (1978)	The individual/agent as a source of power, through resources etc.	Structural power
Structurally defined Systemic Historical	Hayward and Lukes (2008) Deetz and Mumby (1990)	Structures or institutions as sources of power (Competing) interests	Individual agency and consequent responsibility

For completeness I highlight one final distinction with regards to conceptualisations of power. This distinction relates to whether power is primarily a negative phenomenon or might also have a positive side to it. For example, Fleming and Spicer (2014) suggest that power generally has negative connotations but argue that it can be positive in some situations. This is a view shared by Hardy (1996), in her criticism of Lukes' implied position that power is always negative. In contrast, power can provide the energy and impetus to, for instance, bring about organisational change where seemingly "it can achieve great things" (Clegg et al. 2006, p. 3).

Taken together, and consistent with my critical stance, I tend toward a structural conceptualisation of power, which effectively means that rather than assuming that individual ' translators' of neuroscience research findings have absolute agency, I contend that structural power will exert considerable influence over their efforts through the aforementioned structural factors. As such I hold that power is embedded, unseen, in structure such that structural factors in a societal context serve to shape, and constrain (although not completely determine) the translation efforts of individual translators. In other words I contend that structural factors likely delimit the agency of individual

translators – and I have already alluded to the influence of dominant ideas arising from, for instance neoliberalism and HCT – but that they are not wholly directive which means that there remains scope for further agency, as I will describe in relation to emancipation below.

3.2.3 (Anti) positivism

In Chapter 1 I described a third critical concept; how, according to CT, positivist approaches of natural science have come to dominate even the social sciences. Horkheimer (1937/1976, p. 208) puts it in the following way:

> the sciences of man and society have attempted to follow the lead of the natural sciences with their great successes.

In other words, the positivist scientific method of the natural sciences has come to be seen as a model that the social sciences might emulate, despite the limitations that this approach imposes on knowledge. Further, positivist approaches are seen as high status, as the "received view of science" (Guba and Lincoln 1994, p. 106) and as providing a formidable tool for the prediction and control of the natural environment. CT challenges this perspective.

Habermas (1972/2007), for instance, argues that this 'traditional ontology' is based on a set of core and interrelated assumptions, namely the possibility of objective knowledge devoid of any interests, and the depiction of reality as it is, independent of the knowing subject, as alluded to in Chapter 2. It also holds to the notion of immutable laws and an ordered world whereby such laws have the capacity to offer a universal explanation. In arguing that positivism cannot escape the effects of fundamental human interests and as such cannot be pure or value-free, Habermas rejects an "illusion of objectivism" (1972/2007, p. 69). Horkheimer (1937/1976) similarly questions the possibility of objective knowledge when he argues that the activities of scientific knowledge are not set apart from society. He suggests that:

> the facts which our senses present to us are socially preformed in two ways; through the historical character of the object perceived and through the historical character of the perceiving organ … both are not simply natural; they are shaped by human activity and yet the individual perceives himself as receptive and passive in the act of perception (Horkheimer 1937/1976, p. 213).

Instead, there are three types of knowledge, suggests Habermas (1972/2007); i) knowledge in the natural sciences, ii) knowledge in the social sciences, and iii) emancipatory knowledge. CT's position is that the first of these knowledge types has come to dominate such that, if knowledge is to have any status, it must comply with the rubrics of natural science. This dominance has led to a narrow, instrumental view of (technical) rationality in which everything becomes subject to calculation and prediction in service of efforts to control the natural environment. Horkheimer (1937/1976) and Von Hayek (1975) both argue that the status afforded to positivist forms of knowledge and theory have given rise to a society which privileges research that claims to be able to accurately measure any dimension of human behaviour.

Positivist models have also come to the ascendancy in management science (Clegg 2014). For instance, Ghoshal (2005), as mentioned in Chapter 1, laments the adoption of a scientific model in business research, arguing that:

> as philosophy of science makes clear, it is an error to pretend that the methods of the physical science can be indiscriminately applied to business studies because such a pretension ignores some fundamental differences that exist between the different academic disciplines (Ghoshal 2005, p. 77).

As alluded to earlier, when applied to the social domain, a natural science approach cannot avoid context stripping, excluding meaning and purpose, overlooking the (in)appropriate application of general data to specific instances, and curtailing rich exploration by using a priori hypotheses, (Guba and Lincoln 1994). In addition, such an approach works from reductive assumptions about human behaviour (Habermas 1972/2007), as highlighted in Chapter 2.

Scientism. I contend that the dominance of positivism and the privileged status of the natural sciences spawns so-called scientism, and that the translation of findings from neuroscience research into prescriptions for practice in organisations bears the hallmarks of scientism. In other words, although the focal topic of my research is translation and not particular neuroscience findings per se, I nevertheless contend that the explicit 'scientific-ness' of findings from neuroscience research has some bearing on its translation.

‘Scientism’ is held to be an inappropriately deferential attitude toward science (Haack 2012). Whereas (natural) science is a method, scientism is best understood as a philosophy or set of beliefs about science. There are number of aspects to scientism. The Oxford English Dictionary defines it in the following way:

> The belief that only knowledge obtained from scientific research is valid, and that notions or beliefs deriving from other sources, such as religion, should be discounted; extreme or excessive faith in science or scientists; the view that the methodology used in the natural and physical sciences can be applied to other disciplines, such as philosophy and the social sciences (Oxford English Dictionary 2023)

Susan Haack (2012) puts forward six signs which, she argues, indicate an inappropriate deference toward science. First, the honorific use of ‘science’ and related words. Second, the ornamental use of scientific terminology. Third, the insistence on distinguishing between ‘true’ and pseudoscience. Fourth, a preoccupation with the ‘scientific method’. Fifth, the inappropriate use of science to answer questions outside its scope. Finally, the assumed primacy of science which denies the legitimacy of other, non-scientific, forms of inquiry.

CT is concerned with science as an ideology, which I defined in Chapter 2 in relation to neoliberalism as “a general system of basic ideas” (Van Dijk 2011, p. 380) and which here points to how:

> we no longer understand science as one form of possible knowledge, but rather identify knowledge with science (Held 1980, p. 4).

This concern with science as an ideology both highlights issues with a positivist methodology and raises questions about the extent to which scientism plays a part in the translation of findings from neuroscience research. Further, Alvesson and Willmott (1992) remind us of another critical notion; “that science …. can be used to legitimize new dogmas” (p. 436). In recalling Taylorism and the way in which his principles were described as scientific Alvesson and Willmott (1992) point to the risk of an uncritical acceptance of the ‘scientific’ as a means of validation.

Taken together, I suggest that scientism’s enthusiastic admiration for science is a feature of prescriptions for practice, whereby a privileged status is afforded to neuroscience findings by/for organisational practitioners. In so doing, neuroscience research findings are

effectively legitimised as an appropriate resource, despite them only being able to denote a limited and false sort of knowledge. For instance, in his Nobel lecture, Von Hayek (1975), declares that a consequence of the adoption of scientistic approaches by economics and other disciplines, is the "pretence of exact knowledge that is likely to be false" (Von Hayek 1975, p. 437). He argues that the social sciences deal with complex phenomena, and their use of scientistic methods tends to focus attention on what is measurable to the exclusion of the less quantifiable. I submit that scientism is a structural feature in the societal context of translated neuroscience research and is embodied in the approach of translators, perhaps unknowingly or at least lacking full cognizance of its implications and which this research will endeavour to uncover. As an example, in a recent Forbes article[22] invoking the 'neuroscience of focus' as a means of working less to get more done (previously cited in Chapter 1), the author points to "volume in the cingulate cortex", to "hyperactivity in the anterior cingulate cortex", and to a "delicious brain cocktail" of neurotransmitters including serotonin, dopamine and oxytocin. I contend that this is an example of reification as evidenced by the honorific or ornamental use of neuroscience terms per se, and by the way in which their use implies robust and valid evidence for, in this instance, the ability to effectively focus.

3.2.4 Language

The fourth critical concept relates to language. As described in Chapter 1, language is held to actively 'do something'; to regulate, to reinforce, and to express versions of reality which conform to dominant worldviews. More than that, language always reflects power structures, and so cannot be neutral (Paradis et al. 2020). The concept of discourse, about which I will say more below as well as in Chapter 5, is based on this view of language as constructive. Since language both shapes and is shaped by the societal context in which it appears, communication is both socially determined and cumulatively leads to social effects (Fairclough 1989). In other words, reality is mediated by language (Paradis et al. 2020).

Critical approaches point to the pivotal role of language in maintaining power relations (Van Dijk 2013), whereby certain discourses (usually those of the powerful) are systematically privileged (Alvesson and Deetz 2000). Importantly, says Fairclough (1989), there is a

[22] https://www.forbes.com/sites/christinecomaford/2023/07/08/the-neuroscience-of-focus-work-less-and-get-more-done/ [accessed 28 August 2023]

"widespread underestimation of the significance of language in the production, maintenance, and change of social relations of power" (p. 1). As a result critical language studies aims to show the hidden connections between language, power, and ideology about which we are typically unaware (Fairclough 1989).

My understanding of discourse comes from the work of critical discourse analysts, and particularly Fairclough (1989; Fairclough and Wodak 1997; Fairclough 2013). As previously mentioned he both asserts a critical approach and offers a useful framework through which I can account for the dialectical relationship between societal context as macro level structures and micro level events such as prescriptions for practice. More specifically, according to Fairclough (1989) macro structures both create the conditions for, and are a product of, micro events; every micro event contributes toward changing or reproducing the macro structure. In Chapter 5 I describe how, in this research, I take a discursive approach, exploring and explicating language in use by translators and in examples of prescriptions for practice with the intention to uncover connections between them as micro events and the macro level structures around them. Also in Chapter 5 I set out a simple conceptualisation of discourse as a complex of three elements; i) texts as micro events, ii) the conditions of their production and, iii) their societal context. Again this conceptualisation is based on Fairclough (1989) whereby discourse is the critical link between micro level events and macro level structural factors. In Chapter 8 I detail the dominant discourses arising from my empirical investigation.

3.2.5 Critique

The fifth critical concept is critique which, as described above, is held to be a particular form of knowledge and is in opposition to the empirical and positivist models of knowledge of 'traditional theory'. Critique relies on the power of reason as a means of reflecting critically on the reality of the social world (Alvesson and Willmott 1992). It is distinct from the more common everyday term of 'criticism' and defined in the following ways:

> A detailed analysis and assessment (Concise Oxford English Dictionary)
>
> A more formal word for a carefully expressed judgment, opinion, or evaluation of both the good and bad qualities of something (Mirriam-Webster)

In CT critique has a particular meaning, as "oppositional thinking, as an activity of unveiling or debunking" (Connerton 1976, p. 16). But even this meaning is drawn from two different versions of critique (Connerton 1976). One version emphasizes the limits of our faculty of perception, suggesting that what appears as reality is actually constituted by us according to certain a priori categories or rules. In a second version of critique we succumb to a (humanly produced) system of constraints from which reflexivity offers the possibility of liberation (Connerton 1976).

For Morrow and Brown (1994) a fundamental connotation of critique is methodological and from this, I understand critique to be concerned with making visible "the interconnectedness of things" (Horkheimer 1972, p. 11) by which I mean showing the linkages of a particular phenomenon. A critique necessarily follows a detailed analysis of this phenomenon and builds upon insight by explicitly relating to the societal conditions which give rise to the privileged ways in which the world is understood (Alvesson and Deetz 2000).

I hold that critique exemplifies what I take to be the 'suspicious stance' of critical theory. This suspicion essentially means eschewing the face value of a phenomena and instead questioning, denaturalising (as outlined in Chapter 1 as well as below), and challenging its existing social reality. For instance, Morrow and Brown (1994) assert that:

> critical imagination is required to avoid identifying where we live here and now as somehow cast in stone by natural laws (Morrow and Brown 1994, p. 11).

In other words, critique uncovers or 'unmasks' the societal (historical) conditions which underlie what appears to us to be rational knowledge. As such a critical theory of society aims to provide access to the 'essence' of things and not simply to their outward appearance, and is motivated by injustice, inequalities, and asymmetries in power such that:

> critical awareness can make it more likely that systems, goals, procedures, reforms, control and ideas are not take for granted, but are reflected upon and may thus work more 'positively' (Alvesson and Sköldberg 2000, p. 127).

In this research critique offers the means by which we might go beyond or beneath any rational explanations for the translation of findings from neuroscience research into prescriptions for practice and instead elucidate alternate causes and motives. I am in part

informed by Clegg (2013) when he argues that, in the texts of organisational theory, "the actual writing merely re-presents and preserves the deeper possibility of how it is that they are at all possible" (Clegg 2013, p. 21). In other words the texts manifest a shared interest with the world they purport to depict. As alluded to above, I contend that the same is likely true with translations of findings from neuroscience research into prescriptions for practice. Critique offers the possibility of revealing and challenging what is 'beneath' translation. In Chapter 5 I describe my approach to critique, albeit under the guise of denaturalisation, about which I will now say more.

In management and organisation studies (MOS), critical management studies (CMS) assert three central concerns which distinguish critical from non-critical approaches: i) performativity, ii) reflexivity and iii) denaturalisation (Fournier and Grey 2000). Taken in turn, of note is that Fournier & Grey's (2000) conceptualisation of performativity differs from that of Fairclough (1989) in that it derives from a different foundational perspective (Gond et al. 2016). Whereas Fairclough (1989) 'borrows' from Austin (1975) and is concerned with the performative effects of language, Fournier and Grey (2000), in common with most CMS publications, borrow from Lyotard (1984) (Gond et al. 2016) who conceptualises performativity as a 'search for efficiency' whereby efficiency and productivity are central to conventional (organisational) interests. In this research I effectively mobilise performativity in both these senses.

In this chapter I draw on Fournier and Grey (2000) primarily as a way of distinguishing between critical and non-critical work in MOS, since I have set out my intention to be critical. In mobilising performativity in a Lyotardian sense Fournier and Grey (2000) point to how, in non-critical scholarly work, there is an imperative for knowledge to focus on performance improvement and argue that critical work should be 'anti-performative' in the sense that it should eschew the primary importance of performativity in organisational life.

I should also acknowledge debates concerning performativity in MOS. For instance, not only can the conceptualisation of performativity draw on different foundational perspectives as described above (Gond et al. 2016), but even within CMS there are different viewpoints. For instance Spicer et al. (2009) dispute the appropriateness of Fournier and Grey's (2000) anti-performative stance and argue instead that CMS should be a (critical) performative project – such that it should encourage what they describe as 'progressive forms of management'. In

highlighting my intention to be critical, this research strives to be anti-performative in the sense that it will not comment on, for instance, ways in which the translation of findings neuroscience might be enhanced in service of productivity improvements.

Denaturalisation is highlighted as a form of critique involved in establishing the presupposition of approaches (Morrow and Brown 1994). That said, denaturalisation is not something that is exclusive to CMS (Delbridge and Keenoy 2010), rather it seems to encompass the notion of critique whereby proponents "inquire into taken for granted beliefs", and "challenge" or "reveal" (Delbridge and Keenoy 2010, p. 803).

In this research I describe my approach as denaturalisation rather than 'critique', primarily to maintain a sense of consistency with critical discourse analysis as my chosen empirical approach and whereby Fairclough (1985) suggests that:

> denaturalization involves showing how social structures determine properties of discourse, and how discourse in turn determines social structures (Fairclough 1985, p. 739).

I make one final observation regarding critique and which associates it with researcher self-reflexivity (Morrow and Brown 1994). Given our imperfect ability to perceive, and our tendency to 'succumb' (Connerton 1976), by which I mean our likely acceptance of dominant, surface level representations of reality, reflexivity is in a sense, a critique of ourselves and an intention to become aware of what it is that shapes and constrains us. Taken together, without critique it is likely that a restricted view prevails. It is also worth saying that although CT has been accused of 'negativism', critique is intended to bring something positive, to shine a light and create the possibility for things to be different (Alvesson and Willmott 1992).

3.2.6 Emancipation

The final critical concept in this section, and a central aim of CT, is that of emancipation. As shown in discussions about power above, CT arguably de-centres the human subject as the centre or origin of social phenomena. Instead it sees the individual as uncritical and passive, conforming to wider societal forces and with a narrow agency of his or her own (Alvesson and Sköldberg 2000). However CT also posits hope, as described above. Of particular relevance to emancipation is the notion that:

> human beings have a unique capacity to change their behavior in response to knowledge about it (Morrow and Brown 1994, p. 9).

The human potential to reflect, to question and to resist is at the heart of emancipation. Further, emancipation is not a gift that can be bestowed (Alvesson and Willmott 1992) but instead is a project in which one must actively engage. As set out above, for Habermas (1972/2007), emancipation is a particular type of knowledge interest. It is concerned with identifying both structural and unconscious sources of phenomena, not simply for insight but as part of a process which might emancipate us from the very forces which push us into certain forms of behaviour. In other words:

> emancipation describes the process through which individuals and groups become freed from repressive social and ideological conditions, in particular those that place socially unnecessary restrictions upon the development and articulation of human consciousness (Alvesson and Willmott 1992, p. 432).

The notion of emancipation, and particularly critical theory's utopian vision of it, has been much debated and criticised, including in management studies. For example Alvesson and Willmott (1992) highlight post-structural critiques of emancipation, as well as practitioner distortion of it, and propose a modified version. They reconceptualise emancipation as 'microemancipation' with:

> an emphasis on partial, temporary movements that break away from diverse forms of oppression, rather than successive moves toward a predetermined state of liberation (Alvesson and Willmott 1992, p. 447).

This research is necessarily less ambitious in terms of emancipation than critical theory per se. Instead I emphasise 'microemancipation' as a less grandiose project in which my role as a researcher is "to make visible to others the critical perspectives and possibilities for alternatives" (Alvesson and Willmott 1992, p. 112) with regards to the translation of findings from neuroscience research into prescription for practice in organisations.

3.3 A framework for critical research

In the previous section I separately describe a number of critical concepts which I maintain are particularly pertinent to this research and from which it is possible to begin to see the overlaps and connections between them. In what follows I set out the way in which concepts from CT are drawn together in a framework for critical research. Myers and Klein

(2011) argue that whilst the criteria for conducting positivist and interpretive research are widely discussed, the same is not true for critical research. Further, as already seen, CT tends toward a theoretical or even metatheoretical approach rather than an empirical one (Alvesson and Sköldberg 2000), perhaps as a result of its disenchantment with positivist approaches, whereby:

> the insights of critical theory do not lend themselves easily to use in empirical undertakings (Alvesson and Sköldberg 2000, p. 111).

I pointed to the work of Myers and Klein (2011) in Chapter 1, particularly their proposed set of principles for critical research. In essence these principles incorporate the key tenets of CT as laid out above and inform the critical perspective on translation which I develop in the next chapter. In brief, and with the intention to avoid repetition, Myers and Klein (2011) suggest that critical research comprises three key elements. Firstly, the generation of insight through interpretive research. Secondly, the incorporation of critique in which a researcher draws a priori on critical ideas, takes a value position, and uncovers through denaturalisation. Thirdly, transformation through which a researcher facilitates emancipation. These principles provide a useful framework for my own critical research and conceptualisation of a critical perspective on translation.

3.4 Conclusion

In this chapter I elaborate on critical theory. I ultimately conceptualise it as, i) concerned with a critique of the dominance of positivism in society, ii) taking a structural view of power in society, where what I describe as structural factors facilitate and constrain our lives, but because their effects have been normalised over time they remain unseen, iii) highlighting the important role played by language in reflecting and sustaining structural factors and the dominant interests underlying them, iv) proposing a fundamental role for critique, or denaturalisation, to challenge and uncover said structural factors and, v) offering a means of emancipation. Conceptualised in this way, CT offers both the justification for and a means of framing an empirical investigation into the translation of findings from neuroscience research into prescriptions for practice. The perspectives arising from the central concepts of CT justify the research and become components of a framework for critical research which is described in brief.

In the next chapter I further explore the notion of translation by setting out a broad view of translation studies and translation in the scientific field to distinguish translation from related fields and concepts. I situate my research within the field of translation theory (TT) in MOS, and review its different perspectives before arguing that it is incomplete because it lacks a critical perspective. I go on to develop a critical perspective on translation as a rejoinder to this shortcoming.

Chapter 4 - Translation

In the previous chapter I elaborated on critical theory by setting out some key concepts and their particular relevance to this research. In this chapter attention turns to the notion of translation in light of the research problem and aims of this research as set out in Chapter 1. I will further elucidate what I mean by translation, including vis a vis related concepts such as science communication and science popularisation, which enables me to argue that the translation of findings from neuroscience research should not be seen as a neutral or a passive process. I incorporate this understanding into an analysis of translation theory (TT) in MOS and argue that it currently misses an approach which is critically oriented and embodies the concepts set out in Chapter 3. I go on to develop such a critical approach both as a means for exploring the translation of findings from neuroscience research into prescriptions for practice in organisations, and as a contribution to TT.

In what follows I will firstly examine translation in broad terms. This includes consideration of the field of translation studies as well as translation in a scientific context, which the particular focus of this research makes relevant. I describe how the notion of translation is a useful way to frame this research, and a potential means of explaining the paradox at its centre whereby prescriptions for practice in organisations are so altered from neuroscience research findings to render them not just different in degree but different in kind.

Secondly, I examine translation in management studies by way of translation theory. I describe the prevalent approaches to translation and consider how TT helps us to understand how findings from neuroscience research have been translated into prescriptions for practice. From this examination emerges a shortcoming in extant approaches to translation which, I suggest, fail to adequately address issues of power with an awareness of context at a societal level. This leads me to argue that we need to look beyond these extant approaches. In particular I suggest that the development of a critical approach to translation, incorporating concepts described in Chapter 3, offers the possibility of accounting for the paradox whereby prescriptions are so altered from neuroscience research findings to render them not just different in degree but different in kind. Thus far, whilst some level of critique has been applied to neuroscience itself, as described in Chapter

2, the process by which it is brought into prescriptions has not been subject to critique or denaturalisation.

Thirdly, I develop the aforementioned critical perspective on translation, and in so doing assert a claim for a scholarly contribution to translation theory. I do this by drawing together aspects from critical theory and research, as well as ideas from translation studies and TT. For instance a critical perspective on translation pays explicit attention to the role of power and interests in translation and endeavours to account for how its broader societal context might shape it. In relation to findings from neuroscience research, and their translation into prescriptions for practice in organisations, I argue that the development of a critical perspective on translation facilitates an exploration which can reveal how translation serves to reflect and reinforce dominant societal ideas and interests in ways which might not be immediately obvious. In other words whilst at the surface level they purport to report findings from neuroscience research, at a deeper level prescriptions for practice effectively become a 'Trojan Horse' (Karjalainen et al. 2019) for dominant societal ideas, as described in Chapter 1.

4.1 Translation

Colloquially Translation is most often used to refer to the conversion of something from one language to another, as detailed in Chapter 1. It has its roots in the Latin *translat-*, which means 'carry across'. The Oxford English Dictionary defines translation as "to move from one person, place or condition to another" (Oxford English Dictionary 2023), and Mirriam-Webster defines it as:

> an act, process, or instance of translating such as a: a rendering from one language into another *also*: the product of such a rendering
> b: a change to a different substance, form, or appearance[23].

4.1.1 Translation studies

The study of translation is centuries old, going back to "scholars like Cicero, Horace and Jerome" (Baker and Pérez-González 2011, p. 40). The academic study of translation has its origins in the mid-twentieth century, with Translation Studies emerging as a field in the

[23] https://www.merriam-webster.com/dictionary/translation [accessed 25 August 2023]

early 1970s (Holmes 2000). Translation studies is concerned with the systematic study of (foreign language) translation and interpreting and:

> revolved around elaborating taxonomies of different types of equivalence that may hold between a source text and its translation (Baker and Pérez-González 2011, p. 40).

Translation studies has become a field in its own right and not just a sub-field of linguistics, cultural studies, or a minor branch of comparative literary studies (Snell-Hornby 2006; Baker and Pérez-González 2011). It is "a vastly complex field with many far-reaching ramifications" (Bassnett 2013, p. 12). Translation is often described as an 'interdiscipline' since it draws on disciplines including linguistics, literary criticism, cultural studies, gender studies, computer science, history, philosophy, rhetoric, and semiotics (Venuti 2012).

Hermans (2013) puts forward the idea of 'norms' and suggests that even though translation serves a communicative purpose, we must go beyond language to fully understand it. By norms he references both the 'regularity in behavior' and any mechanisms which might account for that regularity when it comes to translation. Norms, he argues, might serve to contextualise translation, whereby cultural and not linguistic factors become relevant in the understanding of it. In short, Hermans (2013, p. 5) contends that:

> Viewed in a broader cultural and historical context, translation norms in their totality can be said to inform the translation poetics of particular periods and cultures.

Albeit norms must be inferred since they are not directly observable. As a term 'translation' has become more widespread, moving beyond examining the transfer from one language to another and denoting the shifting of ideas, knowledge, or practices (Bassnett 2013)**.** Social scientist Richard Freeman (2009) asks 'what is translation?' and wonders how, if at all, it differs from 'transfer'. He argues that users of the term generally see them as being the same. Freeman (2009) also points to common invocations of translation as being inferior to the original, as evidenced by everyday phrases such as 'lost in translation' (Boxenbaum 2006; Toennesen et al. 2006; Johnson and Littlefield 2011). Further he suggests that translation is anything but simple and mechanical, but is instead beset by "uncertainty and contingency" (Freeman 2009, p. 4) which makes it at best 'an image' of the original which is never 'innocent'. Freeman (2009) argues that this lack of innocence is particularly because

translators are the principal actors in the process which means that the original text is far from being the only 'source' of translation. Instead:

> translation takes place within discourses in which some kinds of association or translation are legitimated and authorized just as others are excluded or denied (Freeman 2009, p. 5).

As a result translation, and the transformation it entails, always has political implications since it always serves a purpose of some sort or other. Translators are therefore engaged not merely in a technical but in a political process.

Further insights regarding translation can be sought from a five year interdisciplinary project which questions *"How well do facts travel?"* (Howlett and Morgan 2010), sub-titled 'the dissemination of reliable knowledge'. Howlett and Morgan (2010, p. 5) assert that "the possibilities for facts to travel well are important to our lives". In the project multiple contributors conduct investigations from a broadly social science or humanities perspective in order to explicate why and how facts and knowledge travel. Contributors consider what facilitates and obstructs their journey and how "once facts leave home, it is more difficult to keep them safe" (Howlett and Morgan 2010, p. 6). This work seeks to address questions about which facts travel, what their particular characteristics are, what they travel through and how, and what happens to them along the way. Whilst generating some interesting ideas, particularly around the idea of 'travelling well', which incorporates both the integrity of a fact as well as its 'fruitfulness', translation (or something similar) is not directly evoked as a process or mechanism that facilitates the travel of facts. As a result 'travel' is portrayed overall as a process of dissemination (or failure to disseminate) in which the characteristics of the 'fact' seem to overshadow any contextual factors.

Taken together the discussion above points to translation as a notion which, in the traditional sense, involves i) the movement from one language to another as well as, ii) the transfer of knowledge and ideas from one location to another. In addition, I hold that whilst language is clearly of import, the idea that translation is a simple and mechanistic process is naïve and that we somehow need to, iii) account for the norms or context of translation in order to render any study of it more complete.

I turn now to look at translation in science more specifically, given the focus of this research on the translation of findings from neuroscience research into prescriptions for practice in organisations.

4.1.2 Translation and science

The most obvious example of translation with regards to scientific fields is that of medicine. Translation in medicine means something quite specific and has an agreed, World Health Organization, definition:

> the synthesis, exchange and application of knowledge . . . to accelerate the benefits of . . . innovation (Greenhalgh and Wieringa 2011, p. 502).

Here translation is conceptualised as being reliant on both 'push' and 'pull' factors, with successful translation deemed to have been accomplished following the practical use or implementation of scientific facts. Further, unsuccessful translation is seen to result from insufficient evidence, which is remedied by a more efficient evidence-pathway. Translation in medicine then specifically refers to the transfer of knowledge from 'bench to bedside', from research to application.

Translation studies traditionally viewed scientific discourse "as neutral and less worthy of attention than literary-related work" (Olohan and Salama-Carr 2011, p. 179). This is no longer the case and there is now interest in studying the translation of science for a non-scientific audience, but again with a particular focus on the "special role that language plays" (Krieger and Gallois 2017, p. 4). This focus might include both the 'language of science' and the 'science of language' (Krieger and Gallois 2017) where the former refers to communication for and by experts which is inaccessible to non-experts, whilst the latter refers to a concern with how humans communicate and share meaning. Commonly translation of science is viewed as an exercise in communication accommodation, whereby language is modified and technical information is simplified for non-expert audiences (Krieger and Gallois 2017). This accommodation is underpinned by an extensive understanding of the information needs of different audiences, albeit this is something scientists themselves are accused of often lacking (Krieger and Gallois 2017). Fahnestock (1986) suggests that so-called 'accommodators of science' speak of it more elegantly than scientists themselves, by which she means that non-scientists are able to write about science in an accessible and stylish way, unhindered by the qualification which scientists

necessarily include. She applies ideas from rhetoric and discourse analysis to investigate 'accommodated science' (Fahnestock 1986) by examining paired communications that cover similar topics for different audiences. She identifies shifts in rhetoric, including in genre and in statement type, finding that as scientific reports travel from science to lay publications, the 'genre' moves from forensic to celebratory and from a concern with, for instance, establishing validity to one celebrating scientific achievements (Fahnestock 1986). This highlights the differences between texts for a general versus a specialised scientific audience.

In addition, Fahnestock (2004) points to the study of science communication as a thriving subdiscipline, and to the proliferation of book length translations of science as part of a wider popularisation of science. I see science communication and science popularisation as related and overlapping activities, both perhaps relevant to this research, concerned as it is with the shift of neuroscience research findings to a wider organisational audience. I will now say something about each in turn.

Science communication has a vital part to play in modern society (Burns et al. 2003), which means it is important to distinguish it from other terms with which it is often conflated, such as 'public understanding of science' or 'scientific literacy'. Burns et al. (2003) define science communication as:

> the use of appropriate skills, media, activities, and dialogue to produce one or more of the following personal responses to science (the AEIOU vowel analogy): Awareness, Enjoyment, Interest, Opinion-forming, and Understanding (Burns et al. 2003, p. 183).

They suggest these components might be thought of as the tools of science communication. This conceptualisation implies an activity that is one-way, from scientists who must have communication skills, to an awaiting society. However, suggests Rose (2003b, p. 308) instead:

> there are both a multitude of sciences and a multitude of publics; that all of us are the lay public for most areas of science outside our own narrow specialisms.

The study of science communication is eclectic (Krieger and Gallois 2017), because it endeavours to both shed light on the production, spread and influence of scientific

knowledge (Fahnestock 2004), and to serve as a corrective to overly simplistic accounts which posit a one-way diffusion of scientific knowledge. For Rose (2003b) “understanding is a two-way street, demanding the scientists’ understanding of the public as well as the reverse”(p. 308).

There is a huge volume of communication of and about science today (Rose 2003b), especially as there is increasing pressure for scientists to communicate their research and the societal implications of it (Illes et al. 2010). Neuroscience is a discipline that is particularly subject to misinformation and inaccurate reporting suggest Illes et al. (2010). This susceptibility is perhaps because of a growing interest in the popular press and the degree to which the public are more convinced by reports which use brain images and neuroscience language (Beck 2010), including the so-called ‘seductive allure’ (Weisberg et al. 2008) as described in Chapter 2. Such interest brings particular challenges, although it can also afford opportunities, suggests Eagleman (2013). These opportunities might include demonstrating the value of public funding, inspiring critical thinking, preventing misinformation in the media, elucidating the limits of science and how it might be used and finally the simple joy of sharing what is known about “in the case of neuroscience, the world inside us” (Eagleman 2013, p. 12147).

Further, Lynch et al. (2014, p. 480) point to the role of journalism in the communication of science as “a key site—if not *the* key site—for communicating science to the public”, whether in a newspaper, television show, or the internet. This key role of journalism is especially the case because science is complex and somewhat detached from society, with the result that science news coverage is a primary source of scientific information for citizens and decision makers (Schäfer 2017). Science news coverage ensures that scientific ideas are debated beyond the pages of specialist journals. For instance, Gesualdo et al. (2020) highlight the role of journalists as ‘knowledge brokers’, a role which involves ‘transforming knowledge’ and comprises five major functions; i) awareness, ii) accessibility, iii) engagement, iv) linkage and, v) mobilisation. Following research into journalists’ knowledge brokering between the science community and news consumers, they suggest that the first three of these functions are more prevalent in journalists’ accounts than the final two (Gesualdo et al. 2020). They speculate that this disparity is because the prevalent functions (awareness, accessibility, and engagement) align more fully with the professional

norms of journalism. Also journalists might not be fully conscious of or able to articulate linkage and mobilisation as aspects of knowledge brokering, perhaps because they conflict with journalistic values. Further, changing media structures are affecting the coverage of science news, argues Schäfer (2017). He sees that with legacy media in decline and a growth in online media there is a changing role for journalists. Scientists can move directly to increase their visibility and the role of science journalism comes under further pressure, with a resulting decline in specialist expertise in publishing houses as science writing is increasingly undertaken by generalists who have less time to produce articles in a '24/7 news culture'. Further, Schäfer (2017) suggests that science news coverage of some issues has become more controversial and politicized – for instance climate science or gene editing – but has not changed at all for other issues, which remain firmly within the science pages. This lack of neutrality is reinforced by Illes et al. (2010), particularly in relation to neuroscience, when they suggest that:

> Not all science in the public domain is treated equally. Like the science behind genetically modified foods and nanotechnology, neuroscience combines high public relevance with rapidly advancing technologies. Everyone has a stake in understanding how the brain works (Illes et al. 2010, p. 61).

While the role of journalists as knowledge brokers has long been acknowledged in the science communication literature (Gesualdo et al. 2020), journalists have also been decried as popularisers of scientific knowledge.

Science popularisation. The popularisation of science, suggests Fahnestock (1986), is evidenced by the growth in the circulation numbers of print titles such as the Scientific American. This might be a somewhat outdated assertion in the sense that circulation numbers have subsequently declined as the internet has emerged and established itself as an efficient channel for the dissemination of science information, as described above (Trench 2007; Blanchard 2011). However popularisation is one of two main reasons given for science blogging (Blanchard 2011), the other being building an online identity. Blogging differs from more traditional forms of popularisation in that it allows two-way conversations to develop, and is essentially open to anyone with an interest in a particular topic (Blanchard 2011).

Scientific communication and the popularisation of science have many parallels. However, there are differences, not least because:

> popularisation serves a secondary function: not just the dissemination of ideas, but also the translation of those ideas into a form that the (non-specialist) public can understand (Adams 2006, p. 15).

And whereas the 'accommodation' of science might include pieces written by scientists or specialist science journalists who:

> attempt to reach a broader audience than the original research report …. they do not attempt to capture that audience in the ways magazine or newspaper pieces typically do (Fahnestock 2004, p. 12).

The popularisation of science is a relatively recent phenomenon and as late as the beginning of the twentieth century the importance of 'scientific aspects', even those put to good use, was not thought to be interesting by the media (Nature 1937).

Taken together these ideas suggest that science popularisation is an activity where versions of a core message travel to and are adapted for different contexts and audiences (Fahnestock 2004). It is distinct from science communication and understood as involving the popular media, perhaps undertaken not by scientists themselves but by journalists, and not necessarily science journalists. It "includes only texts about science that are not addressed to other specialist scientists" (Myers 2003, p. 265) which have undergone some degree of transformation in order to make them accessible, or even "superlative in order to sell news" (Gesualdo et al. 2020, p. 129). The dominant view of science popularisation is one in which:

> first, scientists develop genuine scientific knowledge; subsequently, popularisers disseminate simplified accounts to the public …[and that]… any differences between genuine and popularized science must be caused by distortion or degradation of the original truth (Hilgartner 1990, p. 519).

An underlying assumption is that the aim of popularisation is to convey simplified scientific knowledge, in one direction, to a wider audience (Myers 2003), which results in two separate discourses; one within scientific institutions and one outside them. However, this dominant conceptualisation is problematic for a number of reasons (Hilgartner 1990; Myers 2003). Firstly because it assumes that scientific knowledge is the exclusive preserve of scientists/scientific institutions. Secondly, because it assumes that where science is

concerned the public is a clean slate, just waiting for scientists to impart their knowledge. Thirdly because it assumes that science travels only in one direction and, fourthly because it assumes that the information is simplified or dumbed down (Myers 2003). As described above, conceptualising popularisation in this way results in the two separate discourses; the original science and the product of popularisation. The original science, addressed to other specialists, is pure and better, it is of higher status than popularised texts. As such popularisation is not politically neutral, but rather serves the interests of those who derive their authority from science (Hilgartner 1990, p. 520):

> A concept of purity requires one of contamination, and the notion of popularization shores up an idealized view of genuine, objective, scientificially-certified knowledge. Furthermore, the dominant view establishes genuine scientific knowledge, the epistemic 'gold standard', as the exclusive preserve of scientists; policy makers and the public can only grasp simplified representations. Finally, this view of popularization grants scientists broad authority to determine which simplifications are 'appropriate' (and therefore usable) and which are 'distortions'.

Findings from neuroscience research are not only much talked about in the popular press (O'Connor et al. 2012) but more than that "few popular science news articles today attract as much attention or are communicated with as much flamboyance as those involving the neurosciences" (Gruber et al. 2011, p. 1). In addition neuroscience is deemed to be highly relevant to the public (Illes et al. 2010), and this interest, coupled with the tendency of inaccurate reports is problematic (Pasquinelli 2012). For example, Beck (2010) recounts a media report in which neuroscience research investigating activation in the auditory cortex in response to male and female voices is misreported as finding non-activation following male voices. The research actually found that female voices activated the auditory cortex more, but not that males voice failed to activate it at all. A question should also be raised when science communication or popularisation slips into the marketing of (neuro)science. Chancellor and Chatterjee (2011) describe how social value arises from science when scientific knowledge is translated into effective diagnostic tools and therapies. They contrast this notion of social value with that of commercial value, which arises when such technologies are offered on the open market. Brain fitness products are an example of the latter, they suggest, where neuroscience and commerce collide and where a plausible scientific rationale has been co-opted into the design of commercial products for which

there is limited (if any) scientific evidence. In this instance commerce has effectively moved ahead of the (neuro)science. Hence science communication is vital:

> As neuroscience advances, the gap between scientific and clinical knowledge and public understanding widens. Scientists have a responsibility to communicate science to the public and offer antidotes to the press' tendencies to simplify, exaggerate, and dramatize findings (Chancellor and Chatterjee 2011, p. 24).

So far in this chapter I have sought to examine how ideas concerning translation more generally, as well as those relating to scientific material more specifically, might inform this research and whether or how 'translation' as a notion might be in a position to account for the paradox at the centre of this research whereby prescriptions for practice are so altered from neuroscience research findings to render them not just different in degree but different in kind. The ideas above are taken from outside the MOS field. Inside my own field, and as previously described in Chapter 1, I also consider how the management ideas literature might inform my research.

4.1.3 Management ideas

Given the primary concern of the management ideas literature with theoretical explanations for the adoption of new ideas, as described in Chapter 1, I looked to it as a relevant body of work which might inform this research. However as previously described I found it to commonly involve a descriptive analysis of the supply and demand sides of management ideas, or of the characteristics of the idea itself. As such it is more concerned with the diffusion of management ideas (for instance, see Sturdy 2004). I will say some more about diffusion approaches to translation below, but for now suggest that they are not in a position to fully address the paradox at the centre of my research, as restated above.

Nevertheless, the management ideas literature did spawn the central idea of distinguishing between a critique of the management idea itself and a critique of its popularisation (Huczynski 1993), as well as further pertinent suggestions regarding the involvement of forces external to the fashion setting market, both described in Chapter 1. These seemingly simple ideas helped me to adjust the focus of this research to a critique of the translation of neuroscience research findings and away from a critique of the findings themselves.

4.1.4 Employing translation

The description of translation studies provided above, its brevity notwithstanding, has shaped my understanding of translation as distinct from popularisation. Popularisation is generally concerned with making something understandable and is also designed to 'capture' attention and 'oversimplify' (Fahnestock 1986). In so doing popularisation reduces both the complexity and the status of, for instance, a written article. In MOS popularisation is concerned with the dissemination and diffusion of ideas and in particular why some spread and others do not (Madsen 2019).

I see translation as the more useful notion for the study of the movement of neuroscience research findings and take a range of ideas from the above, including that translation is not: i) mechanical (Bassnett 2013), ii) one-way (Hilgartner 1990) or, iii) a neutral process (Freeman 2009). Rather translation involves iv) translators (Freeman 2009), v) in contexts, vi) shaped by norms (Hermans 2013). Further the prevailing view is that 'original' science (and those involved in it) occupy a higher status, as well as the effective right to veto translation efforts. Although a primary focus for translation studies has been language and rhetoric, there are compelling arguments that to more fully understand translation one should go beyond them (Freeman 2009).

I hold that translation is different from popularisation and that it should also be distinguished from notions such as the transfer or diffusion of knowledge which imply a passive process involving the movement of knowledge or information from one context to another. However these terms are sometimes used interchangeably or are inferred to be versions of translation in management studies. For instance Pollach (2021) investigates the transience of management fads and describes popularisation both as a form of translation and as the transfer of knowledge.

In what follows I look in more detail at extant work on translation in MOS and develop the argument that translation is best conceptualised as a political process and, in this instance, one in which research moves outward from a specialized field of enquiry (neuroscience) into a new field (management science), *and* the process by which research findings move from the laboratory and into practice (Littlefield and Johnson 2012). This process is undertaken by 'translators' who are unavoidably working in a particular societal context and who, I argue,

produce prescriptions for practice that are partly shaped by that context, as described in Chapter 2, particularly in the way of unseen structural factors as set out in Chapter 3.

4.2 Translation in Management and Organisation Studies (MOS)

Translation is a vibrant and growing field of research in MOS (Wæraas and Nielsen 2016) and "an important perspective for studying the flow of management concepts" (van Grinsven et al. 2016, p. 285), as well as being used to explore a wide range of topics or issues in the literature. For instance, Wright and Nyberg (2017) explore how organisations translate so-called grand challenges into practice, and in particular how businesses respond to the challenges of climate change, especially in the face of competing economic demands. They argue that it involves a process of continuous translation during which:

> organizational actors make sense of potentially challenging ideas and concepts, negotiate their meaning, and adapt them for particular situations and contexts (Wright and Nyberg 2017, p. 1634).

This process effectively enables them to convert climate change challenges into what is termed 'business as usual' and which aligns with dominant business discourses and practices. In this view of translation ideas are not fixed but rather altered by people/agents to fit a local context.

Meanwhile, Maguire and Hardy (2009) draw on the metaphor of translation to understand institutional change, and in particular changes in practices around the use of Dichlorodiphenyltrichloroethane (DDT) leading to its declining use. For them translation involves an interactive negotiation by involved parties concerned with what is being transferred and in particular shared meanings which, they argue, have led to the de-institutionalisation of practices around DDT. Maguire and Hardy (2009) use translation - as distinct from diffusion - to highlight how meanings change as they travel. They draw on the work of actor network theory as adapted to explore institutionalisation in management studies, and ask specifically what role translation plays in de-institutionalisation. Maguire and Hardy (2009) conclude that specific problematisations regarding DDT survive the translation process, contributing to the decline in its use. They also highlight the limits to agency which arise from the process of translation, whereby the initial problematisation alone was not sufficient to bring about deinstitutionalisation. Further examples include translation as a pragmatic approach to instrumentalising management ideas, by providing a

practical guide which sets out what happens to ideas as they transfer (Røvik 2019), as well as translation of an organisational form to create a new organisational venture (Tracey et al. 2018).

Although translation is presented as relatively coherent and delimited (van Grinsven et al. 2016), these examples show how scholars can focus on different facets or aspects of it (Scheuer 2021). For instance, although most interpretations of translation "share a focus on the modification of ideas by agentic actors in relation to a specific context" (van Grinsven et al. 2016, p. 272), to varying degrees approaches to translation can consider the following factors:

- Actors, translators or agents as those who initiate the process of translation (van Grinsven et al. 2016)
- The object, idea, model or token (Scheuer 2021) that moves or is transferred
- The audience, or 'Group B' (Scheuer 2021) as those on the receiving end of translation and separate from translators as actors
- The source or originating context of an idea (Lamb et al. 2016)
- The destination or receiving context, including the broader circumstances and conditions that determine and are affected by the translation of management concepts (van Grinsven et al. 2016)
- Tools and resources, or the means by which management concepts are revised (van Grinsven et al. 2016)
- The mobilisation or actual movement of an idea; how it leaves one group and arrives in another (Scheuer 2021), perhaps gauged by shifts in language, or by some sort of organisational implementation.
- The outcome or result of the translation process (van Grinsven et al. 2016), perhaps ascertained by some kind of measure (Scheuer 2021) which demonstrates that translation has taken place

The variety of these factors points to the way in which the central focus of translation theory can diverge, for instance from approaches which scrutinize the translated idea (Morris and Lancaster 2006), to those which focus on how practices vary as they diffuse

(Ansari et al. 2010), to those more concerned with the process itself (Doorewaard and Van Bijsterveld 2001).

4.2.1 Translation Theory (TT)

In Chapter 1 I described how, in MOS, translation is typically concerned with imported knowledge which comprises management knowledge (in the form of ideas, concepts, or practices for example) and the way that this imported knowledge is inevitably unstable as it moves from one organisation to another, or from one organisational division to another. As also highlighted in Chapter 1, in this research I am concerned with the translation of 'foreign' ideas - findings from neuroscience research – into prescriptions for practice in organisations. In MOS Translation Theory forms the guiding framework of efforts to understand and explain how imported knowledge is modified or adapted to its new context (Spyridonidis et al. 2016; McCabe and Russell 2017). As such I will now consider how extant approaches to translation studies in MOS might contribute to addressing my research question which asks:

> How and why do translated prescriptions for practice in organisations take the form that they do in making their key contribution to the translation of neuroscience research findings into the organisational domain?

A number of topical reviews have sought to systematically identify and examine prevalent approaches to translation in MOS. Firstly, O'Mahoney (2016) conducted a structured literature review, examining 128 studies from which he identifies four approaches to translation. These, he argues, adhere to (overlapping) theoretical archetypes arising from assumptions underlying the ontological, epistemological, and methodological choices made by researchers. The four perspectives identified by O'Mahoney (2016) are i) Actor-Network Theory (ANT), ii) Scandinavian Institutionalism, iii) Organizational Boundaries and, iv) Diffusion. These perspectives are underpinned, in turn, by the archetypes of actualism, social constructivism, symbolic interactionism and scientism.

Secondly, Wæraas and Nielsen (2016) employed a systematic literature review to take stock of the most common approaches to translation in MOS and 'uncover' three 'translations of translation theory' in the way of i) ANT, ii) Scandinavian Institutionalism and, iii) Knowledge-based perspectives, each with distinguishing features as well as some overlap. They suggest

that the ANT perspective was the first to be adopted into organisational research, followed by knowledge-based theory and then Scandinavian Institutionalism.

Thirdly, Scheuer (2021) presents 13 models or theories of translation in organisations which are either "highly cited by researchers in organisational translation studies or represent different ways of theorising and modelling translation in organisations" (p. 13). These, he argues, are grouped around different research modes or philosophies, namely, i) an actualist mode, ii) a humanistic mode and, iii) a scientific mode. Scheuer (2021) unpicks the research modes in greater detail to articulate the 13 models and theories of translation in organisations. Because of this detail I hold that many of his versions are so particular – for instance 'strategy translation', 'policy translation' or 'the middle manager as translator' – that they fall outside prevalent approaches, which render them less relevant to this current research project, as described below.

Finally, van Grinsven et al. (2016) also embark on a systematic literature review to understand the differing conceptualisations of translation. They approach it in a different way; by identifying keywords associated with 'management concept', searching for studies which investigate the translation of a management concept and examining their bibliographies to identify commonly referenced texts. This approach results in the identification of what they describe as "nine core publications related to a translation perspective in the debates on the flow of management concepts" (van Grinsven et al. 2016, p. 274). They then use forward citation to identify all references to these works, ultimately analysing 150 publications from which they develop their own typology. This typology is based on four approaches to translation associated with i) institutional, ii) rational, iii) dramaturgical and iv) political theoretical perspectives. Each type is identified according to whether approaches to translation consider the source of variation to be a matter of re-embedding or deliberate strategizing, and whether the object of variation is structural or representational. For each of the types, the variations show up in four elements: context, actors, tools and resources, and outcome.

Taken together, these reviews suggest that there is broad consensus around four main approaches to translation in MOS. Both ANT and Scandinavian Institutionalism are identified as prevalent (O'Mahoney 2016; Wæraas and Nielsen 2016; Scheuer 2021). Further, articulations of the organisational boundaries (O'Mahoney 2016) and knowledge based

perspectives (Wæraas and Nielsen 2016) show much overlap as they both focus on translation and boundaries, underpinned by the archetype of symbolic interactionism, also identified by Scheuer (2021). Finally, diffusion, underpinned by a scientific mode, is identified as a theory of translation by both Scheuer (2021) and O'Mahoney (2016). I will say more below about each of these approaches below, including what I see as their drawbacks, before providing a comparative summary of them. This summary allows me to argue that, despite the diversity they invoke in relation to translation, extant approaches overlook some important facets of translation identified in the earlier part of this chapter. Further, and given my previously acknowledged accord with critical theory, I hold that none of the approaches adequately attend to issues related to structural power, as described in Chapter 3, and the ways in which structural factors likely shape translation.

4.2.1.1 Actor Network Theory

The first main approach is ANT, arising from the 'Sociology of Translation' (Callon 1986). Wæraas and Nielsen (2016) suggest that ANT is the most empirical approach to translation whereby researchers endeavour to trace the networks in which actors (including non-human) enrol others as part of the process of advancing particular interests. As such research typically involves an in-depth examination at the micro level of the network involved in the 'translation' of an idea/model/approach and in particular makes use of intensive methods, such as ethnomethodology.

For ANT the network is the primary focus because it is associations, connections and interests that lead to the (continual) creation of new entities. Because human and non-human objects are afforded equal status as actors in the network ANT effectively "misses the meaning character of human action" (Whittle and Spicer 2008, p. 621). Here translation involves the attempts of actors to change the interests of other actors so as to enrol them in a network, and as such translation is highly political at the micro or local level (Wæraas and Nielsen 2016). Epistemologically constructivist, O'Mahoney (2016) describes ANT's underlying archetype as actualist, since it can only attend to what exists and is there in actuality. This means that it denies any reality other than events and their relations. Ontologically, phenomenon are continually made and re-made as opposed to existing, with inherent properties and characteristics.

Drawbacks. Scholars point to various limitations with ANT. For instance, Hultin et al. (2020) argue that the actor-centric language expounded by translation from an ANT tradition overlooks change as continuously emerging in the mundane everyday practices of work. They argue that using a different conceptual vocabulary can facilitate a different perspective on the adoption of, in their case, lean practices.

ANT is also derived in part from Latour (1986) and conceives of power as being in association. As such power is not 'possessed' but is instead a consequence, rather than a cause, of collective action. Further, with its focus on the micro level, ANT effectively ignores the extent to which actors may be historically conditioned. This means that whilst it does consider power (in the local network of people and things) it arguably misses a 'critical' dimension. Further, politics (particularly intentionality) is the domain of the human and ANT lacks the tools to cope with this because it de-centres the human actor. Whittle and Spicer (2008) argue that, if you examine ANT in light of the common themes which connect critical work, as set out by Fournier and Grey (2000) and mentioned briefly in Chapter 3, then ANT falls short. Critical approaches are characterised by a stance which is anti-performative, with a focus on reflexivity, and denaturalisation (Fournier and Grey 2000). ANT is at odds with this, and instead relies on a stance that is politically conservative rather than anti-performative, an unreflexive epistemology and a relational ontology in which entities cannot be assumed to pre-exist. Taken together these:

> make ANT less well equipped for pursuing a critical account of organizations – that is, one which recognises the unfolding nature of reality, considers the limits of knowledge and seeks to challenge structures of domination (Whittle and Spicer 2008, p. 612).

4.2.1.2 Scandinavian Institutionalism

A second approach to translation is that of Scandinavian Institutionalism with an emphasis on how local discourses and micro politics shape translation. Scandinavian Institutionalism is underpinned by social constructivism (O'Mahoney 2016) and typically focuses on the local (re)construction or institutionalisation of a management innovation. It has its origins in institutional theory, and particularly the idea that organisations imitate one another as they try to emulate success, a process that leads to increased organisational isomorphism. Much of the early work for this perspective on translation was conducted in Scandinavia, with a focus on public sector reform in which principles and ideas from the private sector were

adopted. Translation is therefore understood as “a process wherein new practices or fashions become institutionalized” (O'Mahoney 2016, p. 340).

Seminal work by Sahlin-Andersson (1996) sees the circulation of models as an editing process, and the editing process as a process of translation which is restricted by editing rules. From this perspective translation takes a standard or regular form. Editors (translators) can include professionals, researchers, leaders, and consultants, all of whom are restricted by the rules - which are not explicit but become visible on post-hoc examination of the way in which models and ideas are ultimately portrayed. As such translation is unpredictably predictable. Empirical work prioritises meaning and tends toward intensive methods, such as interviews or discourse analysis, which best enable researchers to identify and understand discourses.

Drawbacks. Vossen and van Gestel (2019) suggest that the role of interpersonal relationships in the translation of macro ideas to micro practices is neglected in Scandinavian Institutionalism. This is something they seek to remedy in their research through the use of Social Exchange Theory (SET) as a means of revealing the relevance of social interactions in the translation of a broad idea into local level practices relating to sickness and absence. In addition, Scandinavian Institutionalism, according to Munir (2015), lacks ‘a critical sensibility’. It assumes that the “objects of its research can be captured in its analysis” (Willmott 2015, p. 105). In other words, it lacks the ‘suspicious mind’ of more critical approaches with its tendency to take data at face value. Further, Munir (2015, p. 2) writes of institutional theory that its:

> inadequate awareness of power is not due to an epistemological or ontological difference. Rather, the issue is moral and ethical. Whereas critical theorists are always suspicious of the elite’s agendas, institutional theorists are not as apprehensive at all .

As such I contend that Scandinavian Institutionalism approaches to translation, with roots in institutional theory, offers a limited account how power operates. If power is conceptualised at all, it is in a very limited way such that it is difficult to understand what role it plays. Below I will further elaborate on issues of power in translation as part of my argument in favour of a critical perspective, which builds on what has already been said in Chapter 3.

4.2.1.3 Organisational boundaries and Knowledge based approaches

The third main approach to translation in MOS is underpinned by a symbolic interactionist philosophy and incorporates O'Mahoney's (2000) 'Organisational Boundaries', Waeraas and Nielsen's (2016) 'Knowledge Based Approaches' and Scheuer's (2021) 'Symbolic Interactionism'. Ontologically realist and epistemologically relativist, such approaches portray translation as a boundary spanning activity undertaken to ensure the effective flow of critical information, ideas, concepts, or models across boundaries and where boundary brokers act as translators. As such research focuses on a local level and on factors such as boundaries, boundary-spanning, boundary objects, source, and recipient. For instance Yanow (2004) considers the translation of relevant organisational knowledge held at a geographical or hierarchical periphery and in particular the role of boundaries and 'brokers' who operate at the interface between these different boundaries.

This third approach to translation holds that translation is pragmatic rather than controversial or political, and whilst at times it appears to conflate knowledge translation and knowledge transfer (Wæraas and Nielsen 2016), the approach is typically clear that they are not one and the same. Methodologically, research in this vein tends toward interpretivist methods, including ethnography and participant observation, which facilitate researcher understanding of the meanings generated by the different communities (O'Mahoney 2016).

Drawbacks. This approach to translation tends to prioritise the human in analysis, particularly interactions at gaps and at boundaries. Proponents are overly focussed on the micro or local level, potentially missing macro level structures that influence the ability of communities to effectively communicate and translate meanings.

4.2.1.4 Diffusion

The final main approach to translation in MOS is diffusion. Diffusion studies, as set out by both O'Mahoney (2016) and by Scheuer (2021), are interested in statistically evaluating the diffusion of an idea. They tend toward quantifying the instances of a particular management idea, which are then correlated with independent variables such as geography or characteristics of adopters in order to gauge how far an idea has been adopted or how far it has spread. In the diffusion literature the terms diffusion, transfer and translation are often used interchangeably, although fundamentally diffusion approaches focus on the

dissemination or spread of management ideas. For instance, Scheuer (2021, p. 21) defines diffusion as the process by which "an innovation is communicated through certain channels over time among the members of a social system".

Methodologically underpinned by a 'scientistic' or positivist philosophy, diffusion research might use surveys or examine print media coverage to ascertain the dispersal of a given idea, analysing samples using statistical regression or correlation analyses. As such it does take a macro level view and also assumes that such data is a legitimate proxy for how far an idea has practically spread. However it effectively overlooks aspects such as time-lag and the actual implementation (or otherwise) of a specific model or idea. Diffusion research is widespread in the management fashion (and fads) literature. For instance, Mazza and Alvarez (2000) examine the diffusion of Human Resources Management (HRM) in Italy during a delineated period by measuring press mentions to demonstrate the role of the media in the diffusion of management ideas.

Drawbacks. Although this perspective does include a macro level focus, diffusion approaches typically see organisations as passive recipients of transferred ideas and assume that the innovation itself is reasonably unchanged. As such they lack adequate considerations of power and effectively de-centre the human in favour of analysis of instances or frequency. As a result diffusion approaches to translation are restricted to addressing questions about whether and how far an idea, such as a findings from neuroscience research, have spread into the organisational domain, who they are disseminated by and perhaps even their shape, but it is incapable of answering 'why' questions. As such, diffusion approaches to translation cannot account for the aforementioned paradox which lies at the centre of this research.

4.2.1.5 Summarising extant approaches to translation

The discussion above gives a sense of how rich and yet fragmented translation theory is within MOS, and arguably how the diversity of approaches is beneficial. The reviews conducted (O'Mahoney 2016; van Grinsven et al. 2016; Wæraas and Nielsen 2016; Scheuer 2021) point to strengths and weaknesses in each approach, with particular focal points and blind-spots. In setting out the main approaches I also allude to their particular drawbacks. In essence I argue that no extant approach adequately combines a conceptualisation of power and interests with an awareness of context at a societal or macro level, an attention to

which underpins any ability to denaturalise translation, as set out in Chapter 3. Further, I take as confirmation of this gap the assertion that critique is lacking in translation theory and research in MOS which is made by Spyridonidis et al (2016) in their introduction to a special issue on translation in the *International Journal of Management Reviews* (IJMR).

In Table 5 below, I summarise how each of the different perspectives i) define translation, ii) regard context and, iii) conceptualise power. In the table I also include a yet to be defined critical perspective on translation which I will describe below and include the summary here to highlight the collective shortcomings of TT which I contend justifies the need for a critical perspective on translation.

Table 5. Summary of main approaches to translation

	Translation as:	**Social context as:**	**Power conceived of as:**
ANT	Political at a local level: enrolling, persuading, and negotiating	Micro level: specific actor networks	Local and in association Agency of actors who enrol and mobilize a network
Scandinavian Institutionalism	Local institutionalisation of ideas: dis-embedding and re-embedding ideas	Local contexts and practices	Local level: agency of editors or carriers who reshape ideas to their local context
Organisational Boundaries and Knowledge-Based	Pragmatic: facilitating transfer or flow of ideas	Local: across different groups	Agency of boundary spanners negotiating across boundaries
Diffusion	Extent of spread or coverage of ideas	Macro level: broad population	Agency of knowledge brokers and adopters
Critical Perspective	Political and purposeful: sustaining and replicating prevailing status quo	Macro level: prevailing societal customs, rules, and norms	Potency of structural and systemic factors

4.3 Developing a critical perspective on translation

In this chapter so far I have considered both translation in broad terms and TT from the field of MOS. In what follows I will draw from both bodies of work, as well as from critical theory as set out in Chapter 3, to develop what I describe as a critical perspective on translation.

From critical theory. In Chapter 3 I suggested that a critical perspective likely offers a fruitful means of investigating the translation of findings from neuroscience research into prescriptions for practice in organisations. The foundations of a critical perspective arise from a focus on i) highlighting the dominance and limitations of prevailing positivist approaches in society, ii) the way in which societal context and structural factors imperceptibly shape things and in so doing serve to sustain the status quo and, iii) a view of language as an important means through which translation happens.

Also in Chapter 3 I set out my commitment to a more structural view of power and described how I conceptualise 'structural factors' an umbrella term to encapsulate the way that unseen factors from a broad societal context shape and constrain. Further, I set out the role of (not neutral) language in reflecting power and the importance of denaturalisation (as critique) to challenge and uncover said structural factors. The effects of positivism, and its limitations, steer a critical perspective on translation in a different direction, whilst the dominance of positivism also features a priori as a likely structural factor, exerting some influence or constraint on translation. Finally, micro emancipation as a more modest ambition, is also realised through denaturalisation. I contend that these commitments are necessarily constituent parts of a critical perspective on translation.

From approaches to critical research. Also in Chapter 3 I briefly described how critical theory can provide a framework for research. Further methodological detail is set out in the next chapter and here I simply draw attention to Myers and Klein (2011) who configure a set of principles for critical research. In particular I draw on their formulation of critique as one of three elements of critical research and which, they suggest, is itself comprised of three principles. These three principles are i) using core concepts from critical theory, ii) taking a value position and, iii) revealing and challenging prevailing beliefs. I find these principles to be particularly pertinent such that they come to feature in the critical perspective for translation that I seek to develop.

From translation studies. Above I describe how, in employing the concept of translation, I am informed by the translation studies. I understand translation to involve translators in contexts shaped by norms and so not a mechanical or neutral process. These ideas about translation align with those arising from critical theory.

From translation theory. Finally, in setting out the main extant approaches to translation theory in MOS I argue that none adequately encapsulate all those aspects or components described above from critical theory and translation studies. In particular extant TT firstly neglects the role of societal context in favour of a micro level, local, focus and as a result cannot incorporate the likely yet imperceptible effects of structural factors on translation. Secondly, extant TT also overlooks or has a limited view of political aspects of translation, viewing power as locally held. Overall none of the extant approaches combine an account of the effects of societal context on translation coupled with a political sensibility which accounts for the role of power.

4.3.1 A critical perspective on translation

A critical perspective on translation must encapsulate and address all these issues and, in Table 5 above, I begin to show how it might do that. Firstly, a critical perspective holds that translation is not neutral and mechanical but rather is purposeful and political, albeit the purpose is not necessarily visible to the naked eye.

Secondly, a critical perspective views translation at a more macro level, whereby dominant and ideas at a societal level will serve to shape and constrain translation. Relatedly, power is conceived of as being structural and systemic. As such whilst individual agents translators are not powerless, nevertheless their translation is shaped and constrained by macro level structural factors such as particular ways of thinking and unquestioned beliefs and assumptions. Like Freeman (2009), I am not of the view that such factors wholly determine translation. Instead, I agree with him that they constitute a frame of reference within which translators operate, often reproducing dominant discourse, but perhaps also adapting it. These structural factors, as previously described, reflect dominant interests in society which have vied for power over time, competing for and consolidating their dominant (structural) position in society. Structural interests include dominant ideas or ideologies, such as those highlighted in Chapter 2, which are generally taken for granted in everyday life while their effects go largely unseen or at least unquestioned.

Thirdly, a critical perspective contends that translation will likely support and so sustain these dominant ideas, which can be revealed through denaturalisation whereby challenge and analysis can uncover how the 'surface structure' serves as a veneer or proxy for the

'deep structure'. As such, denaturalisation aims to go beyond the surface level and infer the existence and influence on translation of factors which are not directly observable.

As such, fourthly, scepticism is central to a critical perspective, particularly since incorporating a systematic grounding of denaturalisation both embraces the critical assumption that translation is not a neutral process and facilitates a means of bringing to critical awareness more opaque influences on it.

Fifthly, language is of central interest in a critical perspective on translation, not least because of the central role of language in translation more broadly as described above. Language is also important because of the way in which critical theory views it as constructive, and in particular both as a manifestation of societal context and constructive of it.

Next, sixthly, there is a role for axiology in a critical perspective on translation whereby the particular value position of the researcher has a bearing on the research, which might form a start point for denaturalisation or suggest a particular emancipatory aim.

Finally, from Myers and Klein (2011), it is appropriate to a priori call on critical concepts, such as those set out in Chapter 3, during analysis.

4.3.2 Contribution to translation theory

In this chapter I have argued that although there exist multiple and heterogeneous approaches to translation in MOS which collectively offer rich accounts of translation, none of the extant approaches adequately combine a conceptualisation of translation as political with a structural view of power. In essence extant approaches overlook the potential effects of structural factors on translation efforts. I aim to address this 'blind-spot' and have put forward a critical perspective on translation designed to contribute to translation theory by addressing this shortcoming. In my research I employ this critical perspective to explore the translation of findings from neuroscience research into prescriptions for practice in organisations. In particular I highlight the intention to account for the paradox at the centre of this research whereby prescriptions for practice in organisations are so altered from neuroscience research findings to render them not just different in degree but different in kind.

4.4 Conclusion

In this chapter I introduce translation as a central concept for this research. I discuss how ideas from translation studies and the translation of science suggest that translation is a complex and partisan process as well as how neuroscience is susceptible to inaccurate renditions, in part as a result of its growing popularity, also highlighted in Chapter 2. In the management field TT encompasses multiple approaches to the translation of imported ideas or knowledge. I set out the four main approaches to translation in TT to show that there remain shortcomings, in particular how the approaches account for societal context and conceptualise power. I offer a contribution to TT by setting out a critical perspective to translation which draws on ideas from this chapter, as well as those in Chapter 3, to address shortcomings in extant approaches to translation.

In the next chapter I outline the specific methodological approach taken in this research, which is underpinned by the critical approach to translation described in this chapter. The intention is to provide a transparent and reflexive account of the empirical choices made and the steps taken so as to contextualise my account of the findings from this research in the empirical chapters which come after.

Chapter 5 - Methodology

In this chapter I set out in more detail my approach to this research, which is designed to address and account for the paradox whereby findings from neuroscience research are translated into prescriptions for practice in organisations which are so altered from the neuroscience research findings to render them not just different in degree but different in kind. I concur with Alvesson and Sköldberg (2000, p. 283) who suggest that research is better perceived of as a "refractory process" since most often it is more evasive and less straightforward than might be presented in chapters such as this. As a result it is my intention, in this chapter, to describe the approach taken but also to highlight and incorporate a notion of reflexivity in both what I have done and how I have done it, including false starts and iterations through the empirical material.

The translation of neuroscience research findings into prescriptions for practice in organisations is the empirical focus of this research, as a substantive example with an aim to exemplify translation more broadly. By adopting a critical approach my intention is to challenge the notion that translation is a neutral process and, through a process of critique, instead argue that 'unseen forces' drive it and in so doing privilege certain interests over others, such that knowingly or unknowingly translators impose a version of 'neuroscience' on their audience. In other words, I aim to identify the so-called 'deep structures' (Alvesson and Sköldberg 2000) that orient translations and in so-doing make a contribution to translation theory (TT) by highlighting how a critical approach to translation shines a light on aspects of translation neglected by extant approaches.

I begin this chapter with a consideration of reflexivity which I endeavour to hold at the centre of the research. Following on from that I set out my research methodology, including research philosophy, strategy, and design. Next I describe a critical discourse analysis (CDA) and notions of text, before describing the research setting and details of the empirical material collected. I include an overview of the impact of Covid-19 as well as the adherence of this research to ethical requirements. Finally I describe my analytical approach before prefacing the presentation of my findings which appear in the three chapters which follow this.

5.1 Reflexivity

In research reflexivity can be usefully seen as "a set of mutually interrelated processes and practices involving the reflexive thinking, doing, and evaluating of qualitative research" (Corlett and Mavin 2017, p. 377). As such reflexivity involves exposing or questioning our ways of doing (Morrow and Brown 1994) and effectively represents one dimension of critique. Reflexivity takes on particular importance in critical research which rejects the possibility of objective research and instead posits that "there is no one way street between the researcher and the object of study; rather, the two affect each other mutually and continually in the course of the research process" (Alvesson and Sköldberg 2000, p. 39). This entanglement necessitates clarity on the part of the researcher about their role in the production of knowledge, including an explicit reflection on epistemology and ontology and a detailed discussion of methodology that together serve to highlight the vantage point, assumptions and potential biases that will impact the research process (Fournier and Grey 2000).

5.1.1 Reflexivity in this research

In Table 6 below, I briefly highlight the moments in which reflexivity particularly shapes this research and which the rest of this chapter will go on to describe in more detail.

Table 6. How reflexivity shapes this research

Reflexivity through:	Description
Research philosophy	Explicit reflection on ontology and epistemology
Research methods	Detailed discussion of methodology, including methodological coherence as a means of reflexively constructing or designing a research project in a way which is both consistent and which can support inferential reasoning
Empirical material	Transparency with regards to the collection of secondary data or material. Active reflection on the co-production of interview transcripts as texts, including the impact of the interview as a communicative form on resulting discourses

Researcher role	Ongoing and reflexive acknowledgement of the role of the researcher in a research project, including an explicit account of relevant background as well as ongoing questioning of oneself as means of uncovering bias or interests
Analysis	Transparent account of analytical approaches and the importance of moving beyond a rigid use of standard templates or protocols which might demonstrate rigour but, if used by rote, can constrain. Reasoning is clearly explicated and can be linked back to the empirical material
Quality	Demonstrating quality through transparent reflexivity in both the design of the research and analysis. Research components should be internally consistent and analytical reasoning should be clearly explicated and justifiable

I emphasize this point now as the intention is to present my approach in clear and logical fashion, whilst simultaneously giving some explicit sense of the reflexive thinking which has been part of the research process. Further I endeavour to proceed in a manner which leads to research which is neither deliberately biased nor unnecessarily naively empirical, by which I mean straitjacketed through rigid adherence to a given research protocol (Harley and Cornelissen 2022).

5.2 Research Methodology

The aim of any research methodology is to appropriately address the research question which means that different questions require different approaches (Punch 2014) and different methodologies enable different knowledge claims. A research methodology includes the philosophical assumptions held by the researcher, the research strategy, and the specific design of the research, including the methods to be used for the collection of data. In addition to their 'appropriateness', these elements must exhibit methodological fit or coherence, defined by Edmondson and McManus (2007) as "internal consistency among

elements of a research project" (p. 1155). Further, methodological coherence is suggested as one of two components which together demonstrate that a researcher has evidenced a coherent process of reasoning, which is vital in ensuring rigour in any research (Harley and Cornelissen 2022). In what follows I aim to demonstrate methodological coherence.

5.2.1 Research philosophy

In Chapter 1 I locate my research in a broadly critical research philosophy or paradigm and in Chapter 3 delineate how critical theory has shaped my thinking. As a research paradigm, critical theory is one of ontological (historical) realism, whereby what appears as a definitive, or 'real', reality is instead understood to be a consolidation of multiple historical forces and structures which have arisen over time. It is perhaps helpful to contrast this perspective with the 'received view of science' (otherwise known as positivism) wherein "an apprehendable reality is assumed to exist, driven by immutable natural laws and mechanisms" (Guba and Lincoln 1994, p. 109). In contrast historical realism assumes "an apprehendable reality consisting of historically situated structures that are, in the absence of insight, as limiting and confining as if they were real" (Guba and Lincoln 1994, p. 111).

Epistemologically, a critical perspective holds that a researcher is inextricably intertwined with the process of research, as previously mentioned, both rendering objective knowledge an impossibility and requiring an explicit account of researcher influence in the way of reflexivity. Once more, contrast this perspective with positivism's received view whereby "the investigator and the investigated 'object' are assumed to be independent entities, and the investigator to be capable of studying the object without influencing it or being influenced by it" (Guba and Lincoln 1994, p. 110).

5.2.2 Critical research

Although critical theory guides my research, I hesitate to describe myself as a critical theorist. In part because, for some exponents (see for example Habermas 1972/2007) critical theory is a Grand Theory of Society, with a practical intention; the transformation of society and the improvement of the very existence of man (Held 1980). As such critical theory has a:

> basic concern … to analyse social conditions, to criticize the unjustified use of power, and to change established social traditions and institutions so

> that human beings are freed from dependency, subordination, and suppression (Scherer 2011, p. 2).

While I share ontological and epistemological assumptions with CT and have shaped my research according to its central concerns, I make no attempt to confirm the Grand Theory (Alvesson and Willmott 1992) and have opted for a more modest or minimal limited adoption of the theory (Alvesson and Sköldberg 2000).

5.2.3 Research aims and objectives

Here I reiterate the aims and objective of this research as previously described in Chapter 1. I address two broad aims.

Firstly, I aim to determine how and why the translation of neuroscience research findings into the organisational domain occurs as it does by investigating how and why translated prescriptions for practice in organisations take the particular form that they do. To reiterate, the paradox at the centre of my research is that prescriptions for practice are so altered from neuroscience research findings as to render them not just different in degree but different in kind across a range of factors, including their subject matter, level of precision and the appropriateness of claims made. In addressing my first aim, I seek to account for this paradox.

Secondly, I aim to demonstrate how a critical perspective can contribute to our understanding of the translation process by developing such a perspective and using it to address my first aim, the translation of findings from neuroscience research into prescriptions for practice as described above.

My specific research question is:

> How and why do translated prescriptions for practice in organisations take the form that they do in making their key contribution to the translation of neuroscience research findings into the organisational domain?

And I am guided by 2 sub-research questions:

Sub-research question 1: What factors steer the translation of findings from neuroscience research into prescriptions for practice in organisations?

Sub-research question 2: What does a critical approach to translation reveal about the paradox that translated prescriptions for practice bear little or no relationship to the neuroscience findings that they purport to translate?

5.2.4 Research strategy

A research strategy refers to a researcher's "general orientation to the conduct of social research" (Bryman 2012, p. 35). Since "critical theory is characterised by an interpretative approach combined with a pronounced interest in critically disputing actual social realities" (Alvesson and Sköldberg 2000, p. 110), to address my research aim, I use a qualitative methodology as most consistent with its philosophical commitments (Alvesson and Sköldberg 2000) and congruent with 'being critical' (Myers and Klein 2011).

5.3 Research design

A research design is "about organising research activity, including the collection of data, in ways that are most likely to achieve the research aims" Easterby-Smith et al. (1992, p. 33) and in ways which reflect the ontological and epistemological assumptions of the researcher.

In this research I adopt an approach known as critical discourse analysis (hereafter CDA), a more realist variant of discourse analysis, as described below, and consistent with my philosophical position. CDA is held to be more than just a method because it has a theoretical stance on the role and effects of language (Fairclough 2013) and is seen as a branch of critical scholarship (Leitch and Palmer 2010) through which it is possible to examine privileged discourses (Bryman 2012). In what follows I will describe more fully what is involved in using critical discourse analysis.

5.3.1 Critical Discourse Analysis

There are two broad views of language, suggest Wetherell et al. (2001). One view sees it as a 'neutral servant' that reflects reality, whilst another sees it as constructive. In the second view, language is 'misleading' rather than faithful (Wetherell et al. 2001), because "people seek to accomplish things when they talk and when they write" (Bryman 2012, p. 529). Further, language does things that critical theory is concerned with, such as reproducing power and social dominance, as described in Chapter 3.

Whilst definitions of discourse vary, it is commonly held to be more than every-day use of the term implies. I take discourse to be more than a single statement or text, and as existing beyond any individual text(s) from which it is composed. It is 'a structured collection of texts' (Phillips and Oswick 2012), or talk (Van Dijk 1993) which acts as a generative mechanism (Bryman 2004) and is concrete in that they produce a material reality (Hardy 2001). Discourse is a central concept in CDA (Wodak and Meyer 2009) and I will say more below about the particular way that I conceptualise it in this research.

A discourse analysis broadly comprises an analysis of 'texts' or discursive events. Different 'versions' of discourse analysis exist (Alvesson and Karreman 2000), in part arising from its evolution from a range of different disciplinary traditions (Oswick et al. 1997). As described in Chapter 1, discursive approaches are traditionally ontologically constructivist, holding that discourse creates reality, whereas a critical discourse analysis (CDA) represents a more realist discursive approach which sees a real, material world independent of discourse (Wetherell et al. 2001). This latter perspective is consistent with the views of critical theory.

In this research I am particularly informed by Fairclough (1992) and his three-dimensional view of discourse as described in Chapter 1. He suggests that there are three aspects or dimensions to any 'discursive event'. First, at the micro level is the text itself. Second, at the meso level, are what he calls 'discourse practices'. Third, at the macro level, are the broader social practices, which include the "institutional and organizational circumstances of the discursive event and how that shapes the nature of the discursive practice" (Fairclough 1992, p. 4). This three-dimensional position serves to bring together 'three analytical

traditions'; linguistic analysis, interpretivist analysis and macro-sociological analysis, as encapsulated in the following Figure 2.

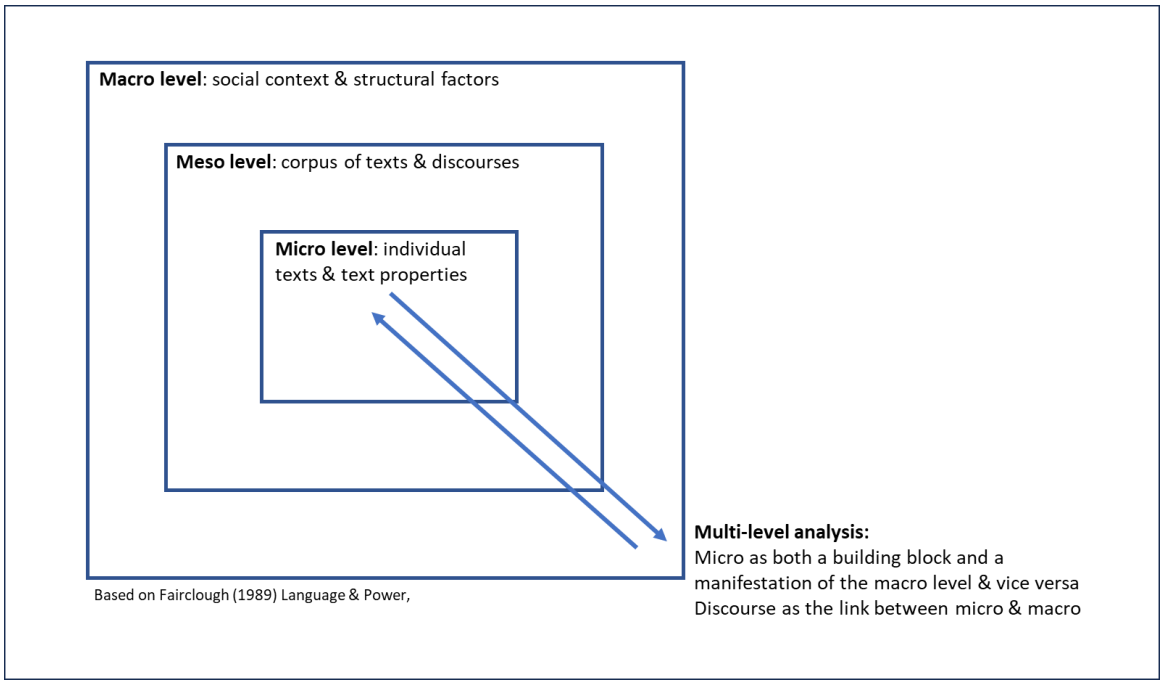

Figure 2. Three dimensional view of discourse

Fairclough (2003) endeavours to provide a usable CDA framework but not a blueprint, and indeed he remains resistant to the idea that CDA is purely a method or tool (Fairclough 2001). As such Fairclough (1989) argues that discourses should be analysed at three levels simultaneously because this approach facilitates a "link between the micro scale of everyday language use and the macro scale of social structure" (Phillips et al. 2008, p. 770). In other words, it helps to show the connection between individual instances or events and the context or environment in which they take place. As shown above, each of the levels has a different focus and requires a different kind of analysis, which I set out briefly below and more fully when I describe the analytical steps used later in this chapter. Further, in what follows I make use of terminology both derived from Fairclough's work (Fairclough 1989,1992,2001), but also adopt some different terms either for the purpose of clarity or emphasis.

Micro level. I describe this first level as the micro level. Analysis is interested in discourse with a small d (Wetherell and Potter 1988; Alvesson and Karreman 2000) and involves close textual analysis of the data or empirical material. The micro level is the most directly 'linguistic' phase of a CDA, highlighting the discursive features (hereafter DF) which exist in

texts and which effectively initiate particular 'discursive practices' (Vaara et al. 2010). Discursive practices (hereafter DP) are effectively constitutive of discursive features and an examination of their constitution is a practical means of apprehending discourses, as described below. Together DF and DP comprise the properties of a text as shown in Figure 2.

Meso level. Analysis at the meso level should be interpretive (Fairclough 1989), with a focus on the mid-range between the micro and macro context, exploring patterns across the corpus of texts in terms of what they can tell us about their production (Phillips and Oswick 2012). Whereas Fairclough (1992) describes these patterns as discourse practice I will refer to this level as concerned with 'production processes'. This difference in terminology is partly to avoid confusion with the discursive practices I have outlined above, and also because focus at the meso level is the particular processes through which text and talk is enacted; how a corpus is produced, distributed, and consumed.

Macro level. At a macro level, analysis is concerned with the broader societal context, including a priori concepts from critical theory, which has contributed to the production of the texts. Analysis at this level analysis should be explanatory (Fairclough 1989), as it draws heavily on philosophy, politics, history, and social theory (Phillips and Oswick 2012) and engages in critique with these in mind. The focus here is to challenge and raise questions of translation by searching for and disclosing the basic assumptions or start points which underlie the properties of a text highlighted at a micro level and connect them to both discourses and to contextual factors, as I will describe below.

Fairclough's (1989) approach to CDA is useful partly because it provides these multiple points of analytic entry, and although the CDA is presented as if progressing from the micro, via the meso to the macro, in reality it is much more intensively iterative, involving constant movement between the three different levels. Further, Fairclough (1992) emphasises the dialectical nature of critical discourse analysis whereby the elements of it are separate but not completely discrete (Fairclough 2001), which makes for significant complexity both during empirical work and the subsequent presentation of it, something I will reiterate within the chapters which comprise my findings.

5.3.2 Texts

As described above, a CDA is concerned with the critical analysis of 'texts', although what constitutes a 'text' is debated. Leitch and Palmer (2010) set out a spectrum of definitions, from a narrow view whereby text is viewed exclusively as written language, to a broad view of text as potentially anything that is created to communicate meaning. I concur with Phillips and Oswick (2012, p. 12) who view texts as "both the building blocks of discourse and a material manifestation of it". The selection of texts is a critical component of any CDA because it provides the underlying justification for the validity and significance of the insights offered by the analysis (Leitch and Palmer 2010). I now describe my approach.

5.4 Data collection

As I have described, a critical discourse analysis comprises an analysis of 'texts'. Overall I selected 20 written articles as examples of translated findings from neuroscience research, augmented with 32 interviews conducted with individual translators. Each of these is regarded as a 'text' and in CDA terms also known as a 'communicative event' or a 'micro instance', both inseparable from the context and processes by which it is made, and containing both traces of its production and cues as to how we should interpret it (Fairclough 1989).

5.4.1 Texts as empirical material

Texts in this research include both articles and interview transcripts as described above. The former might be seen as 'naturally occurring' in that a researcher has no role in their production (only in their selection) and they are not affected by the data collection process. For the latter a researcher plays an active role in their production and as a result analysis must be approached with differing levels of reflexivity, including the researcher reflecting on their role and effect during the interview process as described later in this chapter. However, discourse theory makes no provision for a scenario in which texts arise from different data sources or methods of collection in the sense that all empirical material is simply classified as a 'text'(Cruickshank 2012).

Articles. In this research the selected articles are effectively manifestations of the phenomenon of translation, and comprise examples of prescriptions for practice in organisations. Use of such secondary material in research, whilst 'naturally occurring', still

requires reflexivity, in particular with regards to the selection of articles, since I have made the choice in terms of which to include or exclude. In this selection I have endeavoured to be transparent by providing a full account of my approach below.

Interviews. The qualitative research interview is a prominent method for data collection, used to elicit information from an interviewee or respondent (Bryman 2012), as well as a widely used way of enhancing a corpus with supplementary data in a CDA (Fairclough 1992). Typically interviews are concerned with the experiences and expertise of so-called respondents, and such accounts are produced in interaction with the researcher, otherwise described as 'co-produced'. From this co-production arises the need for reflexivity (Alvesson and Sköldberg 2000). However, some additional points need to be made in relation to interviews conducted as part of a CDA since, as described by Hammersley (2014, p. 532):

> interviews carried out for the purposes of discourse analysis are unusual in that they are not, generally speaking, aimed at gaining information about informants' experiences or opinions, nor are they usually designed to document their attitudes, but rather to obtain a sample of the discursive practices that they employ, with a view to studying the nature of these and how they function.

What this means is that whilst interviews are typically designed to fulfil the assumed information needs of a researcher, in a CDA the focus is on how things are said and not on what is said. As such, in my interviews with translators of neuroscience research findings I am less concerned with what they say about translation than I am with the discursive practices which they draw upon, or the specific ways in which they use talk to accomplish things. Again, Hammersley (2014) puts it succinctly when he suggests that interview respondents are "being invited to perform discursively so that their performance can be analysed"(p. 532). Thus, from the perspective of a CDA interview respondents are not 'informants' or 'truth tellers' but instead use language to 'do things' and it is these 'things' which become the focus of a discourse analysis (Alvesson and Deetz 2000). As such interview transcripts are simply texts, as described above. This stance, however, creates an ethical dilemma (Hammersley 2014). How can a respondent give informed consent when they likely assume an interviewer is interested in their experience and might either struggle to comprehend an interest in discursive practices, or unhelpfully adjust or manipulate their

use of language in some way? Ultimately Hammersley (2014) concludes that the use of interviews is justifiable as typically the risk of harm is low.

An additional issue also arises in that the 'things' to be analysed, the discourses themselves, are not 'pure' because the researcher has played an active part in shaping them through the questions asked (Cruickshank 2012). Further the interview itself is held to be a particular communicative form or genre, with associated expectations and norms. This discursive setting will likely shape the discourses which means that an interview should more accurately be seen as an interview-discourse, on its own producing a version of reality (Alvesson and Sköldberg 2000).

In this research, the inclusion of interviews elicits a range of benefits, as well as some particular challenges. As a second source of empirical material, interviews bring an additional and alternative perspective on translation, including a richness not discernible through articles alone. For instance, information about translator background and experience provides useful context to their translation efforts. Further interviews provide more scope for contradictions to arise whereas articles, perhaps due to their nature, typically represent a more coherent or consistent version of neuroscience research findings for organisational practice.

Taken together the texts which comprise the empirical material in this research are not mere documents but have force potential (Fairclough 1992) in that they communicate, legitimate and de-legitimate ways of thinking and acting. They have a range of other potential effects, not all of which are apparent.

5.4.2 Text selection

My research does not aim to establish generalisable findings and as such the intention was to select texts which arguably typify translation, while also reflecting sufficient diversity as a way of ensuring the possibility of identifying a full range of factors. To achieve this, I effectively created a 'sample frame' for the texts, guided by the deliberate use of clear criterion. These criterion were identified in advance so as to avoid or minimize the risk of bias and to ensure the collection of comprehensive and inclusive empirical material, allowing for the identification of sufficient participants but also taking account of practical considerations.

With regards to sample size, there is no hard and fast rule which sets out how to establish a sample size in qualitative research, although factors such as the heterogeneity of the population (the more variety, the bigger the likely sample), the number of selection criterion used (more criteria lead to a bigger sample) will have some bearing (Ritchie et al. 2013). That said, samples are typically quite small in qualitative research; at some stage an inquiry will reach a point where little that is new emerges from each additional unit. Further, a researcher must do proper analytical justice to data which has been gathered, and from a critical perspective, this includes further exploring what is taken for granted, what is problematic, and what looks to be privileged.

Translations of findings from neuroscience research. I used a CDA to examine examples of prescriptions for practice, in the form of articles penned about neuroscience findings by translators for the organisational domain. Such articles were selected by first identifying a range of relevant articles, then selecting individual texts (or discursive units, Hardy 2001) for analysis. The texts selected are held to be typical of those published, and the rationale and systematic process by which they were selected is described in detail below.

Whilst previous research examining the appeal of the brain in the popular press (O'Connor et al. 2012) including how misunderstanding is perpetuated (Beck 2010) has used the LexisNexis database to search for neuroscience articles in the popular press, it was not possible to emulate such a search for texts in business publications, as LexisNexis does not refine by business publication and an exploratory search resulted in a large volume of irrelevant content. As a result it seemed appropriate to take the same route as organisational practitioners in identifying and accessing such material. Increasingly managers' information seeking preferences, which refers to the way people search for and utilise information, are moving onto the internet (De Alwis et al. 2006), whereby it is a first source of information amongst managers and in turn represents a new genre or opportunity for science reporting (Trench 2007).

Google is the search engine with the largest market share, particularly in the Western world, and in many ways 'Googling' has become synonymous with searching for information. Therefore, a google search for practitioner material was conducted as follows:

1. Identify appropriate search terms, reflecting the idea that a typical searcher uses about 3 words in their search query.[24]
2. The google search was designed to identify the top 20 results, taking into consideration that research conducted in 2014, shows that on average, i) a 'searcher' does not go past the first 5 listings on a search engine results pages (SERP), ii) that the first page typically has a click-through rate (CTR) of 71% (whilst pages 2 and 3 have a combined CTR of 6%) and, iii) that on the first page alone, the first 5 results account for 67.60% of all the clicks whilst the results from 6 to 10 account for only 3.73%. [25]. Thus, top results tend to garner by far the most attention from searchers. Table 7 shows the search terms, the total results for each search and the number of relevant articles once the above criteria are applied.

Table 7. Search for texts

Google Search	Total Results	Number of relevant articles for analysis
Neuroscience for managers	6.8m	11
Neuroscience for organisations	24.7m	9
Neuroscience for business	72.9m	12
Neuroscience at work	103m	13
Organizational neuroscience	13.5m	16 (9 scholarly)
Neuroscience for leaders	21.9m	0

3. I removed duplicates and applied exclusion criteria which included: paid for advertisements; paywall protected and subscription-only material; undergraduate & postgraduate neuroscience courses; books for sale; neuroscience bodies; neuroscience jobs, off-topic items (i.e., infant neuroscience); videos.

[24] https://moz.com/blog/state-of-searcher-behavior-revealed accessed 1 April 2020
[25] https://moz.com/blog/google-organic-click-through-rates-in-2014 accessed 1 April 2020

4. I subsequently summarised and tabulated the remaining items as a sample frame in order to create a sample matrix (see Table 8) to set out the criteria by which the final sample is selected.
5. This was followed by the purposive selection of 20 articles, as texts, which reflect the range arising from the search, with the expectation that these would yield relevant and sufficient empirical material.

Table 8. Sample matrix (articles)

Criteria							Total
Genre	Articles n=7	Blogs n=6	Course n=2	Scholarly n=1	Misc. n=4		20
Organisations represented	Consultants n=9	Industry Body n=1	Exec Ed n= 1	Business Publication n= 9			20
Authors	Academic n= 4	Journalist n= 3	Consultant n=8	N/A n= 3	Industry body n= 1	Exec Ed n= 1	20
Stance	Advocates n=19	Critics n=1					20
Publications	Large-scale n=9	Small/Own website n= 11					20

The selected texts, shown in Table 9 below, endeavour to reflect the balance of prescriptions for practice published, and therefore mainly comprises articles and blogs, but include some practitioner training course material, a white paper, and an open access scholarly paper. It comprises mainly advocates, but with the voice of a detractor represented, as are those of both big and small consultancies, industry bodies such as the CIPD, and specialist business publication such as the Harvard Business Review.

Table 9. Summary of selected articles

#	Title	Webpage
1	Neuroscience for Leadership and Management	https://executive.mit.edu/.../embodied-leadership-is-neuroscience-the-next-frontier-in-...
2	Neuroscience in Performance Management	https://www.td.org/insights/neuroscience-in-performance-management
3	Neuroscience in action Applying insight to L&D practice	https://www.cipd.co.uk/.../neuroscience-action_2014-applying-insight-LD-practice_tc...
4	How can HR use neuroscience?	https://www.hrmagazine.co.uk/article-details/how-can-hr-use-neuroscience
5	How brain science found its way into business school	https://www.ft.com/content/623f049a-1269-11e8-a765-993b2440bd73
6	How neuroscience is being used to spread quackery in business	https://www.iflscience.com/.../how-neuroscience-being-used-spread-quackery-busines...

#	Title	Webpage
7	Is neuroscience being dumbed-down for the business world?	https://www.oxford-group.com/.../neuroscience-being-dumbed-down-business-world
8	How Neuroscience Can Help Leaders	https://www.business.com/.../the-psychology-of-organizational-change-how-neuroscie...
9	Why Neuroscience Should Change the Way We Work	https://intentionalworkplace.com/.../why-neuroscience-should-change-the-way-we-ma...
10	Beyond Brain Basics: 5 Neuroscience Lessons for Leaders	https://gethppy.com/leadership/5-neuroscience-lessons-leaders
11	Neuroscience and Leadership	https://www.ccl.org/about-our-research/current-research.../neuroscience-leadership/
12	Neuroscience for Leadership	https://www.ldl.co.uk/training/neuroscience-for-leadership/
13	The neuroscience of leadership	https://www.psychologytoday.com/gb/blog/your-brain.../the-neuroscience-leadership
14	The Neuroscience of Strategic Leadership	https://www.strategy-business.com/article/The-Neuroscience-of-Strategic-Leadership?...
15	The Neuroscience of Trust	https://hbr.org/2017/01/the-neuroscience-of-trust
16	How Organizational Cognitive Neuroscience Can Deepen ...	https://onlinelibrary.wiley.com/doi/full/10.1111/ijmr.12071
17	Neuroscience and organisational values	https://www.headheartbrain.com/.../what-has-neuroscience-got-to-tell-us-about-changi...
18	Q&A with IBM's Gary Kildare: Neuroscience, employee co-creation	https://www.hrdconnect.com/2017/06/28/ibm-chief-hr-officer-talks-about-the-hr-technology-evolution/
19	The impact of organisational change on the brain	https://www.hrzone.com/lead/future/the-impact-of-organisational-change-on-the-brain
20	Is Organisational Neuroscience on your radar	https://www.linkedin.com/pulse/organisational-neuroscience-your-radar-2017-trent-rosen

Translators of neuroscience research findings. I subsequently conducted confidential, semi-structured interviews, using Zoom as a result of Covid-19 restrictions, with 'translators' of findings from neuroscience research. These are individuals who have been involved in the process of translating neuroscience research findings into the organisational domain. As shown in Table 8 above, translators appear to be mostly consultants but also academics and journalists whilst some remain anonymous.

Based on King (2004) I took a number of key steps in organising this phase of the research. First, I designed an interview schedule (see Appendix 6), to guide the interviews and to ensure some degree of consistency, as well as to set out the likely content of such interviews and so receive ethical approval for them. The schedule was designed bearing in mind the need to establish rapport with participants, the desire for interviews to have flowing conversation (Hannabuss 1996), and the intention to maximise the value of the conversation, for instance by probing and keeping focussed. The content of the schedule was based on a reading of relevant literature, substantive, methodological and theoretical.

Second, I identified potential interview participants who were individually contacted, via email, and provided with an overview of the research (see Appendix 3) and an invitation to take part. Interviews all were conducted using Zoom, although participants were given a choice to use other technologies, including a simple telephone conversation.

In total I identified and contacted 84 individuals with a request to participate in my research and was able to conduct 32 semi-structured interviews. In this I was in part dependant on access to and the availability of those with the appropriate experience and knowledge. I endeavoured to interview an equal proportion of consultants, journalists and academics whilst also keeping the sample size manageable, as shown in Table 10 below.

Table 10. Sample matrix (interviews)

Primary category	**Sub-group**	**Sub-group**	**Number of interviewees**
Consultant	Coach N=5	Consultant N=7	12
Journalist	Journalist N=6	Science writer N=3	9
Academic	Neuroscience academic N=8	Business academic N = 3	11
Total			**32**

However during the analytical stage of this research I made the decision to limit analysis to the accounts of consultants as translators. At the outset it was more difficult to identify and get agreement to participate from other translators, and although I persevered and ultimately was able to secure agreement from a broadly equal range of translators, this difficulty perhaps arose as a result of the research topic being less pertinent to journalists and academics. Indeed, Table 8 above shows how consultants are the most prevalent authors of articles. Further, it proved to be more difficult for non-consultants to retain a focus on neuroscience research findings for organisational practitioners, often because their translation work was for a broader lay audience, whereas for consultants it comprised (usually) their daily work. From this disparity it became clear that all translators are not the same. This resulted, for instance, in the need to adjust questions during the interview process. Ultimately, and following analysis of the articles, coupled with my familiarity with the interview material which revealed substantial differences between the different types of

translators, I took the decision to focus exclusively on consultants as the primary active translators of findings from neuroscience research for the organisational domain. That said, the additional interviews provided useful additional context and, through their difference, helped to highlight some of the discursive features and practices employed by consultant translators.

5.5 Ethics

In what follows I describe how I ensured that I fulfilled all ethical requirements for this research. As described above, Hammersley (2014) debates issues surrounding the ethics of interviews in discourse analysis. A common assumption of interview respondents is of research interest in their expertise and experience which is not the case in discourse analytical approaches where research is actually interested in discursive practices. Whilst highlighting the potential for deception in such approaches, ultimately he concludes the risks (for damage) are likely to be low and the options to obtain properly informed consent are limited as a result of the complexities of a discourse perspective and its likely juxtaposition with respondents typical ontological position or experience. I acknowledge this debate, whilst necessarily adopting the traditional approach to ethics and ethical approval in light of the difficulty of proceeding in any other way.

As such all participants received a declaration of informed consent (see Appendix 5), and in addition were asked to sign a consent form prior to the interview (see Appendix 4). In addition, I asked permission to record and transcribe the interview both in advance and at the outset of each interview. All participants were assured of confidentiality and all data and recordings are stored in an anonymised form in a secure format. Such is the content of my research, I felt that the interviews were unlikely to be harmful to participants in the way of discussing sensitive topics or evoking previous bad experiences.

All participants gave their permission for their interview to be recorded, and recordings were subsequently transcribed in compliance with the ethics requirements of Cardiff University (for example, I obtained verbal and written informed consent before each interview. Participants' recordings and transcriptions have been anonymised, and signed consent forms kept separately from the main data, securely stored in a lockbox at the researcher's residence.)

5.6 Covid-19 related issues

The interview is usually held to be a flexible method, with the scope for rich and detailed data, the ability to tackle a broad range of research questions, and a familiarity to most research participants (King 2004). I was appreciative of such flexibility when it became clear that I would need to use Zoom to interview my participant sample as a result of Covid-19. I did consider the use of epistolary interviews, either as well as or instead of Zoom, but felt the benefits were outweighed by the disadvantages for my research. For instance, Debenham (2007) points out that the epistolary interview results in a text-based record negating the need to transcribe and allows participants to reflect on and respond to interview questions in their own time. However, they lack spontaneity and can stretch over months (Gibson 2010), participant interest can drift away (Hunt and McHale 2007), and probes are only possible in follow-up emails (Meho 2006). With regards to using Zoom, it is a relatively new technology and the literature closest to it discusses the use of Skype interviews and typically comments on its low cost, convenience and flexibility, (Weinmann et al. 2012) whilst at the same time allowing participant and researcher to see one another, giving it definite advantages over telephone-based interviews (Hanna 2012). Participants can contribute from the comfort of their own location, rapport can effectively be built and there are those that argue that the quality of participant response is much the same as an in person interview (Deakin and Wakefield 2014). That said, it would be naïve not to assume that some data, in the way of non-verbal cues for instance, are easier to miss using Zoom, or that not all participants would be au fait with it, although in my sample of translators I found this not to be the case. Overall, given the straightened circumstance, Zoom was an efficient and viable means of conducting interviews. I had no 'drop-outs', no technical issues and only needed to rearrange a solitary interview. The interview skills required (Kvale 1983) remained much the same as if we had met face to face, as did the need for ongoing reflexivity, the recording and subsequent transcribing of each interview and the use of an interview schedule.

5.7 Quality in (critical) qualitative research

The question of what makes for good quality critical research, and in particular the evaluation of qualitative research within a positivist paradigm has been much debated.

Since the concepts of reliability and validity, developed in the natural sciences, have a very different epistemological foundation to that of qualitative research there are fundamental questions about their value in assessing the quality of qualitative research (Ritchie et al. 2013). Not only that, but methodological pluralism in qualitative research, and in MOS more generally, adds further complications. Generally, it is held that researchers should demonstrate the quality of their work in ways that are commensurate with their philosophical assumptions (Roulston 2010).

Lincoln and Guba (1985) propose two primary criteria for assessing a qualitative study: trustworthiness and authenticity. Trustworthiness in particular has become a main indicator for quality, and relates to i) the credibility, ii) the transferability, iii) the dependability and iv) the confirmability of a study. Its implications for my research are summarised in Table 11 below, based on Lincoln and Guba (1985) and Ritchie et al. (2013).

Table 11. Assessing quality in qualitative research

Element of Trustworthiness	**Description**	**Implications for research**
Credibility	Does the research investigate what it claims to be investigating? Akin to internal validity	For example through checking conclusions with participants, through triangulation
Transferability	Can insights be transferred to other settings? Akin to external validity	Provision of sufficient detail in accounts to allow readers to see that findings are applicable in other contexts
Dependability	Relates to the replicability and 'sturdiness' of findings (Ritchie et al. 2013) Akin to reliability	Provision of detailed information about the research process; transparency in documenting methods used as well as logic behind the results and conclusions drawn
Confirmability	Providing a reflexive, self-critical account that demonstrates researcher values have not been unduly influential Akin to objectivity	Reflexivity, acknowledging researcher impact on the research

I address these aspects in a number of ways. Firstly, two forms of empirical material effectively enables me to triangulate, arguably providing it with *credibility* by strengthening the confidence in any claims made, and mitigating any weaknesses from a single data source. Secondly, I provide a detailed description of the data and my analysis of it and in so doing demonstrate both the *transferability* of the research and its *dependability*. Thirdly, the nature of the research necessitates a reflexive statement, see below, in which will be considered my role in the production of knowledge and an explicit articulation of my vantage point, including possible conceptions and biases as well as challenges. Taken together, these aspects will go some way to demonstrating the *confirmability* of the study.

5.7.1 Reflexivity

As previously described, reflexivity is a central commitment in critical research, and is effectively another dimension of critique (Morrow and Brown 1994). At its most basic level reflexivity is concerned with turning ones attention inwards and reflecting on the way in which research is done (Nadin and Cassell 2006), as a means of ensuring high quality research (Alvesson and Sköldberg 2000). Reflexivity is seen to enhance the trustworthiness of data and bring a general integrity to the research process, although it can be a fine line between interesting insights and self-indulgence (Brannick and Coghlan 2006). These points of course belie the actual complexity of it, especially for a novice researcher still familiarising herself with some of the basic technicalities of research, and where the temptation is to adhere to templates and protocols in order to impose rigour and demonstrate quality, but which might also act as a straitjacket, imposing limitations and potentially stripping research of more creative insights (Harley and Cornelissen 2022).

For Johnson and Duberley (2003) there are three forms of systematic reflexivity, i) the hyper or deconstructive, ii) the epistemic and, iii) the methodological. Methodological reflexivity is a primary concern for researchers in the positivist tradition since it is concerned with monitoring the impact on the research process in order to protect objectivity. For a critical researcher epistemic reflexivity is a more central issue and entails:

> systematic reflection by the social scientist aimed at making the unconscious conscious and the tacit explicit so as to reveal how his/her formative social location or habitat, to which there is a corresponding habitus or set of embodied dispositions, influence any account (Johnson and Duberley 2003, p. 1289).

And with an overall emancipatory aim. In what follows I will endeavour to do that, firstly by saying a little more about my background in order to surface the likelihood of any potential biases, and secondly by setting out the specific challenges encountered which arise as a result of that and how I sought to address them.

Researcher background. Acknowledging the role of the researcher in a research project is an important aspect of reflexivity, especially since critical theory is explicit in its assertion that research cannot be neutral or objective (Horkheimer 1937/1976).

In Chapter 1 I described how my interest in the topic arose from my experience as an executive coach, wherein I was struck by the prevalence of ' translated' neuroscience research findings that were intended for a business audience, and also contributed to it by co-authoring a textbook for other coaches which proposed certain models and approaches to enhance their practice (Brown and Brown 2012)**.** In addition, I spent 15 years in various managerial roles in a large organisation and as such would consider myself to have experience as an organisational practitioner. I came into the PhD programme as a neuroscience enthusiast, an ardent reader of the literature, but with increasing discomfort in the face of the volume of low-quality translations being presented to an organisational audience, which commonly failed to acknowledge limitations and complexities in neuroscience research and instead simply asserted 'brain-based' facts.

However my corporate background coupled with a previous, more positivist, MSc in organisational behaviour and my reading of the neuroscience literature, meant that the appeal of a so-called 'objective' approach was familiar to me and as a result it took me a while to come around to a critical way of thinking. I was also perplexed by what I saw as the wholesale 'condemnation' of science by critical theory, as it felt too extreme to argue that neuroscience research findings were not able to offer anything at all to organisational scholars or practitioners. Further, I experienced the idea of critique as being negative, vague, and not useful in the sense that it failed to offer any solutions, whilst the idea of emancipation occurred to me as idealistic and naïve.

In Chapter 1 I described how, with the help of Huczynski (1993) I was able to shift my focus away from a critique of neuroscience itself to instead focus on 'translation' as the process by which findings from neuroscience research moves to the organisational domain. This shift

served to facilitate exploration of what I consider to be the key research problem; the paradox whereby prescriptions for practice often consist of, at best, tenuous connections to the original science. A further development arose from an appreciation that critical theory was a relevant and useful perspective for this research, which did not require a full-scale commitment to 'being' a critical theorist. That said, my particular background did pose some challenges as I will now describe.

Research challenges. One significant challenge that I encountered was the question of how to simultaneously observe the principles of a critical discourse analysis without becoming rigidly driven by it as a protocol. In many ways a CDA has the potential to incorporate the ideas and criteria of Alvesson and Sköldberg (2000) with regards to a reflexive methodology in that it can be both flexible but coherent, both rigorous and systematic but with scope for 'thoughtfulness' and creativity. But, like any method, it runs the risk of becoming a 'recipe' if applied by rote when it effectively serves as a 'straitjacket' which limits the reflexivity of the researcher (Harley and Cornelissen 2022). From these possibilities arise a tension between an adherence to a CDA protocol (Leitch and Palmer 2010) whilst at the same time not allowing such an adherence to become so rigid that it reduces the role of the researcher and the inferences they feel able to make (Chouliaraki and Fairclough 2010). However, eschewing such a 'template approach' places higher demands on the researcher, according to Alvesson and Sköldberg (2000). Further, it is a mistake to attach judgements regarding rigour to the rote application of an established protocol such as a CDA, suggest Harley and Cornelissen (2022), since rigour is more likely to be inherent in the reasoning of the research which, as a result must be transparent.

At the outset I sought examples of research conducted using CDA, but ultimately have come to understand that there is no single CDA template which can be applied to address a research question, rather a researcher must design their own research within the broader concerns and parameters of CDA. Further, the absence of examples likely adds to the rigour of research, since it requires the researcher to assert a higher level of commitment, consideration, and reflection with regards to research design, the research itself and also analysis of it, including what Harley and Cornelissen (2022) describe as 'conceptual leaps' made, effectively embracing creativity whilst enabling the avoidance of baseless claims. This, it transpires, are the 'higher demands' to which Alvesson and Sköldberg (2000) refer.

Other challenges arose during the process of analysis. Firstly, the difficulty of staying discursive, by which I mean, when confronted with a volume of textual material, the struggle to maintain a focus on the performative aspects of language (what they do or achieve) as opposed to the content of an article or interview. Relatedly, and given my background, a second challenge arose in the difficulty of being 'critical' and being able to question and challenge the texts. I found being critical especially problematic when endeavouring to challenge and uncover background assumptions, many of which are so pervasive that I 'succumbed' in the sense that they appeared to me as reasonable and normative. In both these instances my rejoinder was to revisit the empirical material time and again, iterating between the different levels and between closeness and distance. Further, throughout the research I kept a research diary in the form of a series of notebooks which allowed me to reflect on earlier and later thoughts and positions, particularly relating to the empirical material. These notes proved particularly useful when so close as to not be able to see the 'wood for the trees'. Ultimately, and as described at the start of this chapter, my intention to be transparent as well as my status as a novice research compelled a level of reflexivity through a continuous questioning and challenging of my approach.

5.8 Analysis

As previously described, whereas in traditional qualitative analyses the focus is on 'what is said', for a CDA the focus is instead on 'what is done' with language. In other words how 'what is said' achieves or does something. As such the task of the CDA is to analyse language use and practices to highlight the version of reality which is created ('what is done'), to uncover likely underlying assumptions and to connect these to their societal context.

At this point it is pertinent to reiterate that a CDA is focussed on a collective body or corpus of texts rather than on individual accounts or instances. Whilst there will of course be variability amongst the texts, there will also be regularity and repeated occurrences and it is these that are of primary interest (Talja 1999). These regularities come in the form of text properties (discursive features and practices) and as well as discourses as described below.

5.8.1 Analytical steps

Both articles and interview transcripts, as texts, are the objects of this research and were uploaded to NVivo, primarily as a means of managing the analytical process.

Each of the texts was read multiple times. In the first instance I engaged in an initial reading of the articles, taking them at face value and reading as though I were a member of the articles' intended audience, thus allowing me to experience its 'dominant' reading as the author intended. And following transcription of the interviews an initial reading enabled me to familiarise myself with these as texts.

This initial reading was followed by a first level reading, with a focus on textual analysis, including language and vocabulary use, technical terminology, commonly used words, and phrases, all as a means of identifying significant and common discursive features. This reading enabled me to identify a range of *discursive features* by way of significant patterns in description, vocabulary, and explanation, despite variability in the texts. Multiple readings of the texts were necessary in order to arrive at the discursive features which are outlined in Figure 4, below.

In the next level of reading my main concern was with identifying the *discursive practices* which are implicit or explicit in the texts. This stage was also an iterative process, involving close reading of the texts, alternated with withdrawal to a higher level view of the entire corpus of texts. Discursive practices are constituted of discursive features, so analysis also required me to consider if and how said features combine into an identifiable practice, designed to construct a particular reality. This was a lengthy process, and ultimately three significant discursive practices were evident to me, each comprised of a range of discursive features, and set out below in Figure 4. Having begun with the articles, I moved on to analyse the interviews in light of the discursive practices, using NVivo to code for them and to identify common (or additional) discursive features used by translators to enact particular practices.

Together these discursive features and practices comprise text *properties* and represent the micro level analysis of a CDA.

Familiarity with the texts enabled me to examine them in light of their *production processes*. This stage involved focussing on the articles and on what patterns in their formulation, such as their structure or authorship, tells us about the context in which they have been produced. This stage represents the meso level analysis of a CDA.

The macro level analysis involved me uncovering the (hidden) *background assumptions* underlying the text properties through a process of denaturalisation. In other words, what assumptions can be inferred from the particular discursive features and practices utilised by translators and which are effectively the building blocks of a discourse. From iterating between the different levels of analysis I identify 3 *discourses.* At this point it is worth saying that I use discourse in the manner suggested by Phillips et al (2008) as "an intermediate analytic category" through which I can "connect together the micro level of the text with the impacts of discourse at the level of social context" (p. 17). As such I am guided by a particular conceptualisation of discourse which is outlined in Figure 3 below. In this conceptualisation discourse is a complex of three elements; texts, their production processes and their societal context as uncovered through background assumptions as internalised societal messages (Fairclough 2001).

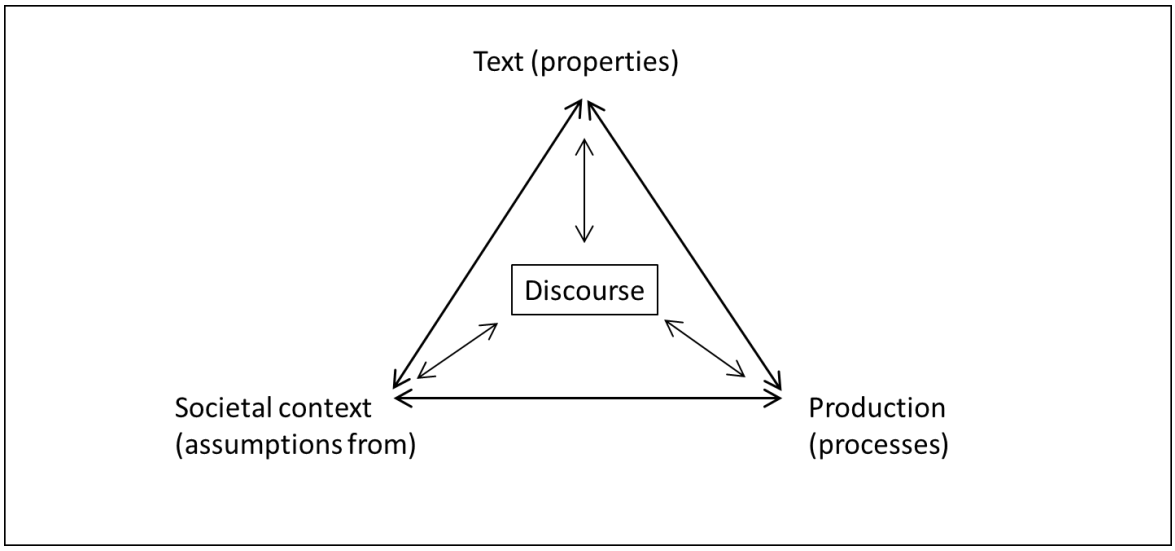

Figure 3. Simple conceptualisation of discourse

Given this conceptualisation, my analysis essentially involved identifying discourses by critically iterating between societal context (via background assumptions) and discursive practices to arrive at what seemed to be a reasonable approximation of a discourse. Additionally, in relation to Figure 3, I point to how:

- "Discourses do not only reflect reality but are the very means of constructing and reproducing it" (Aranda et al. 2021, p. 199)
- All texts are located, and should be analysed, in a social context (Leitch and Palmer 2010)

- Text properties include discursive features (DF) as “articulations of the intended discursive statements” of a text (Vaara et al. 2010, p. 688) and discursive practices (DP)
- An iterative analysis at the three levels of a CDA will reveal the background assumptions which are reflected in a discourse (Aranda et al. 2021)
- Background assumptions are conceptualised here as akin to what Alvesson and Sköldberg (2000) describe as ‘deep structure’ in that they are taken for granted beliefs, so pervasive they are not necessarily available to our conscious awareness and are uncovered through a process of denaturalisation
- Denaturalisation involves ‘deconstructing reality’ (Fournier and Grey 2000), particularly through questioning the text properties, production processes and societal context, including using a priori ideas

The final aspect of the macro level analysis involved more explicitly connecting discourses, via background assumptions and text properties, to their broader societal context, and in particular their *construction* and their *constructive effects*. By this I mean identifying elements (or ideas) from the societal context in which translation takes place and which are reflected in the discourses, as well as the reciprocal impact or result of the discourses on them.

It is important to note that whilst I have presented my analysis as moving from discursive features to discursive practices and their underlying assumptions en route to identifying prevalent discourses, as well as their construction and constructive effects, in reality it was far from a linear process. Instead analysis comprised of many iterations, cycling between closeness and distance, surface, and deep structure, and between the empirical materials and the growing connections I was beginning to make.

5.9 Preface to findings

> a discourse analysis consists of a description, interpretation, explanation and – in some variants also critique of discourses, including their development and what consequences they have for the phenomenon under study (Cruickshank 2012, p. 39).

In presenting the findings from this research over the next three chapters I endeavour to incorporate these aspects. In what follows I briefly preface the findings chapters.

Earlier I describe how, in a CDA, through a micro level analysis of language, one can identify discursive features in a corpus of texts, which then initiate particular discursive practices. Each discursive practice involves a range of discursive features, and the analytical process of moving from discursive feature to discursive practice is iterative; patterns of features emerge and can be associated with specific practices. As these practices stabilise then additional features arise. It is the occurrence of discursive features in the texts which enables me to uncover discursive practices.

A series of patterns and regularities in said features lead me to identify three significant discursive practices, set out in Table 12 below. I assign numbers to the DPs primarily to facilitate a logical presentation of my findings in the chapters which follow this.

Table 12. Significant discursive practices

Discursive practice (DP)	**Neuroscience as:**
DP1	An abstract concept
DP2	A means to an end
DP3	Scientific evidence

In chapter 6 I present findings regarding DP1 - the way in which, following translation, findings from neuroscience research become more abstract, more of a concept or a set of ideas which are derived but then disconnected from the originating scientific field. In this sense prescriptions for practice are neuroscience research findings no longer but comprise a more generalised and abstract idea about neuroscience (and the brain) and, as previously described, not just different in degree but different in kind.

In Chapter 7 I present findings regarding DP2 and DP3. This comprises, firstly, the way neuroscience research findings are constituted as a practical solution for organisational practice and so become a means to an end. And, secondly, the way in which 'scientific-ness' is emphasised (even while neuroscience research findings become divorced from the original science) and 'neuroscience' is constructed as providing objective 'facts', becoming an evidence base which can direct and inform organisational behaviour.

In these 2 chapters I show how particular discursive features constitute and initiate each of the DPs. At the risk of an overly linear representation of the relationship between discursive

features and practices, the constituent discursive features are summarised in Figure 4, below.

In Chapter 8 attention turns to the meso and macro levels of analysis. Firstly I set out findings relating to (meso level) production processes and how they elucidate different aspects of translation to a micro level analysis. Secondly I highlight three discourses (flexibility, instrumentalism, and scientism) and how they derive from and act back on structural factors in the broader societal context in which translation takes place.

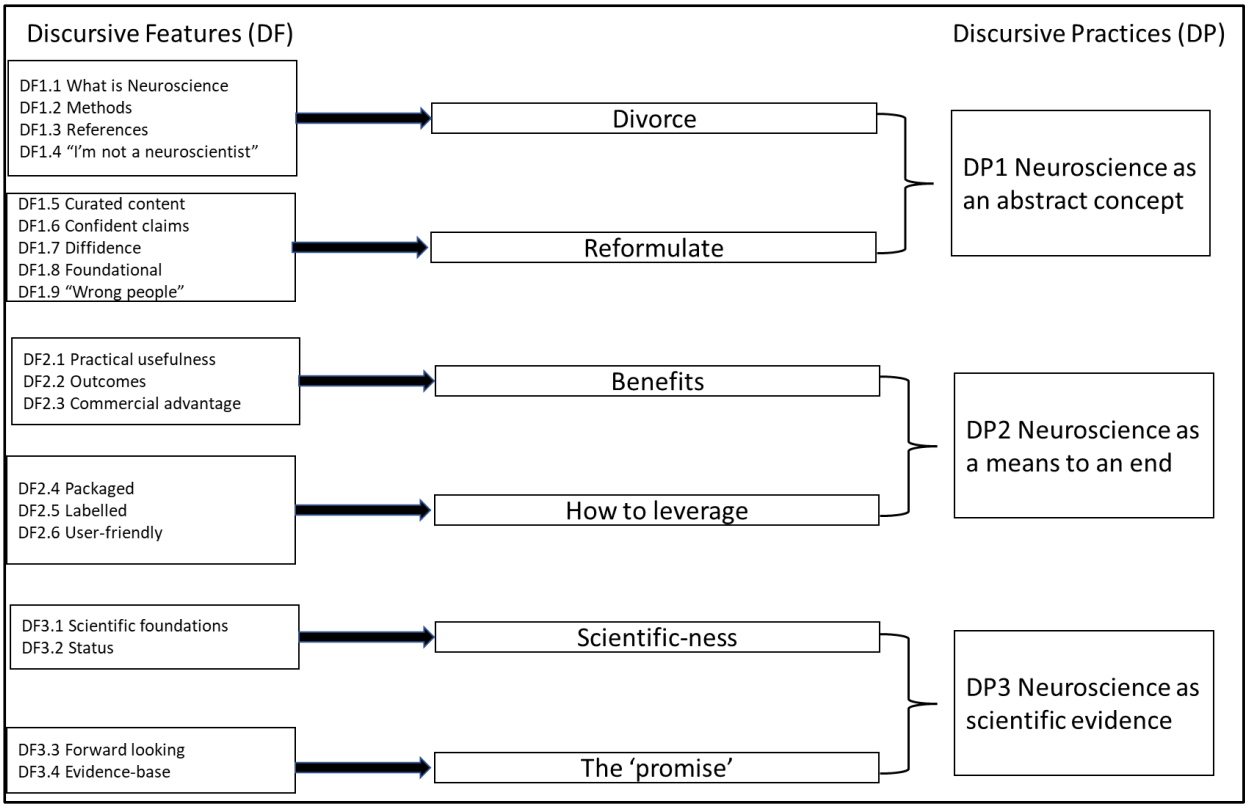

Figure 4. Summary of discursive features and practices

5.10 Summary

In this chapter I have firstly signalled the central importance of reflexivity in critical research, before describing how I use a critical discourse analysis to study the translation of findings from neuroscience research into prescriptions for practice. I set out how texts, as empirical material, originate from articles as examples of the aforementioned 'prescriptions' supplemented by semi-structured interviews with translators. In analysing the empirical material I am informed by Fairclough (1989) whose multi-level discourse analysis iteratively moves from texts at a micro level to macro level societal context, so facilitating a connection

between the different levels which enables, through denaturalisation, sight of the reciprocal effect of the one upon the other. Finally I preface the findings, which are presented in the following three chapters, by describing how discursive features in the texts initiate three significant discursive practices and how these, coupled with background assumptions (uncovered by denaturalisation) enact discourses relating to the translation of findings from neuroscience research into prescriptions for practice. Further, I describe how, from these discourses, it is possible to make connections to structural factors in the societal context in which translation takes place.

As I have mentioned above, in the following chapter I present the findings associated with the first significant discursive practice (DP1). In the chapter I show how neuroscience research findings are, through translation, reformulated as an abstract concept following their divorce from the original science. I also show that this discursive practice has a particular function.

Chapter 6 - Neuroscience reformulated as an abstract concept

In the previous chapter I described how this research adopts an approach known as critical discourse analysis (CDA) and is particularly informed by the work of Fairclough (1989). This chapter is the first of three empirical chapters and here I set out the findings of a micro level, close textual, analysis which relates to the first of the three significant discursive practices (DP) described in Chapter 5 and whereby neuroscience research findings are reformulated as an abstract concept(s).

Before that it is pertinent to reiterate the extent to which a CDA is dialectical (Wodak and Meyer 2009). It is not always possible to completely disentangle the different levels of analysis set out in Chapter 5 and as a result it is possible that aspects of the meso level analysis, relating to the production process of prescriptions for practice, are included in this chapter. Meso level findings will be set out separately, insofar as that is possible, in the first half of Chapter 8.

Further, in the next chapter, I present the two other significant discursive practices. All three DPs, as described in Chapter 5, are constituted by a range of discursive features (DFs) evident in the texts. Together DFs and DPs represent text properties. In this and the following chapter, DPs are elucidated through the selective use of excerpts from the texts selected as empirical material and which, in accordance with a CDA, illustrate not what is said but how something is said and what that accomplishes. In the case of the articles, I identify the particular article from which an excerpt is extracted by ascribing an article number which corresponds with Table 9 in Chapter 5 and which for ease is replicated, with additional analysis, in Appendix 7. In the case of the interviews, so as to preserve respondent anonymity, I again ascribe each with a number, preceded by the letter C, which identifies them as a 'consultant' – for instance C1.

In this chapter I firstly describe how, for this first DP, the constituent DFs can be divided into two main tasks which I describe as i) divorce, and ii) reformulate. Secondly, I present the different discursive features (DF) which comprise these two tasks, using illustrative excerpts and quotes as described above. Thirdly, I discuss the purpose or function of this discursive

practice (DP1) whereby, following translation, findings from neuroscience research are reformulated as an abstract concept(s).

6.1 Tasks of discursive practice

A close textual analysis leads to the identification of a range of discursive features which enact DP1 and can be divided into two main tasks of this first discursive practice; divorce and reformulate, which ultimately combine into an overall function described later in this chapter. The two main tasks and their component discursive features are set out in Figure 5 below.

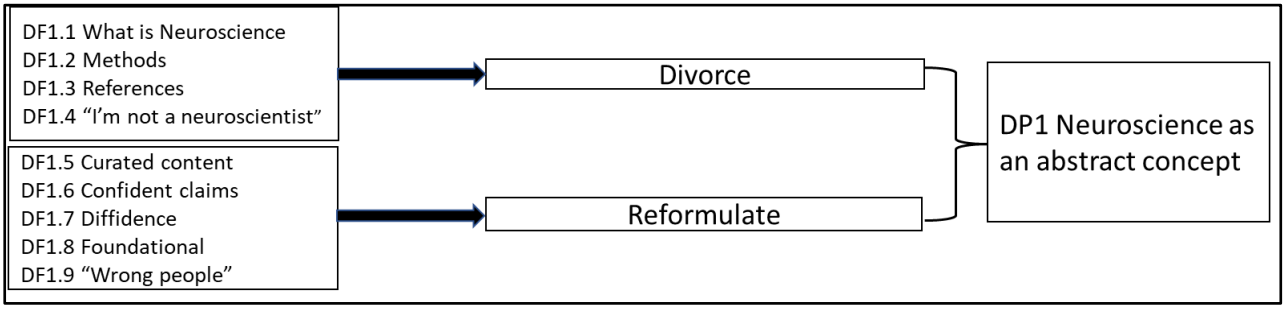

Figure 5. Two tasks of DP1 with associated discursive features (DF)

The first task – divorce – refers to how, in what they do, translators disconnect their work and their version of neuroscience research findings from the original scientific field. This disconnection might be knowingly or unknowingly, but the overall effect is one of detachment from the original science. The second task refers to how translators reformulate neuroscience research findings as an abstract concept through the things that they do.

In the articles neuroscience is essentially divorced from the originating science in the way it is defined (or most often not defined), through the exaggerated representation of neuroscience methods and in the references used or sources called upon. Then it is reformulated in a more abstract way, partly through a narrow or curated range of topics, through a confident assertion of claims made which facilitate, arguably, inappropriate leaps (i.e., to behavioural implications), and a simultaneous diffidence from the frequent use of broad statements suggesting ideas are only 'based on' but are not neuroscience research findings.

Many of the same features are evident in interview texts, although respondents additionally divorce themselves from neuroscience by explicitly declaring themselves to be 'not neuroscientists'. Further, neuroscience findings are reformulated, not only following a narrow range of topics, but also by how they are positioned as foundational knowledge, and by the way in which respondents point to the 'wrong hands' by which they mean the approach taken by other translators and in particular their disapproval of it.

6.2 Divorcing from the science

In what follows I set out the discursive features in the texts which, when employed by translators, have the effect of divorcing them from the science. In Chapter 2, I discussed some of the core tenets of the field of neuroscience and here make the case that prescriptions deviate from these.

6.2.1 What is neuroscience? (DF1.1)

For instance, given the - in many ways - anomalous appearance of neuroscience research findings as knowledge that is supposedly of relevance to organisational practitioners, there is little in the way of clarification concerning what it comprises. If the provision of a definition allows for a shared understanding then it is notable that in the main 'neuroscience' is not defined for this new audience. In the absence of this definition an imprecision emerges.

The following excerpt shows how, in the opening paragraphs of an article which asks: "how can HR use neuroscience", the author positions neuroscience, dramatically contrasting it with archaic approaches to trepanning which serve to reduce any potential resistance to modern approaches, especially in light of a suggested 'wariness'.

> Neuroscience is a subject many organisations are wary of discussing, despite them probably using its techniques and ideas.
>
> When early man was suffering a surfeit of pressure on the brain – a migraine or a seizure, for example – the answer was often to drill or scrape a hole in the skull. Thankfully, science has moved on since then and we are now able to see inside the brain using scans, rather than by sawing it open. Neuroscience, understanding how the human brain reacts to certain

conditions and situations, has become well established in scientific and psychological circles (Article 4).

Although vague in its description of neuroscience as 'understanding how the human brain reacts to certain conditions and situations', the author highlights the progress of science, including 'scans' which enable us to 'see inside'. In contrast to my earlier descriptions of the field of neuroscience (see Chapter 2), this article sets up neuroscience as 'well established' and coherent, perhaps even 'ready-made' to use Latour's terminology (2004) and is less a definition and more a statement asserting a broad acceptance of its relevance. Indeed the article goes on to put forward ways in which neuroscience findings are significant to organisational life according to a range of so-called experts, about which I will say more later on. As such, this article exhibits a common feature whereby an accurate delineation of neuroscience is eschewed in favour of the 'so-what', or the 'how-to', presumably on the basis that a general understanding of what neuroscience is or is not either already exists or is not needed. Indeed, although it might be viewed as strange to be talking about neuroscience research findings in a business context, underlying the lack of definitions might be an assumption; that everyone understands what neuroscience is and as such it is normal, relevant, and legitimate in this new domain.

Relatedly, the way in which translators treat 'the brain' is also of note, since it is often personified, becoming a subject in its own right. The following excerpt provides an example of how translators propose the brain to be the active subject rather than the human individual, in dualistic statements which suggest, as below, that it wants to 'avoid threats' and has 'wants' and 'needs' of its own. Or, in other examples from the same text, that it can 'teach us' and be 'comfortable' or 'uncomfortable'.

For our brains, the key aim is survival, and they have done a good job of this which is why we are all here today. To enable us to survive, the brain wants to do two key things: avoid threats and seek out 'rewards'. Of the two, avoiding threats is by far the more important.

We can go without food, shelter, even water for a while but if the predator gets you, then it's 'game over'.

As part of this drive to avoid threats, the brain wants to be able to predict and have certainty. If the brain can predict what is going to happen, then it is much better placed to protect us. It follows that when our brains have information and certainty, they find this rewarding – it feels good (Article 19).

For context, this article is concerned with "the impact of organisational change on the brain", suggesting that an improved understanding of the brain is a "win-win". In using the brain as the unit of analysis, the author effectively portrays it as functioning in specific (at times problematic) ways which can be addressed following "insights" from neuroscience, particularly its need for certainty. Arguably both the content and the style of this excerpt distance it from the original science. Written in the informal, second person, perhaps as a means of enrolling the reader into a shared narrative, this article reads more as an example of prose than a scientific account. Further, scientific writing traditionally utilises a third person passive voice, which is deemed preferable as a result of both its clarity and conciseness[26]. Considering 'our brains' as somehow separate from us both runs counter to the unpopularity of dualism in the field of neuroscience itself (Meloni 2011) and treats the brain in an unscientific way. Further it succumbs to the reductionism highlighted as an issue in Chapter 2, effectively reducing the person to his or her brain and thereby overlooking all the complexities of what it is to be a human.

In the interview texts, none of the respondents explicitly endeavoured to explain what they were referring to when they invoked 'neuroscience'. Instead their focus was more on the reformulation of neuroscience, which I will describe later in this chapter.

6.2.2 Neuroscience methods (DF1.2)

A second feature which divorces translations from the field of neuroscience concerns the treatment of neuroscience technology which, as a methodological tool, is fundamental to the original science. Typically, in scientific texts "the *methods used are described*, allowing informed readers to draw conclusions about the validity of the results reported" (Thomm and Bromme 2012, p. 189 italics in original). The first excerpt above (article 4) refers generically to "scans", which is a frequent occurrence in the texts, albeit a term that again

[26] https://www.nature.com/nature-portfolio/for-authors/write [Accessed 01/04/23]

lacks precision or any sense of the methodological debates and challenges in the neuroscience field as described in Chapter 2.

The following excerpt comes from an article which purports to advise leaders on how neuroscience can “assist leaders in making organizational change” and notably describes such methods as “brain analysis technology”:

> Improvements in brain analysis technology have allowed researchers to track the energy of a thought coursing through the brain in the same way they can track blood flowing through the circulatory system. Change lights up the prefrontal cortex, which is fast and agile. Overloading the prefrontal cortex can generate fatigue, fear, and anger, because of the cortex's connection to the emotion center of the brain, the amygdala (Article 8).

In itself this is a vague and generalised description which, coupled with the remainder of the sentence, serves to strain, if not undermine, any notion of scientific credibility. For instance, what should we understand by “the energy of a thought” and in what way does it “course through the brain”? These interpretations do not derive directly from scientific accounts. Although the author goes on to introduce some technical terminology, by way of the prefrontal cortex and amygdala, both regions of the brain, this is done in such a way as to further raise questions about accuracy and reliability, ultimately rendering suggestions that the prefrontal cortex is “fast and agile” meaningless.

Whilst this article is an extreme example, it is generally the case that articles simply and unquestioningly render brain scans or “brain-imaging technology” as enabling “us to see which parts of the brain are activated at any given time and what inputs cause what kinds of brain-usage patterns," (Article 1), typically overlooking the interpretive requirements associated with them and failing to even distinguish between the different scanning techniques.

By way of contrast, I include the following example which demonstrates that it is possible to provide a simple yet plausible representation of ‘brain-scanning’. Notably co-authored by a neuroscientist, this article presents a “hypothesis” - that leaders might deliberately develop “more effective patterns of thinking and action” – and which, they argue, their interpretation of neuroscience research provides some evidence for.

When experimental subjects are encouraged to pay attention in particular ways, certain areas of the brain demonstrate observable activation, often in the form of blood flowing to those parts of the brain. Thus, for example, when people are shown a frightening picture, the amygdala is activated in a way that is made visible by functional magnetic resonance imaging (fMRI) scans. This activation is physical and passive. People do not consciously choose the emotions they experience and the activations that arise in the brain (Article 14).

Whilst this excerpt provides sufficient specificity with regards to key variables at play in fMRI studies for instance (ways of paying attention, particular parts of the brain, blood flow made visible presumably referring to the BOLD signal), it too implies a direct relationship with scans and their findings, omitting any discussion of the complex statistical analysis required and the scope for researchers to make different choices in that respect.

Overall, translations of neuroscience research tend to present neuroscience research methods as able to 'see', neutrally, what supposedly exists materially in the brain. Further, they overlook consideration of potential organisational complexities in any interpretation of 'scans' and generally decontextualise. In the main, scans are positioned as a 'tool', and I argue that they also represent a 'tool' for translators, enabling them to claim that the 'ability to see' provides clear and objective findings from which it is legitimate to derive advice for organisational practitioners.

Most interview respondents do not explicitly reference neuroscience methods, but interestingly when they do it highlights a departure from the articles. For instance, there seems to be a much clearer sense of the limitations of approaches to scanning in particular, such that respondents take it as licence to justify steering clear of them. For instance, in the following excerpt, this respondent describes how they eschew the validation of a neuroscience based tool developed in their business, suggesting that the benefits would not outweigh the costs involved:

> We are not into scanning people…interestingly we've talked about validation studies. We've spoken to [X] University. A hundred thousand pounds was on offer… for us to pay…but we also come from the perspective that, you know, what does validation do? You know… when you're a unique individual, and when…you're coming from the perspective that the brain proves this, that we are all unique, how can a generalised

> validation help anyone? Well let me tell you where it helps you, it helps you when you're selling (C8).

Not only that, but there is some confusion about how a 'unique individual' might benefit from a validation which is 'generalised'. This reticence is perhaps explained later on when the same consultant demonstrates how they see scanning to be inaccurate and imprecise, which might account for the earlier reluctance to pay for validation studies:

> If you're looking at scanning techniques, you know, it's not 100% accurate, and people talk about activity in the brain, and what is this? Is it oxygenation? What exactly is going on? And that's very misunderstood (C8).

But on the other hand this is a consultant who has based an entire coaching and management development business on neuroscience. Another consultant takes the position that, again despite business interests explicitly oriented around neuroscience, in fact (client) behaviour is more important:

> I don't think it helps anybody for you to say "oh well neuroscience will change your life"… I don't think that is intelligent. I then say, this is not a clinical neuroscience… it's more of hidden neuroscience, in the sense that we're going to see how it shows up in your behaviour rather than for us to…get an MRI and start to scan your brain to change your opinion. I say it's all about behaviour (C26).

These excerpts imply that the associated consultants do have an awareness of the constraints and limitations challenging neuroscience methods, however their response is simply to side-step their use in their own work, rather than questioning general findings from the field of neuroscience.

6.2.3 References and citations (DF1.3)

As detailed in Chapter 5 the selected articles are not academic publications, with one exception. I should therefore caveat my analysis regarding the use of references and citations by noting that the articles are unlikely to follow the conventions and practices of scholarly writing or journal science. That said, some interesting observations can be made which I contend are sufficient to justify their inclusion as a discursive feature.

There are three aspects to this particular feature. Firstly, some articles contain no references or connections to scientific work even when they explicate 'findings' from research, perhaps instead referring to faceless 'scientists' or 'researchers'. Secondly, there

are instances where references are used in an instrumental way, specifically to ground the translation back into an appearance of science. Thirdly, is the identity of the so-called experts called upon in translations, and in particular the prevalence of specific, highly influential, experts, effectively resulting in articles which are translations of translations. These aspects are further illustrated in Table 13 below, and also prevalent in interview texts.

Table 13. Examples of use of references and citations

Use of references	Article Number	Description
No references		For example unsupported statements such as:
	10	"the brain continues to reform and rewire itself based on how much or how little the pathways are used"
	8	"much of the research in management sciences and organizational behaviour from the past has been criticized for lacking in relevance and meaning"
	2	"compliance may activate the brain's threat network"
Instrumental use of references		Use appears designed to imply scientific credibility:
	17	Includes inaccurate reference list demonstrated by this extract: not alphabetical, not following any style, includes non-cited references "Zaki, J., & Ochsner, K. (2011). Reintegrating accuracy into the study of social cognition (Target Article). Psychological Inquiry, 22(3), 159-182. Neural Mechanisms of Foraging Nils Kolling1,*, Timothy E. J. Behrens1,2, Rogier B. Mars1,2, Matthew F. S. Rushworth1 Science 6 April 2012: Vol. 336 no. 6077 pp. 9598 Nook & Zaki, in prep cited at the NeuroLeadership Summit 2014 Zaki, J., & Mitchell, J. (2011). Equitable decision making is associated with neural markers of subjective value. PNAS, 108(49), 19761-19766. Social comparison affects reward-related brain activity in the human ventral striatum Falk et al. Science 318, 1305 (2007)"
	19	Seemingly inappropriate citations, for instance: "the brain finds uncertainty so uncomfortable …." this point is illustrated by research conducted by Wiggins et al (1992) into children with a parent who has Huntingdon's Disease".
'Expert' references		Dominance of Rock & other NLI associates:
	13	This Rock authored paper provides links to the NLI Journal, refers to "other studies"

Use of references	Article Number	Description
	9	Follows above pattern – names NLI associates, otherwise describes "researchers" or "a major Canadian study"

As shown in **Error! Reference source not found.** above, article 17 addresses "what has neuroscience got to tell us about changing and adopting organisational values?" and unusually provides a list of "references" which the author presumably means to demonstrate scholarly rigour. However, it is quickly evident that the individual references are presented in an inconsistent and often inaccurate way, and that overall the list is disorderly, not following a specific referencing style, nor even alphabetised. To a schooled reader therefore, such an imprecise list might serve to undermine claims to rigour, although perhaps a lay reader might not subject it to such scrutiny and as such view it differently. Such a list of references is not especially common in translations of neuroscience research findings, perhaps not unexpectedly. More frequent, and again perhaps unexpectedly as articles are mainly non-academic, are the use of individual citations embedded in the texts. Of particular note, and given that typical translators lack background training in neuroscience, is the selection of what are deemed to be relevant and suitable references.

In this excerpt, the same author who cursorily describes neuroscience above (see DF1.1), gives over much space to the work of David Rock, highlighting his role in bringing neuroscience to an organisational audience.

> We can thank David Rock, chief executive of consultancy the NeuroLeadership Group, for much of the move from academic textbooks to the modern workplace. His SCARF model – defined as a "brain-based model for collaborating with and influencing others" – outlines a number of domains of human experience (status, certainty, autonomy, relatedness and fairness) around which our perceptions activate different areas of the brain. This determines how individuals react, stimulating either a "reward" or "threat" – or "fight or flight" – response.
>
> The significance for HR is that much of how the function has traditionally operated will trigger a "threat" response in many people. "It teaches us that much of what modern management does creates a hostile environment for the human condition," says Jeremy Old, growth coach at GrowthAccelerator. "For instance, neuroscience tells us why top-down

command-and-control management, prevalent in so many organisations, generates dull compliance and box-ticking. The essential lesson in an HR context is to understand that, in their natural brain state, people are already motivated and the trick is knowing how to avoid demotivating them" (Article 4).

Here Rock is explicitly presented as "chief executive of the consultancy the NeuroLeadership Group", elsewhere his role is more blurred, as he is referred to as "Dr Rock" alongside references to neuroscientists, with the implication that he is a neuroscientist himself, whereas he holds a professional doctorate in the neuroscience of leadership[27]. Here also the author sets out the components of the 'SCARF model' by way of neuroscience content, which is repeated time and again in other texts (as I will describe below) both directly and recognisable through specific phrases used. As I describe in Chapter 8, the work of Rock, or indeed the name itself, is mentioned more often than not in translations of neuroscience. (See also Appendix 7).

This point is reinforced by a number of interview respondents. For instance, this consultant explicitly points to David Rock:

> I'm quite sarcastic about David Rock but I do think that he was the key person who got this into the business world …I don't necessarily agree with…the direction he then took things in, but I do think .. we wouldn't be where we are today if he hadn't championed this…but…inevitably he had his favourite areas that he wanted to kind of really think about and use, and that trickles through if you've got someone who's so … dominant in a field. (C6).

Of note, this consultant describes how:

> I did David Rock's…neuroleadership programme, then did…his masters …I think he's stopped doing those now 'cos we all became competition for him (C6).

And was not alone:

> So my background is in corporate and then in 2001 I ventured into the world of coaching, so I've got accredited through what is now called the neuroleadership institute (C17).

[27] https://davidrock.net/about/ [Accessed 27/07/23]

Notable is that a sizeable proportion of translators (which includes interview respondents as well as authors of articles) have been through programmes and achieved qualifications from the NeuroLeadership Institute (NLI). Presumably they have done this as a means of developing some knowledge and expertise of their own, albeit it curated or pre-translated by the NLI (which relates to observations below concerning the narrow range of neuroscience topics put to organisational audiences). I will return to this point in Chapter 8, for now it is important to note that this training and related credentials are not in the original science, in neuroscience per se, but in a version of neuroscience that has already been translated. Effectively this disparity must result in 'translations of translations', whereby neuroscience has already been interpreted (or translated) for translators who go on to further present their own version of it. Whilst it is possible that this feature has arisen as a result of bias in my sample, I would argue that rather it demonstrates the dominance of David Rock and the NeuroLeadership Institute in the field.

Rock's dominance looks to also be extended through other experts – or their work – who are associated with the NLI, such as Matthew Lieberman as in the following extracts:

> UCLA researcher, Dr. Matthew Lieberman, found that learning to "label" our emotions maximizes cognitive ability (Article 9)
>
> But neuroscience is suggesting a different set of assumptions may apply. Lieberman says that our minds are less like hermetically sealed vaults that separate each of us from one another, and more like "Trojan horses"; letting in the beliefs of other people without our realising the extent to which we're being influenced (Article 17).
>
> Studies by Matt Lieberman show that the brain has just one main 'braking system', sitting behind the left and right temple, which is used for all types of braking - mental, physical, and emotional (Article 13).

In addition, another 'guru' emerges as an influential source amongst a number of interview respondents, although not in the articles:

> I felt neuroscience was a hot topic…so literally did huge amounts of internet research, speaking to different stakeholders, influencers that I knew, looking for a way of, … of bridging and making practical …And I came across Dr […] who… is a neuroscientist and he, sort of bills himself… as a neuroscientist that specialises in the neuroscience of learning… and

> he created this […] tool that he's developed over 30 years. It started as a paper-based sort of assessment which is now online. And I just felt it was a good in. So then to be able to open up to talk about more things that clients felt safe because there was measurement and there was scientific legitimacy (C11).

This particular 'guru' has very much shaped how some interview respondents work with neuroscience, most especially because – as described in the excerpt above – they offer a 'neuroscience-based assessment' which many of them use with their client base. Their version of neuroscience is therefore encapsulated in this tool, about which I will say more in the next chapter.

Overall, the translation of neuroscience is divorced from original science in the way that predominant references used are not from journal articles or scholarly texts, rather they are the bodies of work which have already undergone some form of interpretation or positioning for an organisational audience. Thomm and Bromme (2012) provide a useful marker when they suggest that typically:

> scientific concepts and data tend to be only understandable in the context of preceding work. This embedding of scientific work into a network of related work is typically emphasized by *references*. Furthermore, scientific results are rarely presented in isolation (Thomm and Bromme 2012, p. 189 italics in original).

As a result I suggest that the use references and citations is another significant way in which prescription for practice divorce themselves from the original science.

6.2.4 "I'm not a neuroscientist" (DF1.4)

A further notable DF is the way in which many interview respondents declare themselves to be "not a neuroscientist". In the following excerpt such a declaration is made early on in the interview, when I asked the consultant to tell me a bit about their work:

> You know, the way I bill myself is that, you know, I'm not a neuroscientist, I'm I'm I'm umm, I'm I'm the space I'm inhabiting is you know I'm reading the hard core science, I'm trying to translate that into something that is going to be of practical application in a in a in an easy way to business clients in the service of umm, creating work cultures that are you know, hence the name in the title really engage all the brains in the business and umm, um an so and I feel on very solid ground in that regard because I don't feel as though I'm pretending to be something that I'm not I hate people that do that (C1).

Although volunteering this declaration themself, it is interesting to notice how an otherwise extremely articulate consultant then trips over their words and struggles to convey what they are if not a neuroscientist working with neuroscience. In making clear the lack of a neuroscience background C1 perhaps feels it necessary to justify why neuroscience findings feature in their work in a credible way, and this justification is not straightforward. Further, in being immediately transparent ("not pretending"), and in acknowledging their probable limitations in terms of knowledge, they perhaps invite us to trust them not to overclaim, and to be clear on the boundaries of their expertise, especially since they engage with "the hard core science". The excerpt also provides an insight into their approach to translation; neuroscience findings need to be practical, easy and in service of something. Finally, whilst C1 feels to be on "solid ground", that is not the case for everyone, a feature I will return to below (see DF1.9 "wrong hands"). This point simultaneously suggests that you do not need to be an expert in order for neuroscience to be something that you can work with, so long as you are prepared to properly engage with it – neuroscience is accessible, but it is still specialist knowledge.

We might also take from this that fidelity to neuroscience research findings is considered less important than other things, although this notion is countered by claims to "hard core science" as is the case here when this consultant describes how (on the back of their attendance of NLI training, as described above) they do have the strong knowledgeable base such that they is able to work with it:

> it is very complicated, but I I have a very solid understanding of it, I draw it, I draw a picture and as I draw it, I'm talking about things like executive function and the pre frontal cortex and the limbic system and the purpose they serve, not just the purpose they serve but the impact… that they have on the quality of our thinking (C17).

In another example the respondent also offers up, early on:

> let's start with the beginning, simply because it gives some context to the way I work. The first thing to say is that I am not a neuroscientist, I never have been and never will be…but what I do do is appreciate the output of the science and work it into…and see…what is really applicable in the workplace. And what is not. (C10).

Another possibility here is that, given this type of response typically arises either after me asking respondents to tell me a bit about their background and the work they do, or more

specifically as a result of me asking them how they use neuroscience research findings in their work, is that they might perhaps be second guessing my expectations and in some way conforming to them. In declaring themselves “not neuroscientists” they perhaps deflect any anticipated questions or criticisms of their expertise; they know their limitations and work to address them.

One other aspect of this feature is the assertion that it is not necessary and sufficient to be a neuroscientist in any case. As the following excerpt shows, not being a neuroscientist might even be beneficial:

> I think when you speak to neuroscientist, they know a great deal about certain things in a very focussed way, which is fantastic. But when you’re going to talk about something that‘s slightly outside their area of focus they struggle. So often, if you’re at conference or something, I’ve have neuroscientists come up and they want to talk, and they want to prod you a little bit, and they’re “ do you know about stuff”, and when you ask something outside their realm of focus they’ve never heard of that research, that study, that body of work, and I’m always surprised by that (C2).

Overall this discursive feature helps translators position themselves as reasonable and realistic, behaving ethically in not claiming to be experts. We might see this feature as some sort of rhetorical device or justification designed to distance themselves from making inappropriate claims; because they are transparent and acknowledge their limitations, then we can trust them and their judgement. Further, the allusion is that some distance from the neuroscience research is perhaps beneficial, because they have had to work to understand how to help clients access it, what is likely to be interesting to them, and because they are not submerged in the detail of it they can have a clearer perspective on it.

6.3 Reformulating neuroscience as a concept

The second main task of this discursive practice is made up of another set of discursive features which result in the reformulation of findings from neuroscience research into a concept. By reformulation I essentially mean that neuroscience findings become more abstract and intangible, more of a general idea than a statement of observable facts arrived at through application of the scientific method. This task follows on from the features set out above, since with ties to the original science loosened, translators are able to put forward suggestions and make claims which are outside what has been proven or observed

by scientific endeavour and, I argue, especially to reinforce specific (dominant) ideas. This reformulation arises following the employment of particular discursive features.

6.3.1 Curated content (DF1.5)

One feature of the articles is the narrow range of possible neuroscience content which is positioned for an organisational audience. Given the breadth of the neuroscience field, as described in Chapter 2, this narrow range effectively suggests that translators (deliberately or otherwise) choose to exclude some topics from the broader field of neuroscience and thereby act to contain what is translated. This point also goes back to the dominance of particular 'experts', reinforcing the idea that translated neuroscience, rather than systematically examining the field, has converged on a limited (and potentially false) consensus.

Already, from previous excerpts, it is possible to get a sense of the recurring 'neuroscience' topics or ideas, including content from David Rock's SCARF model (additionally mentioned in Chapter 8 and about which I will say more in the next chapter when I set out how neuroscience findings are leveraged). The SCARF model particularly involves threat and reward systems, the regulation of emotion involving the amygdala, and the capacity to attend involving limits to the prefrontal cortex. Translations often comprise recognisable phrases – such as "command and control" as a style of management which evokes threat and is consequently to the detriment (articles 4 and 8) – which connect back to assertions, citations, or purported neuroscience content. In this way, the content of translations becomes a set of ideas or concepts with an implied scientific consensus. Similarly, threat and reward features in interviews as, for example, when this consultant asserts that:

> The reward mechanisms linked to performance…management in many many organisations is an absolute travesty (C10).

Or this description:

> take…the fight flight stuff. So what's a threat? What's a reward?...In a very practical way, how do you monitor whether the way they're behaving suggests they're kind of experiencing a threat…other than experiencing a reward and how do you then kind of talk to them about why they're behaving in this strange way. (C6).

Another prevalent topic in the articles is 'change' otherwise connected to (neuro)plasticity. This prevalence is illustrated here by an excerpt from an article which highlights five lessons for leaders, of which this 'lesson' is the first, which purport to "shed some light on the practicality of these notions", by which they mean structures and functions in the brain, and which have been the content of a previous article.

> 1. The Brain is Plastic
>
> At one time, it was thought that once a person reached a certain age, the brain stopped developing and could not be changed. This has since been proven untrue. It may be more difficult to change some aspects of the brain after a certain time, but the brain still has a lot of plasticity throughout a person's lifespan.
>
> The brain continues to reform and rewire itself based on how much or how little the pathways are used. That means that we can always learn new things.
>
> The pathways are created through the connections of neurons. Each neuron has on average about 1,000 "arms" called dendrites that connect it to other neurons. The connection between the cells is called a synapse and occurs over a small gap called a synaptic cleft.
>
> The way neurons share information is through sending and receiving neurotransmitters across the small gap. The neurotransmitters trigger a chemical process, which creates an electrical charge that travels through the neuron. This process of electrical charge, neurotransmitters, electrical charge, and so on is what creates the pathway of neurons. There is a saying "Cells that fire together, wire together." That means that when learning a new task or about a new person, the best way to learn it is to do it multiple times, so that the neurons "fire together" and eventually "wire together".
>
> It is never too late for a leader or an employee to learn a new skill or a new way of doing things. Change is hard sometimes, but research tells us it is possible (Article 10).

This excerpt encapsulates a number of discursive features which I have already described. For instance it includes the absence of any references despite the seemingly detailed scientific (or at least technical) explanation suggested by the use of specialised terminology, such as neuron, dendrite, and synapse (although excluding axon, another part of the neuron vital in neuronal communication). Even the quote "cells that fire together, wire together", is

not enhanced by a citation, despite it commonly being attributed to Donald Hebb (Hebb 1949). The description of neuronal communication is simultaneously detailed and meaningless, excludes key information (axons and action potential) and looks to be presented so as to facilitate a "that means that" explanation during which the author actively connects neuroplasticity to the ability to change, learn new skills, develop oneself.

This prevalence is also reflected in interviews, for example:

> one of the concepts I often talk about… is how neuroplasticity … is essential to the principle of becoming a more neuro-agile person (C7).

Since many translators rely on a small number of experts what we see is their ('expert') translations repeated and adopted by others. Further through this process of repetition we are seemingly led to a consensus regarding which aspects of neuroscience research findings are most relevant to organisational practitioners. This consultant explicitly remarks on this feature:

> I do think in the … world where the neuroscience has been translated to business it in my view, it's gone too narrow…I mean…probably 80% of what you see is about fight or flight, then reward … plus unconscious bias, you know and you'd think that's all the neuroscience has ever sort of talked or told us about… and that, you know, there's a richer sort of seam of areas that are very important for leadership and business…that gets a lot less ...coverage (C6).

This excerpt introduces the idea of 'coverage', which I interpret to mean exposure. The narrowness of content seems to be problematic to this individual because whilst previously "there were there was loads of new stuff coming out", now it's more "just building on…this thing we already know"(C6).

Interviews potentially provide further clarity with regards to this particular feature; about the way in which neuroscience research findings are seized on as a potential 'solution' and not because they are inherently pertinent. For instance this respondent describes how neuroscience topics are arrived at in response to requests to present at conferences and other events:

> We think of a topic, you know there's a particular application and often that, the need for that will come out from the marketing piece, so it'll come from 'we'd like you to come and speak at this conference' we speak at a lot of kick off meetings, in house corporate events as well… Often the

> research need, comes from one from one of our practitioners, my client has asked about this, can you help, and it's wonderful for us because we'll go and help them with that then I have another LinkedIn article, you know (C8).

Not only that, but the new material can then be used as marketing content. As such the neuroscience content might primarily be beneficial to the translator – because it generates interest in their work. This idea is also shown in the following excerpt, when I asked a respondent how they decide what to write about:

> So, thoughts that I'm having, so things that I'm thinking about…that I think are quite interesting. I get promoted by what I am thinking and what I'm reading. I do actually work with a couple of PR agencies…And so…they suggest angles that they think the press might be interested in, and then I'll write. So they'll give me a prompt and… I'll respond to those prompts (C1).

Whilst this respondent was unique in working directly with PR agencies, it reinforces the point that that knowledge development in the field of neuroscience does not directly feed into the work of translators, rather they actively solicit ideas for their potential to address other needs, be that an article, a presentation, or a client need. Unsurprisingly then curated content seems not to overlap with the main research topics of central concern to the field of neuroscience, as set out in Chapter 2.

I also contend that the nature of this curated content begins to formulate a particular view of organisational life - the challenges and the possibilities both at the individual and organisational level. Ideas from neuroscience primarily attend to the individual(s) within the organisation, including the way they approach organisational processes, and necessarily exclude any notion of organisational context. This reductionist tendency has already been highlighted in Chapter 2 and will be further discussed in Chapter 8 in relation to discourses and their constitutive effects.

6.3.2 Confident claims (DF1.6)

Another discursive feature concerns the ways in which translators confidently make assertions, both as to the relevant neuroscience content, as described above, and to its ability to resolve or improve organisational challenges. In other words, the certainty with which the translations establish connections between neuroscience findings and

organisational issues is a feature which, I suggest, further facilitates the abstraction of neuroscience, particularly since these 'leaps' are not grounded in specific research.

In the following excerpt, extracted from an article entitled "Neuroscience in performance management" the author sets out a range of arguments concerning the problematic nature of current approaches to performance management in organisations, particularly the consequences of such approaches which include a "toxic environment". This excerpt comprises the opening two paragraphs where the author confidently establishes that problems arise from "violations of the brain's threat and reward networks".

> Of all talent management processes, performance management is arguably the most important to get right. And, arguably, it's also the most difficult to do well. The potential upside for getting it right is significant; the potential downside of doing it poorly is even greater. When done poorly, performance management not only hurts business performance, it can destroy morale and create a toxic environment.
>
> Unfortunately, few organizations do it well. There are many surveys and research studies that indicate that performance management is almost universally despised by employees and managers alike. There are many reasons, and just about all of them can be traced back to violations of the brain's threat and reward networks (Article 2).

As we have seen, threat and reward 'networks' are a recurring idea in translations, and in this instance the author goes on to explicitly make the claim that attending to them, via a series of recommendations, will improve the process of performance management. This leap requires the author to invoke the existence of such 'networks', and the nature of their functionality, and then to connect them to an organisational process. The language used in this and other texts to confer such certainty leaves no room for provisionality. Whereas journal science might refer to regions of the brain being 'implicated' in specific responses, or speak of associations, typically translated texts are more definitive – in this case the author speaks of the "many reasons" which can be "traced back". In this, the author is more than suggesting there might be an association, rather they are stating that there is and providing recourse to that.

This discursive feature is more subtle in interviews, and visible in the ways in which respondents confidently assert the beneficial effects of neuroscience content. In the

following excerpt, the respondent describes “understanding how your brain works” as though this were a straightforward and established endeavour. Further they suggest it is possible to “help its functionality”, again as though this was well understood and common knowledge. Further still is the assertion that “it will boost a learning culture”, presumably on the basis that the above knowledge has a proven connection to organisational culture:

> One of the other, sort of, business triggers, is also erm, that by understanding how your brain works and how you can help its functionality, is it overall it will boost a learning culture, which is again is something that businesses are looking for. So how do we underpin everybody’s learning, err, and especially now as people are going to be working more remotely and there’s different ways of learning and flexibility around learning. If they’ve got more foundations of understanding themselves and the way their brains work, it’s the bedrock and foundation to them build up the learning initiatives (C11).

This discursive feature sees translators make confident statements concerning neuroscience knowledge and its relevance; ‘we know’ versus a more tentative ‘findings suggest’. The former is much more prevalent in texts than the latter, as is a tone that is certain and trusting, rather than provisional or critical.

6.3.3 Diffidence (DF1.7)

Another discursive feature which indicates a reformulation of neuroscience research findings into a series of concepts or ideas is the way in which texts, on closer examination, often claim only to be ‘based’ on or taking ‘insights’ from neuroscience but then labelled as neuroscience findings. In other words, translations are somewhat diffident. This seemingly small distinction suggests an awareness that it is not scientific knowledge per se which translators are working with, but ideas arising from it; insights from neuroscience rather than neuroscience itself. This feature, coupled with the effects of other features such as dominant experts (DF1.3) and curated content (DF1.5), reinforces an earlier suggestion that translation work might more accurately be seen as translations of translations.

This elusiveness or diffidence is an interesting departure given the confidence with which translators assert the existence of “networks” and leap to implications for organisations. For example, the following excerpt, the second from an article providing “5 neuroscience lessons for leaders” combines confidence in the reward network and what has been “proven

to be rewarding" whilst at the same time avoiding a definitive statement that these ideas comprise neuroscience research findings.

> For leaders, rewards are often an effective way to motivate employees. Based on neuroscience, there are some rewards that seem to release more dopamine than others. You will see that money, or material goods, are not on the list. Many of the rewards are related to social interaction in some way.
>
> Following the science, leaders can review their system of motivation and rewards to consider ideas that are proven to be rewarding to the brain. While each employee is different, there are many categories or rewards that would be useful to implement in order to truly activate an employee's reward pathway. More dopamine means employees who are happier, more focused, and more motivated (Article 10).

In order to legitimately ground their assertions the author describes them as being "based on neuroscience" or "following the science", both broad and general statements a step away from them 'being' neuroscience. In this way translators effectively 'hedge', which is also partly evident in how respondents pull back from claiming to be neuroscientists and instead suggest they take 'insights' as described above.

6.3.4 Foundational knowledge (DF1.8)

Another discursive feature can be seen in the way that interview respondents reformulate neuroscience findings as foundational knowledge which fills an important gap and suggest that it should be the basis of much else in the organisational field. For instance, this consultant describes neuroscience as "the final piece of the jigsaw" and "the most important", which suggests a perspective from which knowledge about the brain should underpin any effort to understand people and their behaviour. Neuroscience is absolutely foundational:

> What it was was the missing, the missing link… it was the final piece of the jigsaw that we could drop in and say, "when we wanna understand people and we want people to understand themselves, we want to understand the real difference"… Then this is the one piece of the jigsaw that we didn't have. And frankly it was the most important because the brain leads all the rest (C10).

The suggestion that it is the final piece of the jigsaw is quite a claim in terms of what it purports to contribute to the understanding of people. The notion of "real difference" is another strong statement which goes to the idea of foundational knowledge. This consultant is convinced that neuroscience is in a position to provide important explanations in terms of understanding people.

This is another reductive perspective, in which 'people' are reduced back to their brain which "leads all the rest". Further this next respondent suggests that having such knowledge is "empowering" and can help us to make "wise choices":

> having that foundational understanding of neuroscience, and how the way we think affects our biology…really is…an empowering knowledge for people to make wise choices about how they direct their focus and attention (C17).

Statements such as these effectively set neuroscience up as compulsory knowledge, and imply that it can provide an explanation on which it is possible to act on. But at the same time such statements are speculative and lacking in specificity. This lack of specificity is reinforced by the following excerpt in which the consultant highlights "the gap", explicitly references "concepts" rather than neuroscience and asserts the need to start with the "brain-based elements first":

> What many of these concepts, and that was the gap that I identified was …the factors that make you learn, think and process information fast and to be mentally flexible cannot start at any other place than the neurophysiological or brain-based elements first. Because those things will influence the ease, the speed, and the flexibility with which you learn, think and process information…. (C7).

Previously this respondent had asserted the need to ensure that whatever you develop, in terms of neuroscience content, come from the science. This assertion was especially in light of others who "sort of throw something in the mix about the brain" when they were asked how they specifically approach it. For them it is necessary to start with "brain-based elements first". This has the effect, as will be discussed later on, of prioritising "neurophysiological or brain-based elements", focussing on the individual and excluding the impact of any social or organisational context, as well as diminishing other interventions or approaches to organisational behaviour.

Ultimately this notion of neuroscience as foundational knowledge is also reductive. In this instance it somewhat mirrors the "often tacit, belief in the reductionist program for understanding the link between the brain and behavior" which characterises much neuroscience research (Krakauer et al. 2017, p. 480) as set out in Chapter 2 and whereby a focus on neural circuits and brain structures does not help develop any understanding of behaviour. Thus, as it stands, much neuroscience research does not do more than study the component parts of the nervous system, including the brain, and so "is not sufficient to understand how the brain generates behaviour" suggest Krakauer et al. (2017, p. 480) who also, and in contrast to translators, argue that neuroscience as a field needs to better understand behaviour before it seeks to elicit neural patterns.

I make one final observation which is that this particular discursive feature connects to another feature described later which relates to how neuroscience findings are set up as having the potential to provide an evidence base for some professions or professional functions (see DF3.4 in Chapter 7).

6.3.5 "The wrong people" (DF1.9)

A final discursive feature is the way in which translators allude to other people who work with neuroscience 'badly' as we began to see earlier (DF1.4), and might even seek to mislead us. In the following excerpt taken from an article in which the author effectively interviews a neuroscientist, he reports how said expert has a 'concern' about "the wrong people":

> Her concern lies in the wrong people 'hijacking' neuroscience while it's in a stage of heightened popularity and feeding inaccurate information to the consumer. There is a danger that this could lead to an erosion of the field of neuroscience as a helpful aspect of business (Article 7).

Rather dramatically we are told that the "wrong people" might "hijack" neuroscience, with attendant dangers. However it transpires that these dangers likely relate to interest in neuroscience in the business world drifting away, rather than anything more nefarious. One effect of this expressed "concern" is how it seeks to other the "wrong people" and their "feeding" of inaccuracies, and functions as a warning that anyone interested in

neuroscience findings should perhaps solicit advice from the 'right people'. This is a feature which also arises in interviews, albeit this respondent talks about "the wrong hands":

> so there's a risk, when it's in the wrong hands, there's a risk when people…who are not trained in it believe they know enough to use it, and they haven't got the depth of science behind them, they don't know how to couch, to phrase, to position, when they're working with people. So, people end up being misled… the danger is that it could result in something bad… beyond that it, there shouldn't be a huge risk (C10).

The excerpt further suggests that there is a right and a wrong way to reformulate findings from neuroscience research and despite the same consultant earlier acknowledging themselves to be "not a neuroscientist" (see DF1.4), it is those "without the depth of science behind them" that are the "wrong hands". The discursive work of both excerpts serves to other those who are considered to be translating inappropriately, who remain un-named, conferring a general sense of disapproval without being seen to be accusatory. This feature also helps construct the identity of my translators as somehow better or as the 'right' people in that they are transparent in acknowledging their lack of neuroscience background, but seek a 'solid' grounding in order to "bridge that gap between…the weighty academia and neuro-nonsense" (C8).

6.4 Function of DP1

I present the above discursive features (DF) as components of a particular discursive practice (DP). DFs are both visible in texts and 'do' discursive work which together, I argue, enables me to point to a particular DP. In CDA terms this chapter comprises findings from a micro level analysis and highlights the properties of texts as described in Chapter 5. In this chapter I have set out the features as a means of explicating a broader practice, in this case how translation renders neuroscience findings as an abstract concept. In what follows I will consider the function of this practice.

On the surface this particular discursive practice is not immediately obvious, particularly to a lay reader of findings from neuroscience research with a more limited understanding of the 'rules' of science (Thomm and Bromme 2012) and which might comprise the majority of organisational practitioners. It is not clear that neuroscience has been divorced and reformulated since it is still described as neuroscience. Further, one might attribute some aspects of this practice to, for instance, the need to simplify and make neuroscience findings

accessible as well as pointing to differences between practitioner publications and (academic) journal science highlighted in Chapter 2.

I suggest that it is possible to see each feature as having a particular effect, which combine into an overall function for the discursive practice. In getting to this point I am informed by Harley and Cornelissen (2022) who put forward a guide to the process of reasoning, and in particular advocate inference to the best explanation (for instance by considering competing explanations, contrasting with alternative explanations, and explicating the virtue of the chosen explanation). In Table 14 below, I have summarised how translated neuroscience findings become an abstract concept through the effects of a range of discursive features which then suggest the function of the DP itself.

Table 14. Effects of discursive features of DP1

Discursive feature	**Effects**
Divorcing	
DF1.1: What is neuroscience?	Lack of definition enables flexibility in terms of what is included and excluded
DF1.2: Neuroscience methods	Facilitates exaggerated claims of conclusions that can be drawn
DF1.3: References & citations	Implies rigour, but also decontextualises from broader body of work Leads to dominant experts
DF1.4: "I'm not a neuroscientist"	Anyone can understand it enough as long as they put in enough effort or work with the right people
Reformulating	
DF1.5: Curated content	Narrow range of neuroscience content, often comprising translations of translations, effective consensus of what neuroscience for organisational practice should comprise
DF1.6: Confident claims	Enables leaps such as to behavioural implications for Shores up the 'value' of neuroscience ideas Exaggerates ease of deriving benefit from ideas
DF1.7: Diffidence	Hesitancy avoids accusations of inappropriate claims to expertise

DF1.8: Foundational knowledge	Sets up neuroscience as compulsory knowledge
DF1.9: Wrong people	Value of expertise and the risk of misleading claims or "neuro-nonsense" putting people off

Firstly, neuroscience findings become a series of ideas rather than a rigid science and I posit that making them abstract makes them simpler, easier to describe and to change. It buries confusing details and leaves us with general concepts which are easier to understand. As such it allows a simultaneous claim to science (and the associated benefits of that) but then the licence to go beyond the parameters of science and what can be claimed. However, with this abstraction comes a loss of context, as 'neuroscience' becomes difficult to properly understand and learn, especially because it is somewhat elusive and, further, untestable in its new guise.

Secondly, it becomes legitimate for non-neuroscientists to be translators of findings from neuroscience research. Since it is only the concept of neuroscience a lack of formal grounding in neuroscience is no barrier, although a lack of expertise does make translators reliant on others. This reliance is illustrated by an implicit consensus on the range of topics and the dominance of some 'experts' and in particular because there is a risk of driving interest away.

Thirdly, neuroscience findings are reformulated for a particular purpose, as seen through the narrow range of topics which populate translations of neuroscience. This range is both assembled by and reinforcing of dominant ideas and issues in the workplace. For instance the need, responsibility, and ability for employees to change and develop skills quicky as seen in translations concerning plasticity, which affirm the possibility of this ability to change. Or even the idea that the brain is the root source of what it is to be human capital and so needs to be properly managed – which the evocation of threat responses will get in the way of. Further it normalises the idea of neuroscience findings in the workplace and exaggerates the ease of benefitting from it as an idea whilst potentially opening the door to a more biological focus on workplace performance.

This range of discursive features at use in the texts combine to suggest that whilst prescriptions might appear to be about findings from neuroscience research, commonly

they render neuroscience as an abstract concept or set of ideas. This discursive practice is related to but different from another of the discursive practices set out in the next chapter and which concerns the way in which texts 'appear scientific'. I suggest that texts emphasise 'scientific-ness' in a number of ways, presumably to achieve particular functions (see Chapter 7), whereas in the case of neuroscience as a concept, other discursive features are in play in service of a different function. This seeming contradiction facilitates a scenario whereby translated neuroscience is simultaneously 'scientific' and not, enabling claims as to the rigours and objectiveness of any assertions made, whilst also setting up an allowance to go beyond the science.

6.5 Summary

In this chapter I report findings from a micro level of my CDA, which comprises a close textual analysis of the selected texts as set out in Chapter 5. I highlight a range of discursive features which combine to enact a particular discursive practice (DP1) whereby findings from neuroscience research are reformulated as an abstract concept. This is accomplished in two main ways. Firstly through discursive features which serve the task of divorcing the texts from the original science, and secondly through discursive features which serve the task of the aforementioned reformulation.

In this chapter I use excerpts from the empirical material to illustrate the ways in which the discursive features achieve these tasks. These features include the ways in which i) absent definitions, ii) simplistic accounts of neuroscience methods, iii) limited experts cited and, iv) non-neuroscience background combine to effectively set translated neuroscience findings apart from the original science. In addition features which i) limit the range of neuroscience topics, ii) make confident leaps and assertions, iii) involve hedging and, iv) highlight who has no legitimacy to translate together combine to effectively reformulate findings from neuroscience research as more abstract and as a series of ideas or concepts. I suggest that the overall function of this discursive practice is to render neuroscience findings more flexible and malleable.

Taken together the findings set out in this chapter also serves to reinforce the existence of the previously described paradox at the centre of this research, whereby 'prescriptions for practice' are rendered not just different in type but different in kind from formal

neuroscience findings, disconnected from the norms of scientific discourse (Thomm and Bromme 2012) whilst at the same time endeavouring to retain some of the perceived advantages of appearing scientific. As such, the findings also begin to allude to some of the ways in which the translation of neuroscience research findings into prescriptions for practice in organisations take the form that they do and some potential explanations for that which I will discuss in Chapter 9.

In the next chapter I take the same approach to describe two further discursive practices associated with the translation of findings from neuroscience research into prescriptions for practice in organisations. Chapter 7 concludes the presentation of my findings from a micro level analysis and in Chapter 8 I set out findings from both meso and macro level analyses of the empirical material.

Chapter 7 - Neuroscience as a means to an end and as scientific evidence

This chapter follows on from the previous one and I take the same approach to set out further findings from a micro level, close textual, analysis which here relates to the second and third of the three significant discursive practices (DP) that were described in Chapter 5.

In the first half of the chapter I set out DP2; the way in which neuroscience is rendered as a means to an end. I describe how the constituent DFs can be grouped according to two main tasks which i) highlight the purported benefits of neuroscience and, ii) provide instruction on how best to leverage it. Next I present the discursive features (DF) associated with these two tasks, using illustrative excerpts and quotes as in Chapter 6. Thirdly, I discuss the purpose or function of DP2 whereby findings from neuroscience research have become instrumentalised in service of a desired outcome.

In the second half of the chapter I approach DP3 in the same way. This final DP relates to the way that neuroscience findings have become scientific evidence despite having been divorced from the original science as described in Chapter 6. The discursive features which comprise this DP have two main tasks in which they i) emphasise the scientific-ness of neuroscience and, ii) allude to the many possibilities it seems to promise, even if it cannot live up to these expectations right now. Next I present each DF, as before and then discuss the function of this final DP.

I conclude the chapter with a brief summary of the micro level analyses presented here and in Chapter 6, and suggest that the analyses highlight how language use enacts discursive properties which serve a particular function; in this case rendering neuroscience research findings as flexible, instrumental and an evidence base.

7.1 A means to an end (DP2)

This second significant discursive practice sees a range of discursive features combine in the texts to emphasise neuroscience as a means to an end. By means to an end I mean that neuroscience is rendered appropriate and capable of providing a solution to a variety of challenges. These challenges range from organisational level issues with, for example,

employee engagement, to individual level issues associated with, for example, flexibility or agility in thinking styles. Not only that, but neuroscience findings can bring further benefit by way of commercial advantage or competitive edge to those involved, including those providing neuroscience-based services and their clients.

As described above, two tasks are related to this DP. Firstly there are discursive features which position neuroscience as being broadly beneficial and applicable to all, with the underlying assumption that it must be made practical. For neuroscience findings to be worth engaging with in this environment it must be useful. Further, favourably connecting neuroscience findings to positive outcomes in organisational terms make it more explicit and tangible.

Secondly, are the DFs associated with realising such value; how neuroscience can be 'leveraged'. These are underpinned by the assumption that organisational practitioners need clear direction, since they are not experts in neuroscience findings themselves, and neither do they have the time (or interest) in becoming experts; simply they are interested in the benefits arising from it. In that sense neuroscience findings have been effectively commodified - translated into a resource or an asset to be employed in pursuit of some advantage. Further, a label of 'neuroscience' is, either explicitly or implicitly, extended to approaches which either do not have their origins in the field of neuroscience, or where neuroscience makes no significant contribution beyond what appears to be common-sense but is nevertheless invoked as a justification.

In what follows I will describe the discursive features with regards to these two tasks, summarised in Figure 6 below, whereby neuroscience becomes a means to an end.

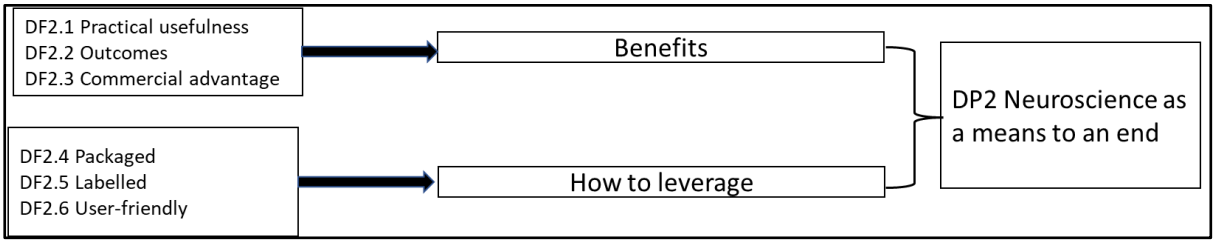

Figure 6. Two tasks of DP2 with associated discursive features (DF)

7.1.1 The benefit(s) of neuroscience

In the texts neuroscience is constituted as being beneficial through a series of features put to use by translators whereby neuroscience becomes a resource to be employed to achieve some positive result.

7.1.1.1 Practical usefulness (DF2.1)

The first discursive feature which emphasises the benefits or value of neuroscience concerns how it is positioned as comprising general knowledge that can be put to use. Supposedly with broad and practical implications for "all management practices" (article 9), the implication is that neuroscience findings are effectively no more than common sense that can be made use of.

The following excerpt is extracted from an article which positions neuroscience findings as having "tremendous potential" when applied to management and leadership education:

> It stands to reason that a deeper understanding of our collective brains can be of great service to business leaders, managers, and employees. If we have better insights into why we make decisions the way we do, we can course-correct ourselves or react to the decisions of others more effectively. "We will learn more about how to create change, how to control learning, and how to understand moral reasoning," Ancona explained (Article 1).

Having articulated their excitement at its potential, as well as their role as associate dean at a business school, with responsibility to "champion scientific knowledge as it applies to management and leadership education", the author supplements their excited perspective with a view from other 'experts', in this case a business school colleague, Dr Ancona. Of note is the author's assertion that "it stands to reason" that essentially knowing more from neuroscience is beneficial in a business environment, as though a consideration of neuroscience is simply logical and obvious and fits naturally into a business context. The excerpt implies a natural and simple link between knowing more and being able to adjust, or "course-correct", in order to improve effectiveness. This point is reinforced by Dr Ancona's statement, which highlights not just the possibilities, but some definite (albeit wide-ranging) useful contributions to be provided by a greater understanding of neuroscience.

Whereas articles, by their very nature, actually put neuroscience to use, interview texts provide a slightly different emphasis and are often one step behind, setting out why it

should be put to use. Often respondents suggest that they know that, as fascinating as it might be, the value in neuroscience is in its ability to be 'applied'. Only once it is rendered useable in some way can it deliver results for organisations. In the following interview excerpt, this consultant highlights how neuroscience becomes useful when it moves from being interesting information into a practical application:

> Coming back to the science… I like to explore … science and how it… can be useful in the workplace, and to strip it of its complexity, because in the workplace, if we're… to positively energise a workplace, it is not … now we have to simplify things beyond interesting. So I've been on a lot of courses in my time, you know management courses, run by business schools or universities, or whatever, even consulting firms who, … at the end of the course, I would say, that was interesting…but what did I ever do with the information? And I think that…our job, as as consultants in the world of people support and development, and the internal functions, the job is not to make it interesting, it is to make it useful. And it is to make it add value … to the intention of the business. What is the business trying to do, so how well aligned to the purpose is it (C10).

They describe the need to "simplify things beyond interesting", to provide a means for people to "do" something with the information, reinforcing the idea that neuroscience is of practical use, and capable of adding value to the business, albeit in a general way such as by "positively energising a workplace". In this way, with neuroscience "you're making it … practical, you're making it interesting, you're making it very concrete" in some way (C7). And this very concreteness is important to a client base who need neuroscience to be tangible in order to entertain it. The following excerpt further emphasises the shift toward the concrete and also introduces the idea of quantifiability:

> a lot of corporate companies are sceptical and they're very much about 'what's the practical application'. Hence getting involved in [name of neuroscience tool] because I felt it bridged the science world, but it also gave numbers and measurements which is want my clients wanted (C11).

I will set out discursive features associated with the 'scientific-ness' of neuroscience later in this chapter but for now this notion of quantifiability relates to the idea that for "corporate companies" to overcome their scepticism they need to find neuroscience useful and so it must be practical and "numbers and measurements" are an advantage.

Another aspect of this feature is in the way that some respondents recount how they have found neuroscience to be personally useful. For instance, this consultant describes working

with a coach earlier in their career (before moving into consulting) and how that coach had introduced some useful neuroscience ideas:

> so I started to learn a little bit about ….. err, not psychology or anything like that, anything formal, but a framework around thinking about how you are in your environment and…that was very very helpful to me, to navigate always being the only woman in the room, and as I became more and more senior, definitely being the only woman in the room….so that's I think where my interest started and I found it very, very helpful (C5).

Although rather vague, describing "a framework around thinking", these ideas were clearly attributed by her to neuroscience. Further instances arose during interviews, but mindful of respondent anonymity, I will only add that others found neuroscience to be useful in the process of recovering from both chronic and acute medical conditions.

In all this DF consists of moves to establish the practical usefulness of neuroscience and does so in a very general sense, perhaps as a result of the previous DP1 whereby neuroscience is understood as an abstract idea rather than precise and specific research findings.

7.1.1.2 Outcomes (DF2.2)

The second discursive feature which serves to demonstrate the benefit of neuroscience is the way in which purported outcomes are highlighted in articles; what sorts of results it can bring about if organisational practitioners were to embrace it. Such outcomes can include the removal of barriers which impede effectiveness, for instance, those impacting 'cognitive processes' or even stress. Prevalent as part of this feature are terms which include productivity and effectiveness, as evident in the following excerpts:

Neuroscience "will play a huge role in the future of business education," says Michael Platt, a Wharton professor, because "we have reached a point where we understand so much about the human brain — how it processes information — that we can use neuroscience to do business better" (Article 5).

This project translates some of the latest findings from neuroscience for use in the enhancement and acceleration of leadership development. The project identifies, explores, and tests relevant neuroscience-based findings for application to leadership development. The emphasis is on improving techniques and strategies for developing leaders (Article 11).

There will be an upward spiral of motivation, growth, and productivity (Article 10).

For example, we know that stress hurts the brain and that has a huge impact on productivity. Medina says that enduring continuing stress is like trying to fly an airplane under water (Article 8).

And there is no denying that this information is useful – managers and employees alike can greatly benefit from understanding neuroscience, from improved relationships to greater creativity and productivity resulting in better, more rewarding places to work (Article 7).

Often, and in keeping with DP1, these outcomes are vague and nebulous or are indirect, perhaps related to particular skills which might in turn improve business outcomes. The following excerpt comprises the second paragraph of an article which puts forward a 'hypothesis' regarding "wise leadership". This excerpt essentially posits that transforming the way one thinks by developing a capacity for mentalizing and mindfulness facilitates leadership capacity by improving quality of thinking:

Neuroscientists and psychologists are beginning to learn what happens at moments of choice inside the human mind (the locus of mental activity) and the brain (the physical organ associated with that activity). If you understand these dynamics and how they affect you and those around you, you can set a course toward more effective patterns of thinking and action. You can replicate those beneficial patterns, at a larger scale, in your organization. Over time, this practice can help you take on a quality of strategic leadership: inspiring others, helping organizations transcend their limits, and navigating enterprises toward lofty, beneficial goals (Article 14).

The article goes on to claim that "executive decision-makers can use their minds to transform organizations". It stitches together ideas and research findings from neuroscience as a means of evidencing the possibility of such an outcome and suggests a relationship between individual brains and organisational performance in another example of reductionist thinking.

From interviews it is possible to see much the same feature; claims as to likely outcomes of putting neuroscience to use are vague and generic, even when respondents are explicitly

asked about what organisational clients feel that neuroscience brings, as is the case in this excerpt:

> Their expectation would be that their people become more productive, and…that they're able to achieve things, you know, simpler, better, faster…that .. we help them improve their mental…well-being… that we help them minimize any…risks in their job, so improvements in their health and safety figures…so probably a lot of the things that we've spoken about (C11).

In using affirmative adjectives such as "simpler, better, faster" the respondent only commits to broad and general "improvements" which help people become more productive without recourse to specificity. Interestingly "mental well-being" is explicitly mentioned, with the implication that these outcomes are something that their corporate clients would benefit from attending to, although it is not clear whether they have been raised by clients themselves.

An additional perspective in terms of outcome is how neuroscience is advantageous in generating interest for consultants as business owners, as described here:

> When you think about the channels we would use to get into organisations, it's almost always through a head of HR, or HRD, or learning and development director and head of training. Typically these people are uber interested in humans and what makes them tick and they're also, if you're in the position where you've done this for many years, you've probably been continually exposed to something similar. It's the same, it's painted green this year. And then we come along, we talk about the neuroscience, and the psychology. That pricks peoples ears up, and ok I've heard that my audience will like that because I've given them something new and useful. And so I think it's those 2 elements - …if you haven't heard of it before it's easy to get a conversation going with these kind of people, it tends to go really well and then they want to do more of it with other people (C2).

In particular, the suggestion that it "pricks peoples ears up" because it is new and supposedly "useful", which makes it more likely that "these people" will then engage in conversation which leads to something else. As such, one outcome for consultants is that the novelty of neuroscience can essentially open the door for them to new business, which relates closely to the next discursive feature.

7.1.1.3 Commercial advantage (DF2.3)

A third discursive feature which engenders beneficial and practical neuroscience is the way in which commercial advantage arises through translation. This particular feature appears both explicitly and implicitly, for both translators themselves, as well as for their (potential) clients. For example, the following excerpt is taken from a lengthy CIPD research report entitled "Neuroscience in action", concerned with "how insight from neuroscience is being used by organisations to inform L&D practice". The report summarises findings from a range of interviews with organisations and 'independent practitioners' asked about their experience of applying neuroscience to learning and development. This particular excerpt is taken from the penultimate section of the report, exploring "the key benefits and challenges associated with incorporating neuroscience principles into L&D practice":

> Demonstrating business credibility is something even the most senior L&D and HR professionals still struggle with. While many recognise this, we are perhaps underestimating the challenge we face. Thirty-four per cent of business leaders say that HR leaders are not perceived to be of the same calibre as other senior leaders (CIPD 2013). Forty per cent think that HR struggles to debate and challenge organisation issues with sound reasoning (compared with just 18% of HR leaders who think this is the case). Often, we try to meet this challenge by building business acumen. However, perhaps we need to place more focus on demonstrating strategic functional expertise and evidence based practice. An appreciation of neuroscience blended with insight from a range of disciplines could really help us increase our credibility (Article 3).

Alongside a short paragraph listing organisational benefits ("cost savings, reduction in turnover, improved customer perception"), the larger proportion of the section is given over to the "more kudos" or "enhanced credibility" that is reportedly attached to the use of neuroscience, and described in the excerpt. The report suggests that applying neuroscience has the potential to enhance the professional status of HR for example, perhaps as part of a focus on "evidence based practice". The implication is that employing expertise arising from "an appreciation of neuroscience" can offer an additional (commercial) advantage. In this same report, so-called "independent practitioners" (who are effectively coaches and consultants) similarly describe how "it does give you an evidence base so sceptical people seem to accept it much more" (p22). In this way, neuroscience can 'lend' its (high) status as

a natural science to those who engage with it. I will say more about both status and evidence base later.

Further, the following excerpt, taken from a description of a "Neuroscience for Leadership" course, makes an explicit claim to the "competitive edge" that comes from applying neuroscience findings:

> The […] Neuroscience For Leadership programme is designed to give your management team a competitive edge based on the latest science. Participants learn how exciting new discoveries on how the brain works can be applied to dramatically improve leadership skills, strengthen communication and build resilience (Article 11).

Dissecting this general claim, the suggestion is that leadership and communication skills, as well as resilience, are the key to competitive edge, which can be realised when "exciting new discoveries" "dramatically improve" them.

In interviews, this feature is particularly associated with consultants themselves, rather than the commercial advantage gleaned by end users of it, and there are a number of aspects to it. Firstly how it allows them, as described above, to set themselves apart from others competing in the same space. This respondent describes how they perceive that by incorporating "the neuroscience of leadership" they differentiate themself from those not in a position to do so:

> I incorporate the neuroscience of leadership in pretty much every coaching session that I do, and it's become a key feature of, you know, keynotes and presentations and workshops that I do as well, which has enabled me to differentiate myself (C17).

Presumably the consultant feels that their ability to incorporate such material creates commercial opportunities that might otherwise not exist. The next excerpt shows how not just including neuroscience, but including "practical stuff" is perceived to be a differentiating factor:

> one of the things that we think differentiates us, I think a lot of people use the science as.. kind of "here's your you aha moment of why this is happening" …we would say we'd always take it a step further and say "and then what can you do with that, what can you do about it" so looking at some of the sort of … practical stuff that really often comes out of NLP rather than neuroscience … that…turned out to be surprisingly backed up

> by the science, looked at… what you can actually do to sort of change some of those reactions, or … answer some of those reactions or whatever you're paying me to do (C6).

That said, the respondent refers to "NLP" (neurolinguistic programming) as often being the source of the "practical stuff", despite a recent review which concludes that "NLP practices are poorly supported by research evidence" (Passmore and Rowson 2019, p. 57) and other more scathing, representations of NLP as a "pseudo-science"[28]. This point reaffirms earlier discussions concerning neuroscience as an abstract concept by highlighting how it is brandished in imprecise ways, including equating it to other bodies of work (or vice versa).

Another dimension of this particular discursive feature is the way in which neuroscience findings are commercially advantageous because they help consultants to engage with those who have typically been more resistant or sceptical about traditional approaches to training and development. This respondent describes how a client base comprising technical or numerate professionals perceive "educational and psychological" approaches to training as inferior:

> although we did training and development, we come from a neuroscience angle every time. And the specific reason for that was, in years gone by… many of the, …hands that paid my my salary, were engineers, chartered accountants, and they understand numbers, specifics, things that are exact. They've been grounded in exact sciences, and many of my clients had difficulty in sort of…well many times I would get the criticism that is "you have an educational and psychological approach, it's a non-exact science". You know, this is of lesser importance, and all this training and development things…it's not really that important and so on (C7).

By coming from "a neuroscience angle" this issue can be countered, since neuroscience is perceived to be more of an "exact science". This point is reinforced by comments from another respondent, who adds that those in authority similarly require a "robustness" in order not to be dismissive, perhaps by extension finding it easier to justify a particular intervention if "a level of credibility" is more visible:

> other thing that's very very useful is that, when you're talking to people in… roles of authority, if there's no…science or a robustness to what you're talking about, they dismiss it. So, it has to be…a level of, credibility. The science is very very useful, for people who are…technical…and need

[28] https://en.wikipedia.org/wiki/Neuro-linguistic_programming [accessed 17 May 2023]

> that underpinning of science to be open to the ideas of what it could potentiate for them in their roles as leaders (C17).

Again, this idea relates closely to features I will discuss in the second part of this chapter. Here my intention is to emphasise the idea that commercial benefits can be accrued by offering neuroscience approaches, whether through enhanced professional status, through competitive edge arising by applying neuroscience findings directly or through differentiation including the ability to enrol a more sceptical client base.

7.1.2 Leveraging neuroscience

The second task of DP2, whereby neuroscience is constituted as a means to an end, arises through features which specify a 'how to' or a 'what this means'. In other words which assume the need to move toward practical steps or actions that can be taken as distinct and in addition to, or instead of, neuroscience findings. In leveraging neuroscience research findings, this discursive practice emphasises all upsides and opportunities and no downsides or risks.

It also assumes that it is legitimate to turn neuroscience into a 'product' whilst also making assumptions about a likely audience that is extremely busy and just needs to know what to do. As such, neuroscience findings are translated into a range of frameworks, lessons, steps, models, and 'listicles', all of which make it more tangible and actionable.

7.1.2.1 Packaged neuroscience (DF2.4)

The first discursive feature most obviously concerns the way in which translators formulate findings from neuroscience into a model, a tool, or a lesson or series of steps to be taken. At the simplest level texts might provide an account of neuroscience findings followed by an interpretation of "what this means" or "next steps", as in the excerpt below:

> So, what can we do?
>
> Fortunately, neuroscience provides insights as to what we can do to help settle and focus the brain when surrounded by uncertainty. The good news is that quite small things can make a big difference. Here are three things we can do:

1. Break down long-term goals into goals that employees can achieve today, this week. Achieving a goal is rewarding to the brain and puts it into a better place to take on the next challenge.

2. As we have seen above, providing as much certainty as possible is also positive to the brain. Our brains crave information (it goes back to the point that if our brains have information they feel they are better placed to predict and to protect us), so it is beneficial to provide regular updates. Even if there is not much news, at least let employees be certain about the communication process – when and how they will receive updates.

Perhaps one of the most useful things we can do is give employees time to reach their own insights about why change is needed. Reaching insights is rewarding to the brain and we are far more committed to change when we feel we have chosen it in some way rather than just having it imposed upon us (Article 19).

This excerpt is extracted from an article concerned with the impact of organisational change on the brain, and from which I have previously used another excerpt to illustrate DF1.1. Having positioned "the brain" as susceptible to negative consequences arising from change and then a likely "negative spiral" in terms of performance, in this excerpt the author moves to solution. Notably, although the suggestion is that there are "three things we can do", this statement is followed only by two. Further, the content of these recommendations rely heavily on the common notions of threat and reward, also described previously. Finally, it is worth raising the question as to whether the recommendations put forward need to rely on neuroscience at all. This is an observation I will develop in descriptions of the next discursive feature (DF2.5 - labelling) below.

Whilst other articles provide advice articulated as, for instance "five recommendations to improve the performance management process" (article 2), or "five neuroscience lessons for leaders" (article 10), notably David Rock's SCARF model is evident both explicitly (see the excerpt from article 4 in DF1.3) and implicitly through frequent references to threat and reward. The following excerpt is extract from an aforementioned lengthy research report by the CIPD into how neuroscience is currently used by organisations to inform learning and development practice:

The SCARF Model

The SCARF Model (Rock 2008) is frequently referenced by our research participants as a helpful tool for applying insight from neuroscience to practice, particularly to support change management initiatives.

Developed by David Rock, SCARF is designed as a tool for gaining greater understanding of human behaviour, and is based on insight about how the brain responds to threat and reward. It stands for: • Status • Certainty • Autonomy • Relatedness • Fairness (Article 3).

Perhaps not surprisingly, given the previous discussion about the dominance of Rock, the report highlights that the SCARF model is "frequently referenced" as a "helpful tool". The use of the word "tool" is of note, particularly since Rock himself typically describes it as a model. The Oxford English dictionary describes a model as a "simplified description" or a "representation", whereas a tool is "a device … used to carry out a particular function". As such, the report is positioning SCARF as more than a descriptive model, it is to be put to use in specific ways in pursuit of particular ends.

The notion of a tool is reiterated in further articles and interviews. For instance, in an article which primarily comprises an interview with a neuroscientist, it is suggested that it is "hugely satisfying to think about how the latest ideas in neuroscience can be translated into effective tools for leaders" (Article 7). And as previously mentioned, interview respondents refer to their use of neuroscience findings in keynote and other presentations, as well as in training and coaching assignments, but their talk concerning neuroscience tools is notable, particularly as shown here, it is portrayed as a central part of their role:

> our function there is a lot to see how can we translate neuroscience into tools that the world of business can use to optimise performance (C7).

For this respondent, the purpose of 'tools' is clear; they should "optimise performance". Another suggested function of tools is that they are a means of standardisation which, in effect enable neuroscience to be applied in a consistent way, as described here:

> I mean, people are aware of things like… serotonin, endorphins.. you know…people talk about cortisol or something like that…and I'm not a scientist, but you can start seeing that people use it slightly out of context, or slightly misunderstanding and then one person to another person to another person. But I think that happens in life, so there's an inevitability about that, which is partly why, again, … I like using…a tool that's got quite specific references in it, to give the clarity (C11).

In this instance, the use of a tool avoids any "misunderstanding" or the issue of technical terminology being used "slightly out of context". Instead it fixes or freezes neuroscience information in a particular way that brings "clarity". Further, even if you are "not a scientist", or perhaps especially if that is the case, the use of a tool might reduce the need for neuroscience expertise of your own, as described in Chapter 6, particularly since you can point users to the "specific references".

Another respondent sheds a slightly different light by describing how they went about designing their own neuroscience tool, but based "on a metaphorical model of the brain":

> we designed our own tool…and when I say design I'm really saying you know we, this literally was two colleagues who sat in a shed in […] and talked for months and months and months about how we could do something that we could own that had some credibility. But also we do very much come from the perspective that a tool is just a tool, nothing gives you an answer, you know…I'm steeped in psychometrics over the years and I really have a problem when people say, and this means that you are X, because it doesn't…it's just an enabler to have… fabulous conversation. That's where I came… from. So what we did […] did an awful lot of the design, and what we looked at was…how we could design something…that was based more…on a metaphorical model of the brain (C8).

In this account, the respondent needs the tool to simultaneously confer credibility whilst acting just as "an enabler" to conversation (in a coaching context). It is effectively positioned as an asset, something tangible which they "own" but differently from the previous account (C11) not something which provides a definitive answer for the user. This account seems to demonstrate a desire to package and apply neuroscience information as an enabler – both of conversations and of credibility. It is also possible that in positioning the tool as an enabler they seek to sidestep any critical questions regarding their own credentials which might otherwise be forthcoming - since this particular individual highlighted that they were "not a neuroscientist" during the interview. And in highlighting that the design process involved "two colleagues who sat in a shed" they diminish the importance of neuroscience findings, although in actuality the tool is the mainstay of their business.

Overall, this feature points to the way that neuroscience findings are packaged into models and tools as a particular means of leveraging or putting them to use.

7.1.2.2 Labelling (DF2.5)

Another discursive feature of this task relates to how liberally the 'label' of neuroscience is applied. There are two elements to this particular discursive feature. Firstly, ideas and approaches which do not have their roots in neuroscience, and may have been in circulation long before organisational interest in neuroscience arose, are retrospectively labelled as neuroscience. Secondly, is the labelling of approaches which do purport to originate in neuroscience but seem only to have vague connections to it. In both instances neuroscience findings are being used to validate or perhaps legitimate other approaches or material. In the following example, the focus is on mindfulness as a recent topic on a "neuroscience for leadership course":

> Thomas Bonfiglio, a regional director with American Medical Response in New York, a medical transportation company, says practising guided meditation with his team at the beginning of meetings has made them more productive. Mr Bonfiglio learnt techniques on a two-day neuroscience for leadership course at MIT's Sloan School of Management, in 2014. "We have a lot of aggressive, alpha-type personalities," he says. "It was often difficult to get the group to work together." But after introducing meditation, they worked more quickly and effectively, Mr Bonfiglio says. "At first people were sceptical because it took up time. However, I found that instead of arguments, there was more positive discussion, and the tone was more conciliatory (Article 5).

From this excerpt we see that the said neuroscience course includes guided meditation practices which were deemed effective according to the interviewed participant, Mr Bonfiglio. Immediately before this statement, the author quotes Professor Platt as saying, "we can use neuroscience to do business better". Together these imply that meditation is a helpful neuroscience practice as opposed to a standalone body of work which has its origins elsewhere. And whilst there is a body of research in neuroscience which considers the impact of mindfulness on the brain (for instance see Tang et al. 2015) to collapse neuroscience and mindfulness is a deliberate and essentially inaccurate move.

There are additional examples of how material is labelled as neuroscience or at least collapsed into content which is collectively presented as such, presumably as a means of validation. These examples include ideas originating from NLP, as described above, and from

social psychology such as fixed or growth mindset (Dweck 2006), as illustrated by the following excerpt from a text which comprises an interview with an HR director of a blue-chip organisation. This excerpt is their response to a question which firstly asserts how neuroscience leads to a "greater understanding of how to improve leadership behaviours and performance" and then asks how their organisation approaches leadership development and organisational transformation with the help of neuroscience:

> We are delving more and more into neuroscience to better understand how people think and the dynamics of, for example feedback and coaching in fostering a growth mindset. People need to hear appreciation, feel they are in a safe environment and have the empowerment to bring forward new ideas (Article 18).

From the response it appears that a range of ideas or approaches, including feedback, coaching, growth mindset and appreciation, all of which preceded the move of neuroscience into organisational practice, are collapsed into a neuroscience approach for leaders in their organisation, via "short learning modules". This is an instance of retrospective labelling.

An example of the second type of labelling comes from texts where there is nominal neuroscience content or where its contribution over and above what are common-sense or reasonable suggestions is limited. In these instances texts appear to invoke neuroscience findings to conclude what already seems obvious and sensible. For instance this excerpt advocates a neuroscience foundation for the assertion that strong bonds between an employer and their employee drives value alignment when arguably there is no need to invoke neuroscience for what seems to be a logical and sensible statement:

> In the workplace this suggests ensuring there are strong bonds with the company and peers in work groups, creating social connection and safety within the group will drive value alignment in the way described in the research above. The values held by peers or an important group will drive social consistency and conformity more than any communications campaign (Article 17).

This example gives some indication of how, at times, translators work hard to make a connection between neuroscience and something in the organisational world, and it is likely the case that unnecessarily (or inaccurately) describing something as neuroscience is a deliberate move to ascribe particular qualities or characteristics to that idea or approach. In

the excerpt above, from the use of terminology such as "social connection" and "safety" we can infer a connection back to the SCARF model, although it is not explicit. Further research confirms the author to have a qualification in NeuroLeadership[29].

The following interview excerpt reinforces the idea that at times neuroscience, as a label, is invoked for what essentially relates to other knowledge, such as the need to be rested, or the limitations of multi-tasking, or habitual behaviours:

> we'd be continually thinking…what would these people, who are middle managers, or management, or just trying to make sense of change…[what] would they get out of knowing about the function of sleep, the functions of…the brain, the limitations of processing capacity, and the need for habit. Vast quantities of … this is … useful stuff because you can give them guides as… why these do things in the way that they do it, and why they might fall down from time to time (C2).

This example shows how attaching a neuroscience label allows consultants to draw together a range of content into an overall narrative which rests on a brain-based explanation and might then be more compelling. It further relates to another frequent idea; that we should work with our brains rather than against them:

Simply understanding a little more about how our brains work can help us to work with the brain, rather than despite it (Article 19).

In this way neuroscience is not the only common label, but is joined by entreaties towards brain-based explanations. This idea positions "the brain" as having a preferred way of working and effectively recommends that we should educate ourselves about it and take it into account, once more adopting a dualist notion whereby we are separate from our brains and need to work together better as seen in Chapter 6 (DF1.1).

Other texts talk about using "brain-based rewards and threats" (article 2), seemingly as a way of suggesting any forthcoming advice is connected to neuroscience and therefore good for the brain. In the following excerpt "having a brain-based work environment" or being a "brain-based leader" are both advocated as ways of ultimately improving "motivation, growth and productivity":

[29] https://individuals.neuroleadership.com/certificate-in-the-foundations-of-neuroleadership-north-america [accessed 17 May 2023]

> The information presented is a starting point for creating a work environment that is based around what is healthy for the brain. Leaders who ignore how the brain functions are leaving a lot to chance. Sometimes things might be great, but then something can happen and they might worsen. Having a brain-based work environment can help leaders effectively navigate the rises and falls in the economic climate.
>
> Be a brain-based leader by helping the people improve the work environment, and the environment improve the people. Both influence the other and, in a working system, there will be an upward spiral of motivation, growth, and productivity. Overtime, this environment will actually change the brains of the people in it, making the team and the organization better able to adapt to change (Article 10).

In essence these are abstract recommendations - what does it actually mean to have a brain-based work environment? And how exactly might it differ from any work environment in which employees might thrive. Once more such labels highlight a reductiveness where "what is healthy for the brain" seems to take precedence over what might be healthy for a person and the residual sense is that "brain-based" has been invoked simply as a means to an end.

7.1.2.3 User-friendly (DF2.6)

The final feature of DP2, which renders neuroscience as a means to an end, is evident in assumptions made about users, including the notion of user-friendliness. For instance, translators frequently endeavour to establish our current working lives as busy or overwhelming, as demonstrated by the following excerpts:

> Life today is a constant barrage of challenges. We have promises to fulfil, problems to solve, tests to pass, and situations to manage (Article 14).
>
> Our brains are confronted daily with information of choice. At times this can feel as though 8 folds of traffic lanes are all merging together into one lane which requires our internal filters to decipher and process all this information. Neuroscience research is beginning to demonstrate what happens at moments of choice inside the human mind and the brain, therefore making it possible to set a course towards more effective patterns of thinking and action allowing for our brains to focus and think optimally (Article 20).

In both instances the authors imply that we are likely exhausted and without much in the way of spare capacity. In the second excerpt neuroscience might be able to come to the rescue. (Of note, the sentence suggesting that "neuroscience research is beginning to demonstrate moments of choice" is directly plagiarised from article 14 in my sample).

This busy-ness justifies both the need for "brain-friendly" interventions, as previously described, and which should be short in order not to overwhelm, as put forward in the excerpts from a further two articles:

> "You need to design them in a brain-friendly way," says NeuroLeadership's Grey. "But we tend to come up with a great agenda, take them all off, sheep-dip them for two or three days, and put speaker after speaker in front of them. By the second day, they're on their knees and can't think straight, and in the breaks they're all trying to catch up with their emails. That is totally against how the brain likes to work. You need to generate attention and you need spacing" (Article 4).
>
> It is very interesting research, and we are actively taking it to our leaders in short learning modules to broaden understanding of why these behaviors are so important for our culture (Article 18).

In some instances a notion of brain-friendly is reductively collapsed into the idea of neuroscience findings needing to be user-friendly without it being altogether clear how we should distinguish between them. Some of these aspects are articulated more clearly in interviews. For instance, this respondent argues that users do not have time to immerse themselves in neuroscience information:

> I find a … lot of leaders are time poor, and you've got to get to the point, and "it's very nice that there's been studies, but I don't need to know all the details about the studies, I just want to know the relevance to me, in my day to day role"…The eyes glaze over when you go into detail…they don't want the details of science, they wanna kind of move on (C17).

In a sense the respondent is suggesting that they are simply responding to their clients situation in packaging neuroscience into models and tools that can be put into practice. And further, the assertion that "the eyes glaze over" effectively legitimizes the exclusion of any detailed scientific information. Instead the implication is that it is the respondents job to "get to the point".

One way of avoiding such eyes glazing over is to avoid the use of technical terminology, as suggested in the following excerpt, except here it is not just a matter of a lack of time, but that people might be scared off:

> it is always…quite a challenge, to sort of not scare people with all these weird names that they don't understand…It's the same for me, if I speak to people in the insurance industry…sometimes they use terminology that I don't understand. And you know, people can't use what they don't understand. And that's very important, that we have to make neuroscience accessible to the normal person, without scaring them off with the weird names…we need to let them understand what is the value of this (C7).

Here the respondent suggests "weird names" are likely to "scare people" who then will not be able to understand "the value of this" [neuroscience]. By implication if one is to leverage neuroscience that might mean working at a higher, even conceptual, level. This particular discursive feature points to how assumptions about clients and their working environments affects translation efforts. Ironically, and as demonstrated in this final excerpt, neuroscience itself can be used to justify how it should be made user-friendly:

> invariably we would always be distilling the science down into very manageable to understand chunks. Some of it because of what we know about attention spans maybe (C2).

Overall this feature serves to justify moves which involve simple messages and clarity about what and how to apply neuroscience, all of which is in evidence in the texts.

7.1.3 Function of DP2

In this first part of this chapter I have set out discursive features which relate to a broader discursive practice following a micro level analysis of the texts. Although I have described separate features it is possible to see some overlap between them (including those from DP1) which highlights the difficulty of distinguishing between them. That said, I maintain that they are sufficiently discrete in the work that they do for it to be a worthwhile endeavour, particularly since a broadly similar feature might vary in its effect in association with different features and practices.

This second discursive practice – neuroscience as a means to an end – is evident through a set of discursive features which are summarised in Table 15 below.

Table 15. Discursive features of DP2: Neuroscience findings as a means to an end

Discursive feature	Effect
Benefit(s)	
DF2.1: Practical usefulness	No longer just scientific knowledge but goes beyond that into real world use Normalises neuroscience as a resource to be utilised
DF2.2: Outcome(s)	Universal, potential to impact everything
DF2.3: Commercial advantage	Creates additional opportunity
Leveraging it	
DF2.4: Packaged	Standardized into techniques which are easy to follow and lead to predictable outcomes
DF2.5: Labelled	Neuroscience can explain everything – even approaches that pre-existed or seem unrelated will benefit from a neuroscience angle
DF2.6: User-friendly	Justifies (over) simplification of neuroscience messages

The first set of features accomplish the task of highlighting the supposed benefits of neuroscience to organisational practitioners, particularly in light of its practicality. Neuroscience findings are broadly formulated as a resource which can be put to use in addressing organisational issues with a generalised ability to bring about business improvements. Further, the brain is a fundamental asset to be used more efficiently and neuroscience findings are the means through which this efficiency can be achieved, and which might bring about competitive edge both to those making use of it as well as to those involved in promoting it.

The second set of features are concerned with the task of how neuroscience findings might be put to use so that benefits can be leveraged. Even if neuroscience is a complex field, various models and tools ensure that it is packaged for easy application and a need for only cursory knowledge. Further because neuroscience is held to be universal, in that fundamental knowledge concerning the brain is relevant to all in all circumstances, it can be drawn upon even post-hoc to lend credibility to extant approaches.

Overall, this discursive practice serves to transform neuroscience into something easy to understand and apply with attendant beneficial outcomes, albeit without any direct research which can demonstrate the contribution of neuroscience findings to the

workplace. Neuroscience findings are to be used instrumentally and uncritically in ways that generally purport to improve performance or outcomes in some way.

7.2 Neuroscience as scientific evidence (DP3)

The third significant discursive practice relates to how neuroscience, despite having been divorced from the science and reformulated as a series of concepts or abstract ideas, is nevertheless employed as being both scientific and as hard evidence. There are two tasks related to this discursive practice as summarised in Figure 7 below.

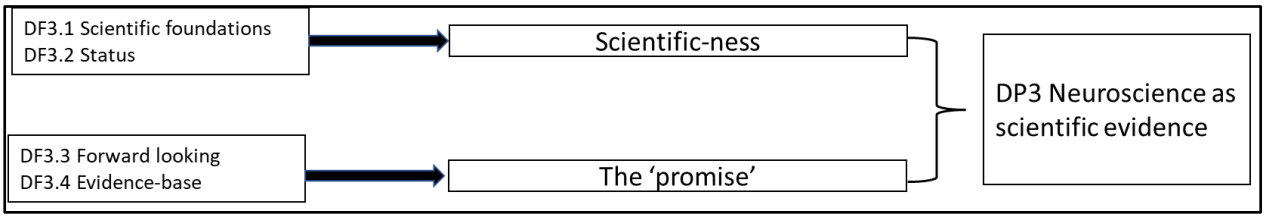

Figure 7. Two tasks of DP3 with associated discursive features (DF)

Firstly, particular features are employed which emphasise what I describe as the 'scientific-ness' of neuroscience material, by which I mean a bias toward positivist approaches, and which are apparent in the way that translations imply they are based on scientific findings (rather than on translations of translation as is often the case). This feature is manifest when translators are at pains to point out any scientific foundations through ascribing links to research or scientific studies and through an emphasis on scientific appearance. Further the high standing of neuroscience is endorsed, at times vis a vis other approaches, and a general confidence in the legitimacy of neuroscience accounts is conveyed. Secondly, I suggest that two discursive features amount to what I describe as a 'promise'. These DFs fan ideas relating to future skills and abilities as well as some kind of readiness to confront anything that might arise in a constantly changing workplace. In being forward looking (DF3.3), particularly vis a vis the more 'traditional', neuroscience findings offer much potential, including the possibility of becoming an evidence base (DF 3.4) through the appropriation of a neuroscience knowledge-base as professional validation.

7.2.1 'Scientific-ness'

Text features signal the 'scientific-ness' of translated neuroscience findings through frequent recourse to 'studies' or to 'research', 'scientists' or 'experiments' as well as to resulting 'rigour' and credibility. Firstly the scientific-ness of neuroscience is emphasised

through recourse to its supposed foundations (DF3.1) and includes respondent moves to use neuroscience findings to make tangible previously intangible aspects of organisational behaviour. The second discursive feature (DF3.2) concerns the status of neuroscience and how translators highlight its superiority, often vis a vis more traditional approaches to organisational behaviour. Both features effectively position what follows as a science, despite earlier observations suggesting that translations are effectively divorced from the original science.

7.2.1.1 Scientific foundations (DF 3.1)

A frequent referencing of 'research' or 'studies' is a notable feature in the texts. As described previously, whilst accurate citations might be absent translators nevertheless endeavour to characterise their efforts as connected to scientific research, presumably as a means of demonstrating reliability and integrity and to benefit from this association.

The following excerpt is an example of this feature wherein the author claims a central role for 'research' in 'filling gaps', providing 'surprises' and even 'reshaping the way we think', most often in a general way whereby specific scientific studies are not cited:

> Neuroscience research is helping fill in critical gaps….There are been [sic] some big surprises in the research… Before neuroscience research, social pain, like feeling put-down in front of others or treated unfairly, was just something to 'get over'…. I believe that neuroscience research will be a significant factor in reshaping how we define leadership, select leaders and design leadership development programs (Article 13).

For a reader these moves position the content in association with 'research' lending it authority and rigour which serves to convince the reader of the legitimacy of subsequent claims made by the author, and to provide reassurance that they are substantiated even if those details are not provided.

Another excerpt, entitled "Why neuroscience should change the way we work" exclaims surprise at how "leaders and their companies continue to operate their most precious assets" in old fashioned ways, before suggesting that:

> But in the last fifteen years, there has been unremitting neurological research which reveals fundamental insights about how we humans function. This information is not arbitrary – it's

factual. These studies impact everything about how we structure work. They show how brain functions affect perception, emotion and conscious thought (Article 9).

The author paints a picture of neuroscience as a field urgently embroiled in constant and relentless study and investigation, from which inevitably emerges profound knowledge about the human race. Not only that "it's factual", by which we are meant to understand that, coming from research, it is accurate and truthful and as such has substantial significance for the workplace since the "studies impact everything". The article goes on to provide a series of examples of "evolving ideas that should change the way we work" by putting forward ideas such as "managing expectations" and following them with descriptions of findings or studies or quotations from familiar names such as David Rock and his colleague Matthew Lieberman. In the above excerpt the author moves to position the ideas which follow as being 'scientific' and therefore 'factual'. In this way, although the author does concede that "the growing body of neuroscience must stand the scrutiny of further research", no efforts are made in this article (or others) to question the robustness or pertinence of neuroscience findings in an organisational setting; it is enough that they have a scientific foundation. The implication is that scientific research or studies provide superior knowledge which is clear and comes in the form of 'answers' as we will see below, and which eliminates any role for interpretation. I will discuss this point further as part of the next discursive feature.

Another way in which respondents highlight the scientific-ness of neuroscience is evident in the oft held idea that, because neuroscience is a hard science, it has the capacity to render more concrete those interventions associated with organisational behaviour which are more typically viewed as 'soft', and which in turn lends them more credibility. For instance:

> I still think that there are some people in business who think that the whole arena of psychology and human behaviour is a bit woo-woo…It's a bit unproven, intangible. So I do believe that there's an appetite, genuinely, for neuroscience, because of that potential…ability for it to be… able to provide some tangible, measurable results around human behaviour. Maybe some answers, actually. Maybe it's around that. So…I think that's positive…I think that if it's opening up business peoples' minds to the the usefulness and the merits of softer programmes such as, coaching for instance, if it can help to afford the respect of other more tangible measurable business programmes, then I think that's very good news. So, I think there's an appetite there, and I think there are people

> whose brains operate that way – they they are genuinely attracted towards answers and facts. That's a good thing, that's a good thing for everyone (C8).

This position connects also to an earlier discursive feature (DF2.3 commercial advantage) particularly where the respondent speaks about "there are people whose brains operate in this way", such that a scientific foundation makes them more accepting of "softer programmes". Pragmatically this renders an association with neuroscience more likely to bring commercial advantage. In particular, the respondent suggests that what is compelling is the idea that neuroscience might "provide some tangible, measurable results around human behaviour", particularly since it might "afford the respect" of other programmes. In other words, the respondent is not simply reiterating the existence of scientific foundations of neuroscience, but putting them to use including their ability to offer softer programmes tangible measures, or "answers and facts" which are then elevated in status since their "usefulness" and "merits" become more tangible and proven.

Interventions and approaches concerned with organisational behaviour become more justifiable in association with neuroscience findings in two ways. Firstly neuroscience can justify the content of such programmes. For instance assertions that the brain works in a particular way can be used to validate suggested steps, models, or tools as described above. Secondly, programmes are justified as a result of the overall credibility of neuroscience. This point is further elucidated in the following excerpt which emphasises the second sort of justification and is shown in the way the respondent describes a long held interest in how they might make "people development more tangible":

> I think the…neuroscience piece…in the corporate world they often like facts and figures and data and return on investment information to support the soft, fluffy stuff. And there's quite a lot of sceptical people around the personal development arena. So, over the last 20 years probably, I've actively been looking for ways that we can make what appears to be like soft and fluffy development, people development more tangible. And especially, you know, in sectors like financial service, engineering, construction, they, they like to have numbers and they like to have some sort of evidence of why things had worked (C11).

Essentially, this comment seems to relate to the desire (or need) to be able to reflect what the corporate world "likes", by way of "facts and figures" so as to be able to counter the "sceptical people", particularly in sectors which are more numerate or technical.

Presumably by making the "soft, fluffy stuff" more tangible, the respondent can demonstrate some of the previously elusive tangibility and even the possibility of data relating to return on investment. Notably, the observation seems less about neuroscience findings per se, and more about what it offers by way of said "facts and figures and data", all characteristics of science more broadly.

The notion of neuroscience providing more technical professions and sectors with some sort of scientific reassurance is one repeated by a number of respondents. And increased credibility looks to be another possible outcome of this 'hardening up':

> What I hear from people is that, so it's what I hear and what I think it's doing, which are two completely different things. What I hear from businesses is it adds credibility and that, especially if you're working with engineers, medics, you know anybody that has a science background…it makes them feel more comfortable. You know "this is science based"…So there's something about…the neuroscience, the brain aspect…that makes it credible to them. Now, I don't think that just adding something about the brain makes anything credible (C3).

However, suggests this consultant, credibility will not be forthcoming by "just adding something about the brain". In other words whilst they concur with previous observations that, particularly for those with "a science background", a "science based approach" seems to be more credible, they also seem to point to the risk of "just adding something", which might even diminish credibility (and is perhaps a nod to the "wrong people" described in Chapter 6).

The importance of scientific foundations is neatly summarised by this respondent in their exposition of how neuroscience findings feature in their work and how:

> We have to make sure we anchor our practices into science, the hard sciences. It helps you to separate fact from fiction. You know, there's nonsense that we only use 10% of our brain, there are so many myths in the world that have been with us for a long time and is 100% inaccurate, it's not true. The more we understand how, how we ground our practices in neuroscience, that's what it does (C7).

His use of the term "anchor" to describe the relationship between "practices" and "the hard sciences" is notable and implies a deliberate attachment of said practices to neuroscience findings which are then used as a support, either to justify content or for added credibility (through dispatching myths) or both.

7.2.1.2 Status (DF3.2)

A second discursive feature enacting the task of scientific-ness arises from the role of status. In particular it relates to the superior status of neuroscience as a hard science and the way in which 'traditional' approaches are set up. Even being labelled as traditional, such approaches are understood to be old fashioned and lacking in some way.

The following extract, the opening paragraphs of an article published in Psychology Today and written by David Rock, provides an example of how translators explicitly establish neuroscience as a material improvement on what has gone before. In this instance, Rock is particularly dismissive of social science research:

> Want to be a leadership researcher? All you need are eyes and ears, and the ability to notice and describe patterns. Or if you want to test your theories, just set up some social science experiments.
>
> This situation is good for the publishing industry - an Amazon search shows 60,352 books in the 'leadership' category - but there are still huge gaps in our understanding of leadership. We still don't know if it's more about traits, attributes and competencies, or about what followers need. Leadership development still involves a lot of guesswork. As a result, organizations don't have enough good leaders, and some of the leaders we have do some pretty unintelligent things (like betting the housing market will go up forever.)
>
> Neuroscience research is helping fill in critical gaps. While we are nowhere near being able to scan a leader's brain while running a meeting (even if that was a good idea), we can study some of the building blocks of what leaders do - making decisions under pressure, solving complex problems, negotiating a transaction, or trying to persuade others. There are [sic] been some big surprises in the research. Here are just a few (Article 13).

The suggestion is that neuroscience is advancing on answers to questions regarding leadership, whilst it is only publishers who are the main beneficiaries of social science research to date. In the statement "just set up some social science experiments" he implies a lack of rigour and a resulting lack of knowledge, and directly attributes a deficiency in capable leaders to this lack of rigour. Meanwhile, neuroscience "is helping fill in critical gaps", even in a qualified way. Interestingly, this restraint (as seen before in DF 1.7) serves to avoid accusations of over-claim which could be levelled at purveyors of neuroscience

findings; he is not claiming that neuroscience has all the answers yet. However, there is less restraint with regards to social science, which serves to reinforce the notion that neuroscience research is of a higher standing and capable of providing "some big surprises". These include the, by now familiar, topics of threat and reward including an implicit explication of SCARF. Other topics include emotion regulation and all are derived from research by named neuroscientists, designed to further demonstrate his assertion concerning the supposed superiority of neuroscience research. I will say more about how 'traditional' approaches to organisational behaviour are unfavourably compared to neuroscience approaches below in a description of the next discursive feature (DF3.3 forward looking).

Another aspect of this feature is the way in which interview respondents highlight particular characteristics as they seek to both commend the high status of neuroscience and appropriate it. For instance, neuroscience is positioned as being "inclusive" with the implication that it is neutral and objective:

> Neuroscience is inclusive of all people…irrespective of race and religion and gender and all those things. So…whatever it is that you offer to…the new world of work…the world's a global workplace now. It involves many cultures, we gotta be inclusive of all those cultures, and that is the power of neuroscience. There's no other science at all that can more anchor your development and learning practices, than…neuroscience (C7).

This respondent seems to be suggesting that because it is "inclusive" it is unbiased and that this is a particular benefit ("power") of neuroscience. Further this idea might also go back to the reformulation of neuroscience as being foundational knowledge (see DF1.8) and the reductionist stance of taking people down to a level of basic biology; because it is impersonal it is neutral. The logic of this particular perspective is well rehearsed by the respondent and, albeit implicitly, excludes the potential impact of any elements of context, whether organisational or any other.

Yet another advantage of neuroscience derived from its status as a natural science put forward by the same respondent, and elsewhere by others, is concerned with measurement and in particular the ability to measure an individual's brain in some way. In the following interview excerpt, the respondent highlights the importance of quantification, through use of a tool:

> I have developed…an assessment called the […]. So, because we are in performance optimisation, and it goes into all the field, like emotional intelligence, development and agility, development, and everything. But we always say that you cannot improve what we cannot measure and therefore we need to be able to measure things (C7).

I have already described how tools facilitate the application of neuroscience ideas (DF2.4). Here additionally we see how they might eschew nuance in favour of quantification. In this way tools are positioned as a way of enumerating aspects of the brain, purportedly associated with neuroscience findings and thereby borrowing its high status. It suggests that quantification or measurement of some sort is both possible and important, since "you cannot improve what you cannot measure". This idea is reinforced during another interview when a different respondent discusses the same tool:

> it's not a psychometric, it's not a preference tool, it's actually measuring how your brain has become wired and what you can do about it. So, it actually sits underneath a lot of the other tool things that are available in the corporate marketplace (C11).

The tool itself is positioned as foundational, since it "sits underneath" other approaches, with the implication that it is a natural start point. However, in terms of "actually measuring how your brain has become wired" it is not clear how this measurement is achieved and what specifically is measured. As discussed in Chapter 2, neuroscience methods endeavour to measure many different attributes of the brain, however it is a complex and qualified process. Further no interview respondent reported any direct engagement with neuroscience technology, including any of the different approaches to scanning. In fact, the opposite is the case, as seen in DF1.2 when respondent C8 describes how they declined an opportunity to validate their tool in such a way.

Finally, in addition to its neutrality and supposed ability to quantify, respondents also emphasise the notion of reliability. When asked about their perception of the appeal of neuroscience to organisations this respondent suggests that:

> because it's based on …. Science, it's not ….. empirical or guesswork or a model […] Erm so it's so it's more reliable […] than somebody's model of how things work, that you think well then what's that based on, the fact that you know (C5).

In this instance the respondent is effectively suggesting that "somebody's model of how things work" is inferior to neuroscience findings because "you know" what it is based on. This view suggests an attitude toward science as not only more "reliable" but also more transparent, reinforced by the portrayal of "guesswork" as one of the alternatives. Neuroscience findings are definitely more reliable than guesswork.

Taken together this discursive feature emphasises the status of neuroscience by highlighting scientific characteristics, sometimes in contrast to traditional approaches, including its supposed objectivity, quantifiability and reliability.

7.2.2 The promise

I encapsulate the second task of this discursive practice in the notion of a 'promise'. There are two aspects to the 'promise'. Firstly a subtle, almost imperceptible even, assurance that neuroscience is able to initiate some kind of readiness for as yet unforeseen circumstances. And secondly in how neuroscience knowledge can be claimed as an evidence base underpinning particular professions or organisational functions that have, to date, been lacking an evidence base.

I have dubbed the first discursive feature "forward looking" as a result of how neuroscience (findings) are positioned as major advances of the modern day, as being at the cutting edge of progress and, as seen above, as superior to 'traditional' approaches to organisational behaviour. The second discursive feature is more prosaically described as "evidence base".

7.2.2.1 Forward looking (DF3.3)

There are a number of elements to this particular discursive feature. Firstly, in how texts characterise the idea (and importance) of the pace of change and the need to keep up to date. For instance, this extract comprises the opening paragraphs of an article which evokes an exasperated tone in the face of assertions (later in the article) that "we still cling to old ideas about organizational systems that do not maximize human performance". Whereas the author suggests organizations do update "their systems", it is not the case that neuroscience findings are being embraced:

> Most organizations and their leaders take pride in updating their systems with the latest technology and equipment. They devote significant resources to ensure their employees are using state of the art processes and materials. Most organizational leaders would agree that

without constant upgrades, they would be trying to achieve success with their hands tied behind their backs.

That's why it is so baffling that so many of these leaders and their companies continue to operate their most precious "assets" – their employees – using badly dated thinking, outmoded concepts and really old-school beliefs.

As the data from neuroscience continues to mount, we wonder why this crucial evidence-based information is still being so widely overlooked? (Article 9)

Set in contrast to "badly dated" or "outmoded" or "old-school beliefs", neuroscience is positioned as a means of "updating", and perhaps on a continual basis as "data….continues to mount", with the implication that, through neuroscience information, it is possible to avoid being left behind and to ignore or overlook it is short sighted.

A second element of this need to keep up to date is reinforced by others, wherein we are advised that we must "adapt and keep up with the world around us" (article 18) particularly since "the pace of change is accelerating" (article 18). This disposition also means that neuroscience content which purports to inform an ability to "change" and "adapt" is particularly pertinent, as suggested in this excerpt:

> And the third bit we do is to…try and develop approaches to help people to adapt and to learn…and then to adopt new practices as quickly as possible as well…So how do they …how are they able to adapt the challenges of the new world, such as now…change is happening (C10).

For this respondent one of the central ideas they have taken from neuroscience findings concerns adaptability, which relates to an earlier discursive feature which described neuroplasticity as one of a narrow range of neuroscience topics translated for organisational practice (DF1.5). As such this feature relates not only to the idea of neuroscience being a modern science, but also the idea of applying neuroscience findings to enable us to keep up to date, by becoming more flexible and adaptable. Here the notion of agility is prevalent and arises from the work of a particular 'guru' and associates who have adopted their approach:

> they're having to rethink their businesses, people need to problem solve in a different way, or be more innovative. So, a part of reimagining their future and being more agile in the way they're developing their businesses, here's a profile that will help people be more agile (C11).

In this way the respondent suggests that the profile can help people understand agility and how to be more agile which in turn helps them to “reimagine their future” and rethink their business. This is another aspect of a focus on the future, or evoking forward looking aspects of neuroscience, by revealing our capacity to become more flexible and adaptable and so be able to productively accede to any future scenario.

Another aspect of this discursive feature is how translators position neuroscience findings as having undergone some kind of transformation, particularly as a result of the development of approaches to brain imaging as encapsulated in the following excerpt:

> Of course, a biological basis for human behavior is not a new concept, only now we have more clarity on the biological processes that influence and govern our actions. There has been a revolution in what we know about how the brain works. "New technology enables us to see which parts of the brain are activated at any given time and what inputs cause what kinds of brain-usage patterns," Ancona said (Article 1).

In this text, because a “biological basis for human behavior is not a new concept” neuroscience is both new and not new at the same time. We are reassured that it was already a legitimate approach to human behaviour but now “there has been a revolution” it takes on a new importance, with the likelihood that the “new technology” will provide more and more knowledge. Further, your willingness to engage with it puts you “ahead of the curve” according to this next excerpt:

> ” Another [sic] reason schools launch neuroscience programmes is because students demand them. At Columbia Business School, enrolment to a three-day “neuroleadership” executive course has increased by 50 per cent over the past two years. “Demand is growing because business leaders who are ahead of the curve know that emotion can impact their performance,” says Yoshie Tomozumi Nakamura, Columbia’s director of organisational learning and research (Article 5).

This formulation is another way in which ‘forward looking’ is evoked in the texts; people who are “ahead of the curve” want to be exposed to neuroscience, which can only be because it comprises knowledge that “can impact their performance”, the article implies. This stance both justifies their interest and suggests that we would do well to follow their lead.

This notion applies equally to translators. Working as a consultant, this respondent effectively describes the need to include material at the vanguard:

> over the years I've… always tried to incorporate what I felt was leading edge development, but with some, some… substantiation, and direct scientific or whatever. And then as neuroscience really sort of has taken off, over the last, I think in the corporate world there's been an interest in it probably over the last five or six years (C11).

Perhaps that is especially the case because the 'traditional' is invoked negatively in the texts, and can even (traditional HR practices) "trigger a threat response in many people" and have the effect of "demotivating them" (article 4). The essence of this particular discursive feature is neatly summarised in the following extract:

> While traditional approaches to leadership development are inherently past-focused (examining which behaviors resulted in positive previous outcomes), a neuroscience approach to leadership focuses on basic cognitive and physical actions and reactions, and as such, can be applied in unforeseen future scenarios and during times of change (Article 11).

This statement is part of one strand of research activity being described by the consulting group concerned, with a focus on the neuroscience leadership. The particular excerpt encapsulates a sense not only that neuroscience is novel but that it can facilitate, in an unspecified way, a capacity in leaders which will enable them to successfully undertake anything required of them in the future.

7.2.2.2 Evidence base (DF3.4)

The notion of an evidence base has a specific meaning both in organisational science and in the natural sciences whereby the best available research evidence, according to specific criteria, is assessed as a means of formulating a view about the most effective intervention(s) (Akobeng 2005). Sources of such evidence are typically some form of review which combines research published in peer reviewed journals and beyond. As such the term implies a systematic scientific process resulting in likely recommendations. Of note here is the way that neuroscience is drawn upon, as scientific evidence, and is held to have potential as an evidence base which can bring rigour and a shared foundational knowledge to inform and support practitioners. This notion is particularly in relation to the profession of coaching, as well as the human resources function.

The following excerpt from an article detailing how "HR can use neuroscience" illustrates the point:

> It [neuroscience] is a diverse field covering, to name a few areas, the study of brain development, learning and memory, the senses, sleep and stress. Now there are signs it is moving beyond the realm of science and psychology, having an impact in real-world applications, including that of business and HR. It is a shift towards what CIPD chief executive Peter Cheese has called "the science of HR" (Article 4).

The author provides a broad summary of neuroscience findings from their perspective and describes what is effectively translation into practice. They then quote the chief executive of the CIPD, otherwise known as The Chartered Institute of Personnel and Development, and the preeminent association for human resource management professionals in the UK, as highlighting "the science of HR" with the implication that neuroscience might comprise part of this science. Nevertheless in the notion of a "science of HR" one anticipates this "shift" arising because of some sort of need for better evidence.

Further, both HR and coaching have such a need:

> the dilemma for HR, it lacks, as a profession, it lacks a shared knowledge base…And, exactly the same is true for coaching…if coaching is really going to be a profession worldwide, it's got to have a common knowledge base in the way that medicine and the law and so on have. And at the moment, it hasn't got that… you know, it's got stuck in competences, which I think is one of the most demeaning words in the English language, because it also implies incompetencies (C20).

This respondent highlights the lack of "a shared knowledge base" in both cases, and suggests that they would do well to emulate other professions such as "medicine and the law". By this suggestion they presumably mean universally agreed upon approaches and protocols which are well understood and adhered to, and even regulated by a professional body. In that sense there is an opportunity for neuroscience, and for HR/Coaching in which scientific evidence can validate professional approaches and in so doing further validate neuroscience itself. The same respondent also describes how neuroscience knowledge is well placed to become an evidence base, particularly vis a via other bodies of knowledge:

> [I] began to realise…that…psychology really wasn't a science at all. It was a set of descriptors, with…no agreements and… no interest among

> international psychological bodies of doing the things that a really important science would do - which is agree some fundamental things …Anyway…I began to see that…the neurosciences were giving us answers about what is the human condition, in a way that the psychology was never going to do (C20).

Of note is the distinction made between psychology and its "set of descriptors" and neuroscience and its "answers about what is the human condition". For this respondent these "answers" provide a foundation for "some fundamental things"; in other words an evidence base. For other respondents the idea of neuroscience as an evidence base is much more pragmatic, perhaps more of a commercial than a scientific consideration, as discussed in this excerpt:

> in the world of coaching… anybody can call themselves a coach, and there's such a wide of variety of qualifications and, or non-qualifications, you know, you can go online and qualify to be a coach in 20 minutes. You don't have to be steeped in the practice and supervision... I do think that with some people, that there's a little bit of… imposter syndrome maybe going on with coaching, you know, I want to learn more and if I learn about 'science' therefore it's true and therefore I can help my clients even more. Sadly, within that, we gain clients… But I also think that's why its popular because people who are involved in the whole world of human development, and personal develop, they're…looking for something a bit more concrete (C8).

In this way rather than neuroscience strictly being an evidence base it becomes more of a justification and perhaps a way of appearing more qualified, particularly in light of the fact that "you can go online and qualify to be a coach in 20 minutes". This sentiment was reiterated by the following respondent:

> I also think that it's become popular in coaching because it's a way to validate the intervention…You know, "the only reason I'm a coach is because I can spell well enough and I've lost my job in HR and now I need to do something, so I'll call myself a coach", and you know, there's not really much validation in the industry…so, if you jump on the neuroscience wagon…you've a) become more confident and b) you get more work…so it's a good idea…not that it changes what you're doing, I've noticed a lot of people don't do anything differently (C26).

Despite both respondents actively embracing neuroscience in their own work, through their comments they seem to express some cynicism regarding the motives of others.

This feature supports the idea, seen in previous discursive features, of neuroscience findings as a foundation. Here though, in addition, it is connected to its status as a natural science and in particular the evidence on which professionals can and should base their practice, albeit with a recognition that it may be use more instrumentally by some, as observed by C8 and C26.

7.2.3 Function of DP3

Taken together, this discursive practice refers to the ways in which neuroscience is explicitly wielded as a science. Those features which emphasise the 'scientific-ness' of neuroscience to organisational practitioners (DF3.1 and DF3.2) do so by continually referencing its scientific foundations. In this way 'scientific-ness' is assumed to be an asset or strength to be exploited, and arguably constructed by and reinforcing a deference to science which overlooks any need to critique. Further, by attributing a superiority to neuroscience knowledge in the face of more traditional approaches, the features ascribe a rigour and trustworthiness to neuroscience and again overlook any need for critique, with a tendency towards a reductive exclusion of other factors which might impact organisational behaviour.

The second set of features, DF3.3 and DF3.4, emphasise tasks relating to the promise of neuroscience, particularly its forward orientation and credentials as an evidence base. Again, these both serve to overlook the need for critique on the basis of its 'potential'. To embrace it is to be forward thinking, to not embrace it is therefore to be 'traditional' or old fashioned and likely to miss out. Table 16 summarises the individual discursive features as well as their effects.

Table 16. Discursive features of DP3: Neuroscience as scientific evidence

Discursive feature	Effect
Scientific-ness	
DF3.1 Scientific foundations	By association increases credibility and tangibility and justifies content
DF3.2 Status	Renders material unbiased, reliable, and measurable
The promise	
DF3.3 Forward looking	Modern, with potential to future-proof, to be ignored at your peril

DF3.4 Evidence base	Verified knowledge as 'proof' which can inform organisational approaches Borrows recognised terminology Rationality; if you do this, then that will follow (if-then)

Another function of DP3 in support of DP2 is the way in which science, as a solid knowledge base, can then be exploited. The exclusion of debates around the subtleties of the scientific method as well as any limitations of resultant knowledge, coupled with an uncritical general tone, might suggest either a lack of understanding of these nuances on the part of translator or perhaps a bias towards positivist forms of knowledge. It may also say something about the intended audience (see user friendly, DF2.6) in that not only are they busy, if not overwhelmed, but they find knowledge derived from positivist approaches more inherently convincing. In other words, the texts reveal an assumption that the audience-base for translated neuroscience is epistemologically scientistic.

7.3 Conclusion

To conclude, this chapter, coupled with Chapter 6, comprises the findings from a micro level analysis of the selected texts. I identify and describe a range of text properties in the form of discursive features and discursive practices.

In this chapter I firstly describe how DP2 serves to construct neuroscience findings as a means to an end through DFs which highlight both their benefits and advantages, and detail how they might be put to use. Secondly I set out how DP3 fashions neuroscience findings as an evidence base through DFs which emphasise their scientific foundations and status and create a 'promise' by formulating neuroscience findings as have potential, including as a professional evidence base.

Overall I suggest that a micro level analysis highlights how language use in the texts enacts these three significant discursive practices through which translation renders neuroscience research findings i) abstract or conceptual, ii) a means to an end and, iii) scientific evidence. Each of these practices serves a particular function(s) which can be summarised as resulting in i) flexibility and malleability, ii) instrumentality and iii) a hard evidence base. In the next chapter, and in keeping with a CDA, I set out the findings from a meso and a macro level analysis of the empirical material.

Chapter 8 - Translation in context: Production processes and discourses

In Chapters 6 and 7 I presented the findings from a micro level analysis of the empirical material and described what can be seen in the texts in the way of language use, including the effects of this usage. I showed how a range of discursive features (DF) used by authors and interview respondents initiate three significant discursive practices (DF) from which I suggest that neuroscience findings are effectively reformulated firstly as abstract concepts, secondly as a means to an end, and thirdly as exemplifying scientific evidence. In this current chapter I set out my findings from both a meso and macro level of analysis of a CDA and as such the chapter has two main sections.

As described in Chapter 5, Fairclough (1992) designates the meso level as 'discourse practice', whilst I prefer 'production processes' as a term. This is partly to avoid confusion with the discursive practices (DPs) of the previous two chapters, and also because it more straightforwardly reflects the substance of this level: what any patterns in the corpus can tell us about the circumstances in which they have been produced. In the first section of this chapter I say some more about production processes in relation to prescriptions for practice before I present my findings resulting from an analysis of their composition, interconnectedness, authors (as translators) and audience (as organisational practitioners). I draw this first section of the chapter to a close by setting out how these findings support the notion of the paradox introduced in Chapter 1. This account of my findings is supported by Appendix 7 in which I endeavour to summarise key elements of the analysis.

At a macro level a CDA is concerned with connecting discursive practices to social context, particularly through use of the concept of discourse which "provides the critical link between the production of texts and the effect of this activity on the social context" (Phillips et al. 2008, p. 16). This stage involves denaturalisation to establish "how social structures determine properties of discourse, and how discourse in turn determines social structure" (Fairclough 1985, p. 739). In the second section of this chapter I return to the notion of denaturalisation before turning to the concept of discourse. I touch on how it both reflects reality through (hidden) background assumptions (Aranda et al. 2021) and is a "generative

mechanism" (Bryman 2012) with constructive effects. I describe three discourses by way of their constitution and their constitutive effects. In this I take heed of Fairclough (1992) who points to the dangers of over determinism both in terms of the effects of the social context on discourse and vice versa. Finally I provide a precis of the discourses, followed by a summary of the chapter as a whole.

Briefly, and in advance of the above, it is timely to reiterate that it is not always possible to completely unravel the different levels of the CDA. As such it is entirely possible that previous empirical chapters touch upon findings presented here and vice versa, although I endeavour to avoid unnecessary duplication. Further, in the interest of presenting findings in a comprehensible way, there is a risk that the logic and structure used to do so does not fully encapsulate the complexity of the analysis and the nuance arising from the empirical material, and suggests a linear process which does not properly reflect the approach taken. This chapter should be read with these 'caveats' in mind.

8.1 Meso level: Production processes

There are "rules which govern bodies of text" (Fairclough 2003, p. 123) that, once discerned, can tell us something about the world in which the texts have been produced, distributed and consumed. These 'rules' are what I refer to as production processes. What this essentially means is that whilst the texts are varied there are stable and durable aspects to them which arise as a result of their broader context and which a meso level analysis seeks to uncover.

In this research the focus is on the translation of findings from neuroscience research into prescriptions for practice in organisations and here I present findings relating to the production processes of the selected articles (see Appendix 7). In particular I show how analysis of the composition of the texts tell us something about their production, distribution, and consumption, including how we might interpret the intent of the prescriptions for practice. Also, based on Fairclough's (1992) notion of intertextuality, I will show how the selected texts connect (or not) with other texts, and say something more about who translates and how they construct themselves (as experts or otherwise). Finally, I set out analysis which relates to the target audience (of organisational practitioners) of

prescriptions for practice, including what the texts tell us about assumptions relating to them.

8.1.1 Composition of prescriptions for practice

The composition of prescriptions for practice includes aspects such as their genre, structure, coherence, and style. In essence these are characteristics of the texts themselves from which we can derive some insight about what is and is not considered to be important by the text authors and for the intended recipients.

For instance, the genre of a text effectively provides a framework and implicitly sets expectations through which an audience approaches a text such that when a text does not meet the expectations of the genre there is a mismatch. In this research, I characterise the predominant genre of prescriptions for practice as a version of a feature article, focussing on general management or leadership and framing neuroscience findings as a business issue or resource before going on to provide information (supposedly) about findings from neuroscience research. As such, the texts are neither popular science per se, although they might exhibit characteristics of science popularisation as set out in Chapter 4, and neither are they news articles. Feature articles are understood as being informative, accessible, and persuasive texts, usually expressing an opinion.

The genre signifies the intent of the text. In this research whilst there is some critique or dissent concerning the 'expansion' of neuroscience outside of its own field (for example Article 6 is critical of the way neuroscience has been positioned for non-experts), more commonly prescriptions support, if not fervently champion, the advent of neuroscience findings in the organisational field. Overall the intention of the texts is to persuade the reader of the practical relevance of neuroscience findings to the workplace and some of the benefits one might expect to accrue.

Another aspect of composition is the style of the texts, and one element of this relates to complexity: are texts complex or are they simple? In the main prescriptions for practice tend to be simple, perhaps overly so, often reducing findings from neuroscience research to definitive cause and effect statements, as shown in the previous empirical chapters. Complexity, where it arises, seems to be a result of confusion and indeed another aspect of style relates to cohesion. In this respect Fairclough (1992) describes how "a coherent text

hangs together sufficiently well for present purposes as far as the interpreter is concerned" (p. 134). He also emphasises that "coherence is not a property of texts, but a property which interpreters impose upon texts" (Fairclough 1992, p. 134). My analysis points to a notable level of confusion in some prescriptions for practice. For instance, and as previously described (see Chapter 6, DF1.3) the author of Article 17 endeavours to orient her text toward more scientific writing, utilising citations and creating a reference list. However, this list is inaccurate, does not comply with any particular reference style and serves to undermine any efforts to appear scientific. Further, the imprecise and repetitive nature of the text detracts from any arguments made as to the contribution of neuroscience findings to ideas relating to organisational values. Overall I characterise the style of the texts as simplistic.

Tonally, many of the texts demonstrate an excited enthusiasm toward neuroscience in the workplace, perhaps as a means of engendering a reciprocal level of enthusiasm in readers. For example, in Article 1, the author is enthusiastic but measured (as described in Chapter 7, DF2.1). They acknowledge the existence of hype in relation to neuroscience but counter this by consulting with (in-house) experts which lead them to conclude that there is much promise in neuroscience-based interventions. Others take an opposite tone – evoking the dangers of overlooking neuroscience and the risk of continuing with 'traditional' approaches. For example, in Article 2 the author posits that typical approaches to performance management are problematic, and even despised or toxic (as shown in Chapter 6, DF1.6) and that improving it is possible through principles that "leverage the brain's perception of rewards and threats", following which it would no longer be "a dreaded task" (Article 2). One other aspect of tone, which I have already described in Chapter 6 (see DF1.6), is how assertions regarding neuroscience findings and their relevance to organisational issues are made with confidence and certainty, creating an impression that there are hard and fast gains to be had.

Structure is another aspect of composition. A frequently used structure amongst prescriptions is one in which the author sets up a business problem for which findings from neuroscience research are positioned as the answer. For example, the authors of Article 14 enrol the reader in a scenario where they might enhance their decision making habits, even under pressure, and provide a detailed example where neuroscience findings have

transformed the decision-making capacity of one executive to do just that. In contrast, where a text is incoherent, it is often a failure to establish a business problem. For instance in Article 4, which purports to be concerned with how HR can use neuroscience, the author fails to set up a need for neuroscience, relies heavily on citations and avoids making any clear arguments.

One other structure is a version of the so-called 'listicle' in which authors present information in the form of a list, usually as advice or steps to take as mentioned above. Whilst it is questionable as to whether this is an appropriate way to communicate findings from neuroscience research, such 'listicles' are quick and easy to read. Listicles are directive in advocating tangible steps, as is the case in Article 15 where, after a lengthy preamble, the author presents eight behaviours designed to foster trust in an organisation. These steps purport to condense a complex body of work into a set of actionable points that is accessible to the reader.

Prescriptions also frequently package neuroscience findings into various models or tools, as described in Chapter 7 (DF2.4). These models or frameworks purport to provide a means of applying neuroscience findings to the business world. A popular model developed by David Rock and touched on in both Chapters 6 and 7, goes by the acronym 'SCARF'. Here I will provide a more detailed description of it as an example of the way in which such models engage with findings from neuroscience research. SCARF is described as a 'science backed model' for collaborating with and influencing others and calls upon findings from neuroscience research as its foundation. Firstly, research on the so-called 'fear response', whereby a region of the midbrain known as the amygdala has been found to perform a primary role in the processing of emotional responses to situations and is especially implicated in the generation of fear and anxiety which can lead to an 'amygdala hijack', whereby more advanced, cognitive, processes are effectively overridden by primitive emotional responses. Secondly, the premise that the human brain is a 'social organ' which responds in various ways to social interaction. One key proposition is that if the responses evoked includes fear and anxiety, then this likely reduces levels of performance and productivity in workers. In part this is based on a much cited paper (Eisenberger and Lieberman 2004) claiming that social and physical threat generate much the same response in the brain. SCARF identifies domains related to the workplace and posited as a potential

source of a threat response as follows, in brief. Firstly, 'status' - do social interactions enhance or diminish our status. The latter will evoke a threat response, so interactions should be managed so as to avoid this. Secondly, 'certainty' – whereby too much uncertainty evokes challenge or even threat, and can undermine productivity. Thirdly, 'autonomy' - whereby lack of autonomy generates uncertainty and stress. Fourthly, 'relatedness' – difficult relationships and the feeling of disconnection can generate threat and anxiety. Fifthly, 'fairness' - the perception of unfairness undermines trust and relatedness. As such SCARF is an acronym and is presented as combining neuroscience findings from basic research and highly cited studies. However in essence its recommendations are based on an interpretation of the potential impact of these factors on performance in the workplace. I set this out as an example of the way prescriptions for practice comprise tools or models.

8.1.2 Connections

At the meso level the way in which texts are connected gives some insight into their production processes. In particular and given that they purport to draw on or be informed by neuroscience findings, of interest is how texts show the ways in which they engage with the field of neuroscience.

As highlighted above, as well as in Chapter 7, notable in the corpus is the connection that the texts have with either David Rock, his organisation, or the SCARF model described above. David Rock is a US-based Australian coach and consultant with a professional doctorate in the neuroscience of leadership from Middlesex University in the UK. He has written a number of articles and books on the topic of neuroscience for organisations. Further he established the NeuroLeadership Institute (NLI) in 2007[30] with the intention to directly engage with experts from the field of neuroscience and ultimately to use brain science to improve organisational performance. This also includes running 'certified' training courses to help participants understand the brain, specifically for the sorts of translators who are now so prolific in the field. A connection to either Rock or NLI or the aforementioned SCARF model is evident in more than half of the selected articles, either

[30] https://neuroleadership.com/about-us/background/our-story accessed 1 March 2023

through NLI training (five authors), or direct or indirect citation (seven articles excluding that penned by Rock himself).

These connections are significantly more prevalent than links to the original science; none of the texts actively recommend consulting original scientific papers. For example, in Article 3, a CIPD research report into the use of neuroscience in the learning and development function in organisations, a third of the references in its recommended reading list are for Rock authored books.

This idea of connections is based on the notion of intertextuality, (Fairclough 1992) whereby "the objective is to specify what other texts are drawn upon in the constitution of the text being analysed" (Fairclough 1992, p. 233). Following analysis I suggest that the texts most frequently draw upon the body of work originating from David Rock/NLI rather than connecting directly with findings from neuroscience research. As a result we might say that the texts comprise translations of pre-translated neuroscience findings – or translations of translations. This also feeds into the notion of the paradox in relation to the translation of neuroscience research findings into prescriptions for practice, which are predominantly disconnected from the field of neuroscience.

8.1.3 Translators

In a CDA a meso level analysis incorporates scrutiny of the authors of a corpus and in particular how their role is constructed and what sort of voice they give to themselves. Having described the tone taken by authors, here I briefly consider who they are, and how they construct themselves as authors of the articles. I have previously described those who address a business audience with neuroscience content as 'translators'. Prescriptions for practice are produced by a range of 'translators', as described in Chapter 5, who broadly fall into three categories. Firstly, are those that I describe as 'consultants', who are frequently business or executive coaches. Often with a corporate background, their work typically involves the coaching, training and development of individuals or teams in an organisational environment.

Secondly are journalists who, on closer scrutiny, can be further divided into two sub-groups: those who trained as journalists and write for business publications on a range of topics, including neuroscience, and those more accurately described as science writers, having

moved into writing, from an academic neuroscience background. Both groups commonly operate on a freelance basis, most with regular commitments to a range of publications, but with substantial differences between them in terms of what they write about.

Thirdly, are those translators that I describe as academics, and again there are at least two sub-categories. Most obvious are those involved in neuroscience research under which guise they have become involved with more business focussed topics. They are distinct from those academics with a business focus, some of whom are more similar to consultants in the work that they do, engaging with clients and presenting at conferences whilst others continue to publish in scholarly journals.

Most obviously the different translators have different backgrounds and we might infer different levels of understanding of both neuroscience and organisational practice. I should acknowledge that these are somewhat neat categories in the face of a more complex picture, as some individuals perform more than one role whilst others do not fall neatly into any of the categories, but have characteristics in common with a number of them.

I provide a summary in Table 17 below in terms of the different categories of translator, their typical background, field of expertise and inferred key drivers, as well as their intention for translation and how they come to make a (neuroscience) topic selection. This is summary is based on analysis of all 32 interviews conducted with translators. Although, as described in Chapter 5, I limit complete analysis of supplementary interviews to consultants, the additional interviews provide this useful context.

Table 17. Categories of translators

	Consultants	**Journalists**	**Science writers**	**Academics**
Background	Organisational	Journalism	Science	Science
Expertise	Business	Journalism	Science including neuroscience	Neuroscience
Motivation	Generate client interest	Mainly commission	Pitch or commission	Public engagement

	Consultants	Journalists	Science writers	Academics
Intention for translation	Application	Engage readers	Inform and educate	Explore new research questions
Topic choice	Narrow range	Editor choice	Own interest	Neuroscience as a method

Further, Appendix 7 lists the articles and their authors and role (where identified). It shows that consultants are the most prevalent category of authors in the corpus, comprising nine of the 17 identified authors. Some, particularly those who are NLI trained, have penned more than one article or prescription for practice (for example the author of Article 2, produced four for that particular website alone), whilst for others the included text represents their sole article concerning neuroscience (for example both the journalist authors of Articles 4 and 5). Translators mainly construct themselves as knowledgeable information givers, and whilst some portray themselves as experts (for example, Article 13 authored by David Rock, and Article 14 co-authored by neuroscientist Jeffrey Schwartz), typically the texts either advocate engagement with expertise (as in Article 7) or endeavour to emphasise their own credibility. For example Article 19 concludes with a description of the author's credentials and expertise, including their NLI qualification, and detailing authorship of a monograph as well as neuroscience-based programmes for a range of organisational clients. I characterise translators of this corpus as unlikely to have a neuroscience background (again contributing to the notion of the paradox) and more likely to have an interest, as consultants, in client solutions and engagement.

8.1.4 Intended audience

By intended audience I essentially mean organisational practitioners as summarised in Chapter 2, Table 2. Following analysis I suggest that prescriptions for practice are oriented toward i) individual professionals for their own learning, ii) at managers and leaders with a line responsibility, to either enhance their own skills or as a means of developing their team members, as well as to iii) organisational decision makers, in functions such as human resources (HR) including specialisms such as Talent Management or Learning and

Development. Further it is likely that, iv) indirect users such as coaches or consultants also make up the audience for some prescriptions for practice, as a means of engaging with a form of neuroscience research findings that they might then utilise with their own clients.

Analysis at this meso level is also interested in how such an audience is constructed and how they are affected by the texts in terms of how they see themselves. In this regard I make two points. Firstly, in relation to neuroscience research findings, the texts make implicit assumptions about the likely level of expertise of their readers; that they have none. Typically they are authored as "readerly" texts (Barthes 1974) in that they expect no work from the reader, instead endeavouring to lay out what they feel needs to be known. This lack of knowledge raises the possibility of a knowledge gap that is exploited by others (suggests Article 6) since those with no scientific background will be unable to critique, instead taking what is written at face value. In this way, practitioners are ascribed a position of novice when it comes to neuroscience, as passive recipients of information.

Secondly, the audience is ascribed by some norms and traditions from the business community. They are aspirational in terms of themselves and their performance (or that of their team) and so open to new information and approaches, particularly since they are responsible for their own progress. They are busy and short on time, as described in Chapter 7 (DF2.6) and so texts must be simple and engaging. They are rational and logical in the way that they think, with a preference for evidence based approaches. The texts, as seen in the previous two chapters, are oriented toward these positions.

8.1.5 The paradox

Taken together I contend that it is not appropriate to describe prescriptions for practice as being findings from neuroscience research in any meaningful way. From this contention arises the notion of a paradox. In Chapter 2 I described the field of neuroscience as a complex multidisciplinary scientific endeavour, arrived at through a variety of (imperfect) developing research methods and technologies, which focus on specific aspects of the intricate and dynamic system which is the human brain. And yet the nature of the 'neuroscience' once it reaches the organisational practitioner in the form of prescriptions for practice is separate from this. Whilst prescriptions purport to be 'about' neuroscience findings they frequently stray far from the original science and, at times, appear to be unrelated to the field of neuroscience at all. Instead they comprise ideas and approaches

which have their origins in psychology or the behavioural sciences or indeed in pre-packaged, pre-translated versions of neuroscience, particularly emanating from the work of David Rock and his organisation.

8.2 Macro level: Discourses, background assumptions, constitutive effects

In this second half of the chapter I set out findings from a macro level analysis of the empirical material. As described in Chapter 5, this level involves identifying prevalent discourse(s) which are partially enacted by the properties of the texts (which include both DFs and DPs) and partially by societal context. As such the macro level of analysis necessitates a denaturalisation of the properties of the texts to reveal their underlying assumptions which I hold show the hidden influence of societal context.

I described in Chapter 3 how denaturalisation qua critique is central to critical theory, and to my critical perspective on translation, and it is in this chapter where this becomes most apparent. Ultimately denaturalisation facilitates the disclosure of constituting structural factors, as well as the constructive effects of a discourse. In the first instance, as described above, I use a process of challenge and denaturalisation to reveal the pervasive background assumptions associated with the discursive practices described in the Chapters 6 and 7. For instance I scrutinise and critique each discursive practice, examine its function, and ask what beliefs or assumptions likely underlie it. In some instances these are more apparent (to me) than others, requiring countless iterations to get to 'deep structure' – or at least deeper. From background assumptions, coupled with the discursive practices, it is possible to identify a number of discourses as described below.

8.2.1 Discourses

In Chapter 5 I set out a simple conceptualisation of discourse (see Figure 3) as a complex of three elements; the texts, their production processes, and their societal context as uncovered through background assumptions. Put more elegantly:

> discourses emerge as particular ways of construing (representing, interpreting) particular aspects of the social process that become relatively recurrent and enduring and which necessarily simplify and condense complex realities, include certain aspects of them but not others, and focalize certain aspects whilst marginalizing others (Chouliaraki and Fairclough 2010, p. 1212).

In what follows I describe three discourses which 'emerge' following a detailed iterative analysis of the empirical material, including denaturalisation. To be borne in mind is that background assumptions have yet to be articulated in this chapter, but will be described after. The intention, in highlighting the discourses ahead of that, is to provide some structure around which the remainder of the chapter can be organised. From my analysis I see the following discourses enacted:

- a discourse of flexibility
- a discourse of instrumentalism
- a discourse of scientism

In what follows I describe each discourse in turn, including how both it is constituted as well as its constitutive effects. Further, I will highlight relevant aspects which appear to have been excluded from each discourse, "uncovering alternatives that have been effaced" (Fournier and Grey 2000). As part of this I endeavour to connect each discourse to 'structural factors' which, as described in Chapter 3, I use as an umbrella term to describe aspects of societal context on the basis that they reflect dominant power relations. In this way I demonstrate how discourses effectively encompass or embody both text and societal context and provide that crucial connection between the micro and the macro in this CDA.

Different discourses are different perspectives on the world (Fairclough 2003) and they might compete with or complement one another. It should be said that the three discourses set out below are broadly complementary with one another; they do not contradict and instead there are instances of overlap.

8.2.2 Discourse of flexibility

A discourse of 'flexibility' is partially enacted by the first discursive practice, which renders neuroscience findings to an abstract concept, and partially by the (uncovering) of background assumptions as internalised societal messages, described below and conceptualised in the following Figure 8.

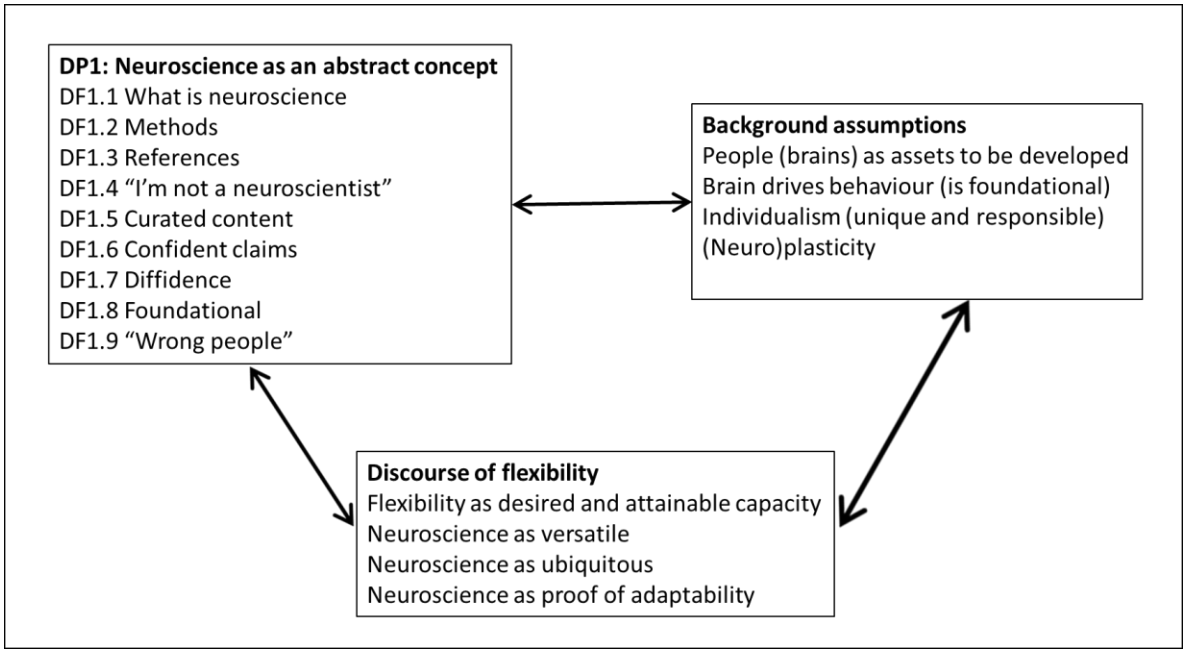

Figure 8. Discourse of flexibility enacted by text properties and background assumptions

Discourses can be recognised in the concrete forms of the texts (Chouliaraki and Fairclough 2010). From the discursive practices identified we see how neuroscience findings become abstract and therefore more malleable, whilst at the same time moves are made to hold onto their scientific roots in various ways. A lack of precision (definitions) supports flexibility, as does the way in which neuroscience findings are positioned as able to contribute to numerous aspects of organisational practice, as well as the specific topics highlighted. In particular, neuroplasticity is the epitome of flexibility, and since it is a quality or capacity that is inherent in us, according to findings from neuroscience research, we are encouraged to think about ourselves as being versatile or adaptable.

This discourse imbues the notion of flexibility with strong, positive connotations – it is a good thing, whilst inflexibility is not something to aspire to – particularly in light of challenging and dynamic (competitive) conditions. Flexibility is cast as the capacity to respond. It leads to competitive advantage and innovation depends upon it (and innovation is similarly desirable). Further, it renders something (neuroscience findings) useful, and in turn findings from neuroscience research renders flexibility achievable by providing biological (scientific) proof of our adaptability.

8.2.2.1 Background assumptions as internalised societal messages

I hold that background assumptions are akin to 'deep structure', described in Chapter 3, in that they are pervasive internal societal messages which reflect the societal context (including structural factors) in which 'translation' takes place, and are uncovered through a process of denaturalisation. A range of background assumptions contribute to the discourse of flexibility, summarised in Table 18 and set out in more detail below.

Table 18. Discourse of flexibility – background assumptions arising from societal context

Background assumptions as internalised societal messages	**Constituted by societal context and associated structural factors**
People (and their brains) as resources to be improved as a means of improving organisational performance	Human capital theory: people as assets to be developed Cognitive capitalism: develop cognitive skills to drive growth Managerialism: focus on efficiency and productivity
The brain as the foundation of behaviour	Reductionism as a tendency (including in neuroscience research)
Individualism	Neoliberal perspective whereby people are self-interested and self-reliant
Plasticity	Neoliberal perspective on dynamic and competitive market necessitating the capacity to adapt and respond

People (and their brains) as resources. Underlying this discourse is a particular way of thinking about people (and their brains) which reflects dominant ideas from the societal context: people are configured as human resources and the brain is reconfigured as a resource or an asset in economic terms. Following this configuration, any investment in development is for the benefit of all, and through it we can enhance our capacity and increase our worth. In particular, I see the influence of human capital theory as a structural factor which conceives of people as assets with a value that can be developed through investment. More recently this has extended to the brain (the concept of brain capital was first articulated around 2011 according to Smith et al. 2021) which is now also part of the project of self-improvement. Cognitive capitalism stresses the decisive relevance of cognitive skills as a facet of human capital, with high predictive value. As such, not only do

we have a responsibility to stave off cognitive decline (which engenders a need to impose on the state for support) but we must actively harness the inherent plasticity of the brain to develop cognitive resources which "enable the evolution of capitalism and the rise of wealth" (Rindermann and Thompson 2011, p. 754). Further, one can see traces of managerialism through assumptions relating to the optimisation of productivity through the application of technique (Doran 2016) in the way that flexibility is a potential source of productivity improvement.

Brain as the foundation of behaviour. Another assumption concerns the way that the brain is conceived of as being the foundation of human behaviour. If people are cast as human capital, then neuroscience is a new and useful way of developing and improving them. This involves a leap to behaviour, and one which might be an unintentional outcome of misunderstanding the science, or might be a deliberate move since a direct connection between neuroscience findings and (organisational) behaviour renders neuroscience much more compelling. Either way, the unfounded (but normalised) implication is that neuroscience findings can do more than simply implicate activity in particular regions of the brain with particular behaviours (or proxies for behaviour as constrained by the limitations of neuroscience technologies described in Chapter 2) and vice versa. This too reflects dominant, reductionist, ideas about neuroscience in society more generally and even in neuroscience research itself (Krakauer et al. 2017).

Individualism. Another assumption underlying the discourse of flexibility is that of individualism. Not only are people human capital, as described above, but neuroscience emphasises their individual uniqueness. This notion is reinforced through the choice of neuroscience topics presented in prescriptions, which focus on the individual. Whilst this is perhaps a result of methodological limitations in neuroscience (as yet, scanning technologies can only scan one isolated brain at a time), nevertheless it fosters an assumption concerning individual uniqueness and responsibility. For instance, when stressful circumstances trigger a 'threat' response, it is not the circumstance which needs to be addressed, rather it is the capacity of the individual to deal with it which should be developed; we must learn to withstand an 'amygdala hijack' and the concept of plasticity 'proves' that we can. As such, failure to learn or adapt is an individual shortcoming. I see this

as reflective of neoliberal assumptions which holds that people are self-reliant, self-interested, competitive, and individualistic (Wallace et al. 2023).

Plasticity. One dominant topic in prescriptions for practice is that of neuroplasticity, which demonstrates an innate ability of the brain to undergo physical changes in response to learning, and which underlies many of the claims made concerning neuroscience research in an organisational context. Further plasticity is recast as flexibility. The assumption here seems to be that plasticity itself is a capacity to be developed and improved, and that with diligence we can make our brain more plastic and thence our behaviour more flexible. This is a desirable capacity in employees since, from a neoliberal perspective, we live in a competitive and rapidly changing world whereby we need to prepare for the possibilities and uncertainties that the future holds. As such, flexibility both justifies the relevance of neuroscience (on the basis of plasticity) and becomes a goal in itself.

8.2.2.2 What is missing?

From the texts, and as described in Chapter 6, definitions of neuroscience are excluded, as are accurate references and citations. Despites claims to 'science' or 'research', where references are used they are typically instrumental, in order to appear connected to science, or to so-called 'experts' who do not publish research in learned journals, as described in the meso level analysis in the first section of this chapter. Also excluded are accurate portrayals of neuroscience methods, which are presented simply as an instrument(s) for investigating the way the brain works, even "despite the well-known technical problems, assumptions and limitations of these technologies, and the fact that they do not speak for themselves and must be interpreted by experts" (Rose and Abi-Rached 2013, p. 13). Further, translation typically overlooks that the brain is located in a body in an (organisational) context. In excluding or overlooking contextual factors translations over-extend claims that can legitimately be drawn from research findings.

Overall the exclusion of these aspect serve a discourse of flexibility. In relation to neuroscience topics, the challenges surrounding neuronal plasticity are not properly elucidated. For instance it is not the case that such changes are easily achieved. And, arguably topics which might undermine the discourse of flexibility are excluded, for instance debates surrounding more 'deterministic' aspects of brain function, including free will and

the role of the unconscious. Whilst these are much contested in the field of neuroscience, they remain unseen in prescriptions.

8.2.2.3 Constitutive effects of 'flexibility'

Discourses are most effective when they are naturalised to the extent that they go unseen (Fairclough 1992). I now set out what I see to be some of the key constitutive or constructive effects of the discourse of flexibility, that is whether and how it serves to generate, challenge, or reproduce dominant narratives in its societal context. In this there is a risk of being overly reductive. Having effectively deconstructed the discourse into some of its constituent parts and now its constitutive effects, I run the risk of not being able to entirely articulate the superordinate or overarching nature of the discourse, since words alone cannot fully do this justice. In what follows I endeavour to capture some aspects of the effects of the discourse of flexibility without being overly reductive, deterministic, or prescriptive.

The discourse of flexibility, in a range of ways, shores up some key ideas from its societal context, and in particular those arising from neoliberalism, human capital theory and managerialism, which I hold to be structural factors. Firstly in how it claims neuroplasticity as biological proof of flexibility the discourse renders it unarguable as a quality or capacity in humans. Secondly, in the way in which our brains are unique, it fosters notions of individualism, and especially within a neoliberal context where already every human being is seen as homo economicus, or a rational agent who acts strategically and out of self-interest (Bal and Dóci 2018).

Thirdly, since the brain has this innate capacity for plasticity we are responsible for making the most of our own brains (Harlow et al. 2013). In other words the discourse is supportive of "neoliberal pressures of personal responsibility" (Pitts-Taylor 2010, p. 640), and in this we are not forced, but rather supported and encouraged to improve our capacities (Millei and Joronen 2016).

This fourthly implicitly sets the scene for ideas pertaining to employability, which signifies the qualities that make a person fit for the job within specific industries and in the labour market generally. Employability is about sustaining a fitness for work (Cremin 2010) and this discourse suggests that flexibility is part of that; developing your capacity to be flexible

makes you more employable. That said, employability, like 'flexibility' is so vague, it is never quite clear how to remain employable, but flexibility (through a willingness to keep changing and working on yourself) is part of it. And plasticity proves that it is possible, so a failure to do so means that in a competitive employment market you are likely to lose out.

Fleming (2017, p. 695) posits that "flexibility is perhaps the most common term to describe employment today" and that flexibility in the labour market has sown the seeds for, fifthly, increased precarity (Caterino and Hansen 2019), which offers workers less security (Fleming 2017) and generates more vulnerability (Cremin 2010). Without wanting to suggest that the included texts are consciously supporting this, I would argue that they are part of a wider discourse of flexibility from which increased precarity has arisen over time.

Further, I would argue that through its emphasis on neuroplasticity as a compelling means of achieving a desired flexibility, this discourse opens the door to the further biologisation of the workplace, including consumption of products and approaches to enhancement (Rose and Abi-Rached 2013). The brain has been normalised as part of the project of self-improvement and cognitive capitalism stresses the decisive relevance of cognitive skills as a facet of human capital. From this it follows that we must actively harness the inherent plasticity of the brain to develop cognitive resources which "enable the evolution of capitalism and the rise of wealth" (Rindermann and Thompson 2011, p. 754). Further, through competition, pressure will arise to enhance oneself (Fuchs 2006).

On the face of it the discourse of flexibility seems reasonable and natural. However, there is a dark side to it in the way that it implicitly reinforces a range of demands on us and becomes quietly oppressive. Overall I posit a connection between the discourse of flexibility and various 'structural factors' as dominant societal ideas or forces which effectively act as enablers or constraints to the ways in which translations of neuroscience findings into prescriptions ensue. In particular I see a neoliberal perspective, coupled with ideas from human capital theory, as well as cognitive capitalism, as having a bearing on this discourse of flexibility:

> Neoliberalism promises prosperity and freedom but has created its opposite – a state of constant social insecurity and unfreedom. As the conditions of work in neoliberal society have become casualized and contingent, individuals have lost their stable mooring in the social world.

> This new “flexible” world in which people are required to constantly adapt to labour markets and changing conditions benefits few. The modern economy has taken on a “winner take all” character. The winners get big rewards, the losers little or nothing (Caterino and Hansen 2019, p. 142)

Further, and given the paradox associated with the translation of neuroscience into prescriptions for practice, it may be appropriate to ascribe findings from neuroscience research as a ‘neoliberal trojan horse’ (Karjalainen et al. 2019). We are misled about its real intent (Zuboff 2019) in the way that it is made to masquerades as one thing when it is another; a means of strengthening the discourse of flexibility as a virtue and which is a one-sided increase in control.

8.2.3 Discourse of instrumentalism

The discourse of instrumentalism is partially enacted by the discursive practice which renders neuroscience findings to a means to an end and which emphasises the practical benefits of neuroscience findings along with advice on how to best leverage them, and partially by background assumptions which I undercover through denaturalisation of said discursive practice. The discourse is encapsulated in Figure 9 below.

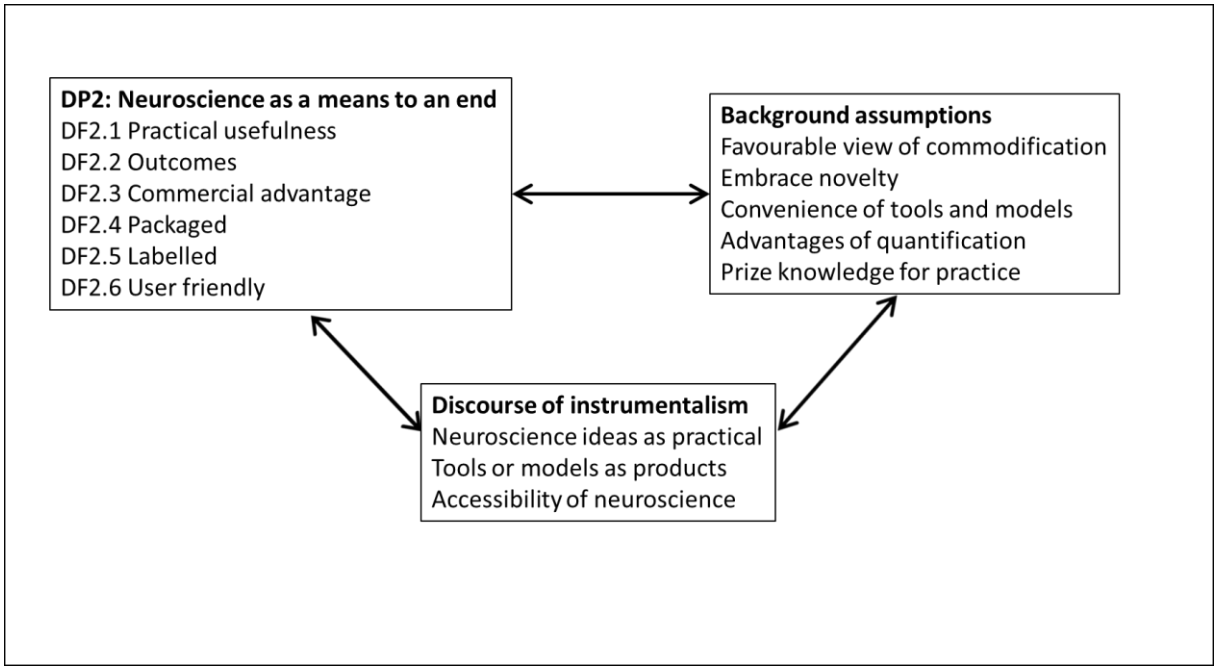

Figure 9. Discourse of instrumentalism enacted by text properties and background assumptions

Instrumentalism refers to the way in which something becomes useful and how its worth is predicated on its ability to do something. In this case a discourse of instrumentalism relates

to how neuroscience findings become of value as a practical means of solving particular problems or achieving particular results. Commodification is central to instrumentalism and here involves the transfer of findings from neuroscience research into a fungible commodity or product which is available to those with an interest in purchasing it. Translation itself is a way in which neuroscience findings are commodified.

The discourse of instrumentalism serves to construct neuroscience research as accessible, particularly when fixed and contained in a model or tool. Translated neuroscience becomes solution or outcome oriented with no need for exhaustive expertise oneself. Further, it offers the potential for a different sort of performance measure through the tools on offer. Instrumentalism might be thought of as a continuum whereby in some instances the usefulness of something is of primary importance and in others just one aspect of it. In the translation of neuroscience research findings into prescriptions for practice we can see this continuum where some translations are closer to the former, and others, fewer in number, are closer to the latter.

8.2.3.1 Background assumptions

As before, a range of background assumptions also serve to enact the discourse of instrumentalism, summarised in Table 19 below and set out in more detail after.

Table 19. Discourse of instrumentalism - background assumptions arising from societal context

Background assumptions as internalised societal messages	**Constituted by societal context and associated structural factors**
Favourable view of commodification	Neoliberalism: market orientation and commercialisation of everything
Embrace novelty	Neoliberalism: competitive edge
Convenience of tools	Managerialism: standardisation, technical efficiency
Advantages of quantification	Positivism: behaviour becomes measurable Neoliberalism: what the market wants
Prize knowledge for practice or application (above knowledge for wisdom)	Managerialism: knowledge as rational resource

Favourable view of commodification. Commodification is "the transformation of ideas, services, goods, and people into commodities" (Karjalainen et al. 2019, p. 16) and which this discourse assumes to be a positive thing. Once commodified, something (findings from neuroscience research) becomes a product which addresses particular needs; in this case a solution to organisational problems, especially because the brain is so foundational. As previously described, the brain has become an asset to be improved. Since neuroscience is knowledge about the brain it is a rational move to consider it a 'product' which can be applied to bring about such improvement. I suggest this assumption represents broader contextual ideas in that the explicit commodification of neuroscience findings is further evidence of neoliberalism playing out. This is both in the way it becomes commercialised as a means of addressing market oriented issues, and in the way that academic science is itself under (neoliberal) commercial pressure, leading to the expectation that scientific innovations will be commercialised (Caulfield and Ogbogu 2008).

Embrace novelty. The premise of this assumption is that novelty attracts attention. As such, if solutions to intractable issues are achievable as a result of knowledge from neuroscience, or at least look as though they might be given how 'foundational' it is, then this will generate interest. Attaching a neuroscience label is commercially beneficial (as seen in the labelling tactics highlighted in Chapter 7, DF2.5) especially to so-called 'soft' topics like as management development such that consultants derive 'competitive edge' from neuroscience research, using it to 'persuade sceptics' or develop tools or to differentiate them from others in their profession.

Convenience of tools. This assumption holds that tools (or models) make something easy to apply. The texts demonstrate a notable emphasis on tools and models as a way of introducing or packaging neuroscience into practical knowledge. Further, tools are both an efficient and effective way of standardising neuroscience information such that it can be applied by non-experts (practitioners) in pursuit of a business goal, as well as an efficient way for translators to capitalise on their investment in developing some neuroscience expertise.

This reflects ideas from managerialism. In particular, since managerialism conceives of management as being rational and value neutral (Shepherd 2018), the application of scientific knowledge is deemed to be optimal, particularly in light of the potential to

quantify behaviour in some way. Put simply, managerialism believes in the ability of science to improve efficiency and effectiveness and in this way has an affinity with, if not commitment to, positivism (Locke and Spender 2011). The instrumentalism of neuroscience findings both supports this and may be an outcome of it. In particular, if management is concerned with prediction through greater understanding, and control through acting, then neuroscience tools become an efficient 'technique' for acting on neuroscience knowledge.

Advantage of quantification. This assumption holds that the quantification of behaviour (or again the appearance of it) in a novel way likely confers some advantage. Firstly it makes efforts concerned with learning and development into more of a hard science by appearing to render behaviour more tangible (ostensibly through the idea of observable brain activity). Secondly it has the appearance of being objective and neutral, rising above any potential bias. Thirdly, through measurement there is the possibility of comparing the efficacy of interventions and any improvements in performance. Fourthly, quantification appeals to organisations and so enhances the marketability of neuroscience interventions.

Knowledge is for practice or application. Here the assumption is that knowledge is of value when it can be applied and is not sought for its own sake. This broadly reflects a managerialist perspective with a preference for knowledge with which you 'do something' over and above knowledge for the sake of wisdom (Klikauer 2015). The implication of this assumption for translation is that only knowledge which enables something to be put into use is included in prescriptions for practice, which means that accounts of neuroscience phenomena are superficial and simplistic.

8.2.3.2 What is missing?

This discourse of instrumentalism excludes fundamental details with regards to how neuroscience research might best be put to use, including specific details of what 'end-users' might expect to gain from it, and including only vague and general suggestions as to where and how it is best used. The same is true in terms of potential measurement. Whilst there is a suggestion that 'tools' represent an opportunity to quantify aspects of performance based on some sort of brain measure, it is not clear what is to be measured and how. Further, instrumentalism implies a direct cause-effect type relationship between neuroscience findings and behaviour, omitting any nuance or qualification.

8.2.3.3 Constitutive effects of 'instrumentalism'

As with the previous discourse, attention now turns to the constitutive effects of 'instrumentalism'. As before it is not my intention to claim that the discourse is wholly 'determined' by the above assumptions and nor that what follows is a complete account of its 'generative' effects. Instead I contend that it does have effects including the following, which are set out in no particular order:

Instrumentalism leads to distortion. In relation to the translation of neuroscience findings into prescriptions for practice this might mean limiting topics to those aspects of the science which can be instrumentalised and from which a form of homogeneity arises. Further it perpetuates reductive tendencies whereby prescriptions render neuroscience findings into tools or simplistic steps which might be taken, even implying a cause-effect relationship. A more extreme effect might be some form of dehumanisation, as we are encouraged to self-instrumentalise (Grunwald 2013) or to view ourselves not in terms of human characteristics (Väyrynen and Laari-Salmela 2018) but in terms of neurons and pathways (Rose 2003a) and which privileges performance over flourishing (Christoff 2014). Further, ethical implications potentially arise from this as, for instance, issues of privacy are subordinated to issues of performance.

Additional distortion might also arise in the way that instrumentalism is consistent with moves to commercialise science, whereby the focus of science shifts onto those areas most likely to produce an economic return (Krimsky 2004). This again is likely to limit the range of topics, as attention consolidates around research which has commercial utility. Instrumentalism might also reinforce notions of knowledge in the service of power, whereby 'how to' knowledge has the most currency in a managerialist context. For instance, the instrumentalism of neuroscience might be an example of Klikauer's assertion that managerialism "does not serve truth but invents ideas in the service of power for one of the foremost powerful institutions in today's society: management" (Klikauer 2015, p. 1109). Knowledge of how to use neuroscience findings is a form of power since it renders competitive advantage (Costea et al. 2008), or at least claims to. One other effect relates to rationalism, about which I will say more below. Here it relates to how, if neuroscience is instrumentalised in a way which transforms so-called 'soft' approaches to hard, then former (soft) approaches are effectively delegitimised.

On the face of it a discourse of instrumentalism supports the transformation of neuroscience findings into a practical form. However it is once more possible to see neuroscience as a 'trojan horse', although in this instance serving as a form of 'seductive allure' (Weisberg et al. 2008) which generates interest and attention.

8.2.4 Discourse of scientism

This final discourse - scientism - is enacted (in part) through the third discursive practice whereby neuroscience becomes first and foremost scientific evidence through discursive features which emphasise its 'scientific-ness' (particularly in light of more 'traditional' approaches to organisational behaviour) and how it is progressive or forward looking. This combines with background assumptions as the hidden influence of societal context, identified through denaturalisation of the discursive practice, and which primarily posit the superior status of scientific knowledge in various ways, as encapsulated in Figure 10, below.

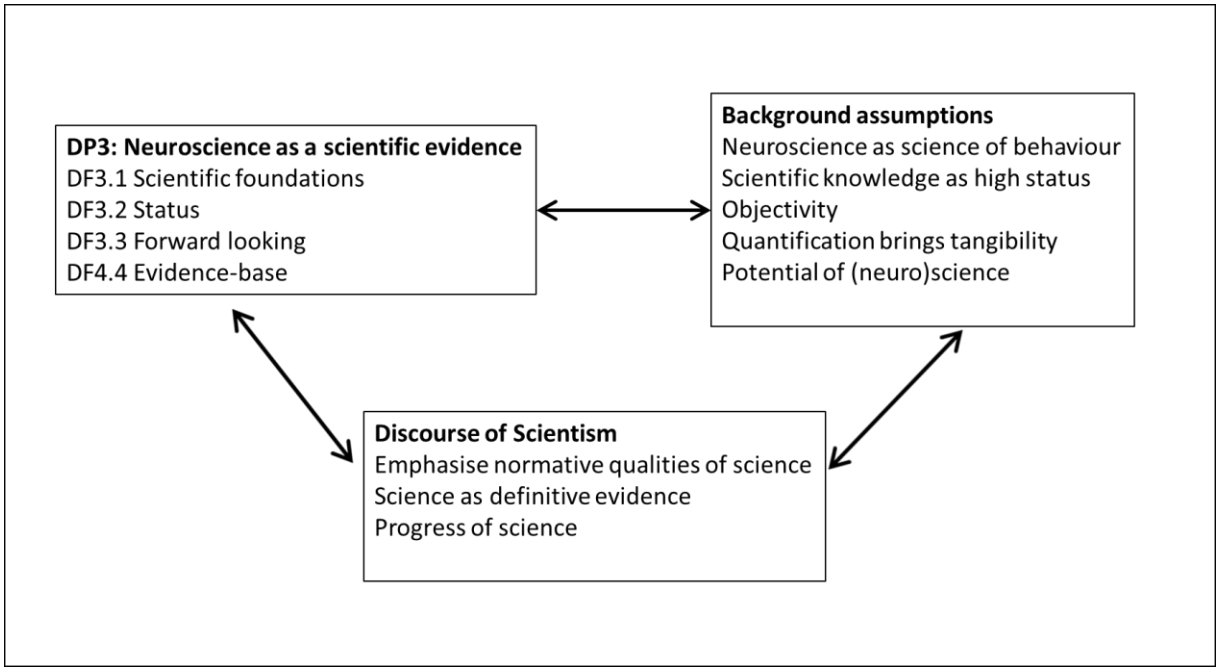

Figure 10. Discourse of scientism enacted by text properties and background assumptions

This discourse facilitates the notion that translated neuroscience research possesses the qualities and attributes commonly associated with the natural sciences and resulting from empirical scientific research, including objectivity, reliability, and generalisability. The scientific origins of neuroscience mean that it provides an authoritative body of foundational knowledge, if not the best evidence regarding the behaviour of individuals in organisations, and which is in many ways long awaited evidence. This makes it a rational

and pragmatic choice and not one that should be overlooked, especially in light of other, 'softer' approaches which are, in contrast, positioned as unconvincing and tenuous.

As described in Chapter 3 scientism differs from science. Scientism is more a set of beliefs or ideology and involves "the use of scientific forms and categories in order to give the appearance of science to unscientific ways of thinking … it is an attempt to subdue what it does not understand" (Scruton p46). Whilst science is a method or approach to knowledge generation. Whereas scientistic approaches reify science and privilege scientific knowledge as omnipotent, scientific approaches arguably remain cognizant of their own limitations and the necessity of other forms of knowledge generation. Notably Horkheimer (1937/1976) points both to the limitations of the natural sciences and to a tendency for "the sciences of man and society" to emulate them whereby, he argues, the notion of pure scientific values are an "illusion", particularly because objectivity is an impossibility. In overlooking this and other limitations, the discourse of scientism demonstrates an affinity with positivism, if not a bias toward knowledge derived from positivist science as partially evident in reductive representations of neuroscience findings and their likely impact in an organisational context.

Scientism, according to Hakfoort (1995), involves using the authority of science in contexts other than science. As such translations of neuroscience findings into prescriptions for practice might readily be described as scientism. Further when presented in particular ways scientism can look like common sense, as it seems to reflect a systematic collection of evidence which leads to self-evident conclusions and so makes the use of science a natural route to take (De Ridder 2014). As such I hold that prescriptions for practice are more scientistic than scientific in the way that they approach the translation of neuroscience research findings.

8.2.4.1 Background assumptions

The background assumptions associated with this discourse are summarised in Table 20, below.

Table 20. Discourse of scientism - background assumptions arising from societal context

Background assumptions as internalised societal messages	**Constituted by societal context and associated structural factors**
Neuroscience as the science of people & their behaviour	Research base as proof Reductionism - brain is the root of behaviour
Scientific knowledge as higher status	Knowledge is rigorous and authoritative Organisations/clients prefer this form of knowledge; it provides proof (evidence) Science sells
Objective means neutral which means no bias	The scientific method ensures science is valid and reliable
Quantification is persuasive; makes behaviour more concrete or tangible	Rationalism Managerialism
A belief in the potential of neuroscience – futurity – even if it is currently imperfect	Old – traditional – approaches have had their day. Advances in neuroscience technology means it will tell us more and more

Neuroscience as the science of behaviour. The essence of this assumption is that because neuroscience is concerned with the brain, and the brain is held to underlie human behaviour, neuroscience can offer new (and better) information about us which can help us to understand and change our behaviour. The neuroscience topics chosen for translation have strong face validity, seemingly corroborating issues and challenges managers are confronted with – stress, motivation, resilience, productivity, and performance. These are presented as well defined and well understood, such that there is a general consensus, although this has arisen amongst translators and not necessarily amongst neuroscientists themselves.

Scientific knowledge as higher status. Also underpinning this discourse is the assumption that scientific knowledge is better than other forms of knowledge, particularly since it derives from “research” or “studies” which convey an assumed rigour. This point is reinforced by the seeming preference that organisational clients have for positivist explanations on the basis that they share the language of organisations . Further, organisations are positioned as more likely to trust empirical approaches since there is an evidential basis to any claims made whilst supposed non-scientific – or more traditional -

approaches are denigrated as lacking scientific characteristics. The use of scientific terminology, particularly in a decorative or honorific way, also points to this assumption in the way that scientific terms and labels are drawn upon by translators to make their translations appear more scientific, perhaps with the intention "to capitalize on that [scientific] authority in order to make their discourse more persuasive" (Cameron and Edge 1979, p. 3).

Objective means neutral, which means no bias. This assumption builds upon the last and is concerned with the way in which science acquires knowledge. The scientific method is assumed to deliver research findings which are straightforwardly objective, accurate, and trustworthy, and as such neuroscience findings are neutral and unbiased.

Quantification is persuasive. We have already seen this assumption and how it relates to the discourse of instrumentalism. Here it is similarly assumed that the field of neuroscience can facilitate a concretisation of previously intangible aspects of behaviour since behaviour is grounded back into activity in the brain which, theoretically at least, is observable through the use of neuroscience technology. This provides a tangible marker for behaviour, rendering it more 'real' and with the possibility to adjust it further. In addition, neuroscience findings can provide an evidence base, providing justification for approaches and techniques associated with coaching and learning and development activities. This too renders such interventions more concrete, through neuroscience explanations which invoke brain regions and suggest cause and effect

Belief in the potential of (neuro)science. A further assumption relates to how, although the field of neuroscience might not yet have all the answers, there is an optimism and excitement about what future research will bring. Neuroscience is spoken about almost as a wonder, as we are told about how technologies have facilitated its progress and how we are learning about the brain at an accelerating rate. The anticipated and imagined futures are full of possibilities which should be embraced, especially so as not to miss out. This reflects broader ideas from neoliberalism, from which emanates the notion of risk (Pitts-Taylor 2010) via a refrain which highlights the risk of being left behind, in this instance by failing to embrace neuroscience information. This is coupled with, suggest Rose and Abi-Rached (2013), how "contemporary biopolitics is infused with futurity, saturated with anticipations of imagined futures" (p. 13), which further generates an impetus to not miss out.

8.2.4.2 What is missing?

As with the other discourses, the discourse of scientism effectively privileges some aspects of societal context whilst leaving out or excluding others, including how translations are predominantly based on previous translations and so are some steps removed from the original science. Further there is little, if any, acknowledgement as to the limitations of neuroscience technologies and as a result how interpretation of findings should be met with some caution. Whilst it is true that findings are arrived at through the scientific method, it is also the case that extensive interpretation is required as highlighted in Chapter 2. Relatedly, implicit in translations are examples of reverse inference which exclude adequate explanation regarding brain regions and behaviour, and often imply one to one mapping, whereas multiple regions will be implicated in a behaviour and similarly one region will be implicated in multiple behaviours. Also excluded are any ethical debates concerning the idea of explicitly including the brain in development interventions for work purposes, the use of so-called neuroscience data ('neurodata') as well as broader societal debates about the ethics and implications of neuroscience research.

8.2.4.3 Constitutive effects of 'scientism'

The discourse has a range of 'generative' effects. Firstly it reinforces and encourages reductive thinking which, from Nagel (1998, p. 1) is the "idea that all of the complex and apparently disparate things we observe in the world can be explained in terms of the universal principles governing their common ultimate constituents". As such the bigger is reduced to the smaller and there is a drive to reduce explanation at a higher level to individual level factors (Kaufman 2020). The field of neuroscience already exhibits reductive tendencies, particularly in beliefs around the connection between the brain and behaviour (Krakauer et al. 2017) and the way in which it tends to support a reductionist conceptualisation of the self (Fuchs 2006) as described in Chapter 2. And in psychiatry there is an assumption that neuroscience will ultimately provide an exhaustive explanation of mental illness and the basis for their treatment wherein other (psychological) science are relegated to place holders (Gold 2009).

Reductionism is also part of neuroscience research, albeit perhaps not well understood outside of the field. For instance Rose (2012) points to how brain imaging is effectively predicated on reductionism since blood flow acts as a surrogate measure (again, described

in Chapter 2). Further Farah and Wolpe (2004, p. 40) make the point that "although brainwaves do not lie, neither do they tell the truth; they are simply measures of brain activity". From this point the question of ethics again arises, but this time in light of simplistic interpretations of neuroscience research and techniques such as the idea that "it seems questionable to rely on neuroimaging techniques in complex social issues" (Fuchs 2006, p. 601). I suggest that through assumptions relating to scientism, these issues are minimised or disregarded such that reductionism is unlikely to be immediately apparent to organisational practitioners.

This leads us to another 'effect' which is the way that face validity is effectively privileged over reliability and dependability; how prescriptions are made to appear to be neuroscience findings and yet make claims based on various 'leaps'. This is particularly pertinent in light of research (Weisberg et al. 2008) highlighting how the general public attributes greater authenticity and reliability to explanations of behaviour that include neuroscience and/or contain neuroimages. As such face validity is sufficient since attributions of reliability follow (amongst a lay audience at least), which releases translators from the need to be strictly faithful to the original science. In other words translations can borrow all the positive attributes of science with none of the constraints.

Further, assumptions about quantification ultimately point to a premium being put on 'measurable constructs' (Kaufman 2020), which effectively narrows the focus to what is measurable (Harley 2015) as highlighted by Von Hayek (1975) who also points to the risk of 'false knowledge' which effectively excludes the unquantifiable. As it stands the translation of neuroscience findings might contribute to this 'false knowledge' through a narrow range of topics, including the privileging of those which look to be measurable in some way.

A final observation here relates to the way in which prescriptions for practice reinforce existing power relations and sustain the position of the powerful through what I describe as insider/outsider status. Deetz and Mumby (1990) point to how, in the modern corporation, management and instrumental-rational interests join together to give preference to certain forms of knowledge. I suggest that findings from neuroscience research might comprise this 'certain form of knowledge' in that they comprise high status scientific knowledge with origins in the scientific method.

8.2.5 Precis of discourses

Whilst each discourse is sufficiently separate, they also complement each other to the extent that at times there is overlap. In Table 21 below I provide a simple precis of the three discourses.

Table 21. Precis of discourses

Discourse	Constituted (partially) by:	Constitutive (partially) of:
Flexibility - as a positive and attainable capacity	Dominant ideas from neoliberalism and HCT	Individualism Responsibilisation Employability Precarity
Instrumentalism - privileging of practical application	Dominant ideas from managerialism relating to knowledge for practice and technique	Distortion Reductionism Dehumanisation Knowledge for power
Scientism - superiority of science and scientific approaches	Dominant positivist bias including preference for quantification	Positivist bias; reductionism, quantification, power

I have endeavoured to capture the central aspects of each discourse and its associated constituent and constitutive elements, acknowledging the difficulty of deconstructing, and reconstructing them in a satisfactory and non-reductive way. I would add to this a brief comment regarding structural factors which could not readily be incorporated into the above accounts. And it is that, through a process of analysis, I have arrived at an account of the translation of findings from neuroscience research into prescriptions for practice by way of micro, meso, and macro findings. In these are relevant traces of structural factors which in turn are fortified by the findings. I will say more about this in the next chapter.

8.3 Summary

The first half of this chapter is concerned with findings arising from a meso level analysis of the articles as prescriptions for practice, with a focus on their production processes and with the caveat that, given the dialectical nature of CDA it is impossible to entirely disentangle this analysis from that at different levels of the CDA. Taken together the meso level analysis provides some insights into the production, distribution, and consumption of prescriptions for practice. Analysis highlights what is stable and durable about the texts such that a

paradox arises whereby they purport to be findings from neuroscience research yet do not connect directly to it, instead relying on the work of other translators and in particular that of David Rock. Prescriptions are simple, not always coherent, but demonstrate excitement about the potential of neuroscience findings, which are set up as a solution for a range of business problems. Authors tend not to have a neuroscience background, but do work to establish some credibility in relation to neuroscience, and organisational practitioners are characterised as neuroscience novices, likely invested in improving themselves or their performance.

The second half of this chapter comprises findings from a macro level analysis and highlights three discourses as a complex of all elements of the CDA. Flexibility, instrumentalism, and scientism are identified as constituting and constitutive of a range of dominant ideas from their societal context which I otherwise describe as structural factors. In this way we begin to see the effects of structural factors on the translation of neuroscience research findings into prescriptions for practice, and vice versa. Further the analysis shows that from what is in the texts, from the details and circumstances of their production, and from the way in which they draw on and reinforce dominant ideas in their societal context, the translation of neuroscience research findings into prescriptions for practice is paradoxical.

In the next chapter I will draw my findings together and argue that they demonstrate a connection between the micro level of the texts and the macro level of societal structures. In so doing the findings shine a light on the extent to which translation is facilitated and constrained by these macro level factors, even when translators have no conscious awareness of it. I will also explore the implications for the translation of neuroscience research findings, in particular vis a vis the paradox, as well as the implications for or contributions to translation theory by way of a critical perspective on translation.

Chapter 9 - Discussion: Translation and neuroscience research findings

In this chapter I draw together and discuss the components of this research to establish how it has addressed my specific research question:

> how and why do translated prescriptions for practice in organisations take the form that they do in making their key contribution to the translation of neuroscience research findings into the organisational domain?

First, I briefly revisit the research problem set out in Chapter 1, which includes how I conceptualise both prescriptions for practice and the paradox described as being at the centre of the research. Second I synthesise my findings by describing the discoveries in such a way as to highlight what we now know about the translation of findings from neuroscience research into prescriptions for practice. Third, I discuss how these findings demonstrate that so-called structural factors can be seen to steer translation since their effects can be seen in the corpus of texts which support them, in turn. Here I also briefly discuss specific structural factors now made visible. Fourth, I situate my empirical findings in relation to extant work on translation in MOS and show that translation theory is incomplete in the way that extant approaches understand translation. I suggest that a critical perspective on translation can add to translation theory because of the way that it reveals the role of broader, structural factors in translation. In so doing I offer a theoretical contribution to translation theory. Fifth, I discuss what a critical approach reveals about the paradox. In particular I show how it both enables us to see the paradox more clearly and how, through the denaturalisation of translation, the critical approach reveals possible explanations with regards to the paradox. Finally, I provide a summary of the chapter and look ahead to the concluding chapter of this thesis.

9.1 Precis of research problem

The research problem which this study contributes towards addressing, as set out in Chapter 1, is concerned with deepening our understanding of the politically partisan nature of what is ostensibly a neutral process of translating ideas from outside the organisational domain into prescriptions for practice in organisations. This research focusses on the

translation of findings from neuroscience research into prescriptions for practice in organisations as one substantive example of this phenomenon. For instance, neuroscience research findings are held to have relevance in organisational research (Becker and Cropanzano 2010) and to the workplace (McDonald and Tang 2014), with an increasingly commonplace deployment of techniques and concepts from neuroscience to other fields (for instance, see Altermark 2014). Further, concerns are mounting about the growth of neuroscience technology and particularly the use of so-called 'neuro-data' in the workplace[31] which, coupled with how ideas from neuroscience are said to be seductive (Weisberg et al. 2008) points to a need for problematisation. Prescriptions for practice recommend and advise on how to deploy neuroscience findings in an organisational context as seemingly relevant and useful information. Whilst on the face of it we could consider such prescriptions to be benign, problematisation via a critical approach highlights their likely darker side (van Bommel and Spicer 2017), particularly since examination of them reveals typically they are much removed, in a range of ways, from the neuroscience research findings of which they purport to consist. I describe this disconnect as a paradox, whereby prescriptions for practice are so altered from neuroscience research findings as to render them not just different in type but different in kind. Instead, the process of translation results in prescriptions which either do not have their origins in findings from neuroscience research, or comprise content which is not primarily neuroscientific in its concerns.

A paradox is a self-contradictory statement or proposition in which two contrasting positions are assumed to be possible, and which "abound in organizations, yet often are silenced or ignored" (van Bommel and Spicer 2017, p. 144) and which forms the central concern of this research in which I am guided by two sub-research questions. Firstly I ask, "what factors steer the translation of findings from neuroscience research into prescriptions for practice in organisations?" and secondly, "what does a critical approach to translation reveal about the paradox that translated prescriptions for practice bear little or no relationship to the neuroscience findings that they purport to translate?"

[31] https://ico.org.uk/about-the-ico/research-and-reports/ico-tech-futures-neurotechnology/ [accessed 8 June 2023]

9.2 Synthesis of findings

My multi-level data analysis demonstrates that, by taking a critical perspective on translation, it is possible to infer evidence of what I describe as structural factors associated with prescriptions for practice, leading me to argue, in response to the first sub-research question, that dominant contextual ideas as structural factors are involved in steering the translation of findings from neuroscience research into prescriptions for practice. Further, and in response to the second sub-research question, my analysis also shows how the paradox can be accounted for, in part at least, by these dominant ideas which are specifically uncovered by use of said critical perspective.

I use a CDA and during the analytical stage of the research effectively impose a number of analytical categories, described more fully in Chapter 5, explicated within the findings chapters, and recapped in Table 22 below.

Table 22. Analytical categories

Analytical level	Micro level or surface of text	Meso level of corpus	Macro or deep level of societal context
Analytical category	Discursive feature Discursive practice	Production processes	Background assumptions Discourses Structural factor

In Chapters 6 and 7 I describe findings resulting from a micro level analysis of the empirical material, which comprises articles as examples of prescriptions for practice and interview transcripts which result from semi-structured interviews with consultants as translators.

In Chapter 8 I describe key findings resulting from meso and macro level analyses of the corpus. As such, and in order to facilitate a clear and coherent presentation, the findings are presented as if in three phases despite, as previously described, analysis being iterative and dialectical with a degree of intelligibility only emerging after a number of iterations.

Chapter 6 comprises the first of two chapters in which I present my findings from a close level analysis of the corpus and in which I describe a range of common features in the way that language is put to use with regards to the translation of findings from neuroscience

research into prescriptions for practice. In Chapter 6 I describe how such features effectively serve to divorce the texts from the neuroscience research findings before reformulating them in a particular way. Firstly texts effectively fail to establish terms of reference by omitting any definition of neuroscience findings. Secondly the treatment of methods similarly lacks precision vis a vis the field of neuroscience. At use in the texts are vague and general terms such as 'scans', a failure to identify particular methods used or any debates concerning shortcomings arising from the use of a particular method. Further it is not possible to identify any particular methodological approach despite efforts to appear scientific by, thirdly, invoking references to research or even citing studies, albeit in a way that does not adhere to normative rules in terms of their presentation or accuracy. In addition, the specific references used embed the texts not in the field of neuroscience but in a body of work which comprises translations of translations. Disconnect further arises through declarations concerning (lack of) expertise on the part of translators such as "I'm not a neuroscientist". My analysis then shows how neuroscience becomes reformulated, firstly as a narrow range of topics, typically arising from previously translated materials, presented, secondly, with less caution (and more confidence) than in normative scientific reports, although thirdly and somewhat oddly, with some expressed diffidence, perhaps an attempt to hedge so as to avoid criticism. Further, fourthly, neuroscience becomes foundational knowledge despite claims of reductionism when findings from neuroscience research are used to explain subjective experience (Gold 2009). Finally, comes a warning that in the 'wrong hands' neuroscience might be 'hijacked' or at least become misleading. I suggest that, collectively these features initiate a discursive practice which renders neuroscience to an abstract concept, the function of which is to simultaneously benefit from invocations to science whilst freed from the norms (or constraints) of it.

In the first half of Chapter 7 I describe another range of discursive features which ultimately render findings from neuroscience research as a means to an end (DP2). The texts exhibit an assiduous emphasis on the practical value of neuroscience research findings through features which, firstly, outline their broad and general usefulness. Secondly, discursive features highlight how it is outcome oriented in ways likely to be of interest in the organisational domain, however unspecific. Thirdly, texts petition for the commercial advantage derived from an application of neuroscience, both for end-users, and for

consultant translators for whom the addition of neuroscience content to their portfolio has enabled some degree of differentiation. I then describe a second set of features which essentially set out various means through which one might employ neuroscience findings. Firstly the use of various tools or models provide clarity about how best to proceed. Secondly some extant interventions now attract a label of neuroscience, either through a deliberate move or on basis of neuroscience findings being foundational knowledge and likely attributable to all aspects of organisational behaviour. Finally, texts attach a narrative of challenge and busy-ness to end-users which justifies a need for neuroscience knowledge, and in a form which is accessible.

In the second half of Chapter 7 I describe a range of textual features which firmly enact neuroscience as scientific evidence (DP3), firstly through frequent recourse to its scientific origins and secondly by affirming the superior status of scientific knowledge given its ascribed rigour, objectivity, and other indisputable characteristics. A second set of features comprise what I describe as the 'promise' since they give rise to the notion of future possibilities ensuing from neuroscience research, firstly through the notion of progress, which incorporates the idea that neuroscience knowledge has been rapidly developed as well and that it will continue on this path, and secondly through how it can be beneficially conceived of as an evidence base. I suggest that the function of these features, through initiation of a discursive practice (a means to an end), is to demonstrate the relevance and ease of neuroscience approaches in the workplace. This discursive practice functions, I suggest, as a means of asserting the trustworthiness and prestige of neuroscience alongside its potential.

Chapter 8 shifts the level of analysis away from the micro level of the texts. In the first half of the chapter I describe aspects of the texts in terms of their production processes following a meso level analysis. I show how texts are often i) structured to inform and persuade readers about the benefits of neuroscience research findings, as well as ii) to make them accessible in various ways, how iii) authors typically do not have a background in the field of neuroscience and iv) neither do they directly connect with the original science as well as v) how the typical reader is constructed both as a novice yet concerned with deriving some advantage from engaging with it. These combine to highlight both the paradox of prescriptions for practice, about which I will say more later, and some of the practises

involved in the translations. The second half of Chapter 8 shifts the focus onto findings from a macro level analysis as shown in Table 22 above. Underlying this focus, and as described in Chapter 3, is the notion that power arises structurally such that what appears as the reality of our societal context is instead a 'reality' that has arisen over time, shaped by power asymmetries and the interests of privileged groups. I set out how three discourses are identified, which are a complex of the texts, their production processes, and their societal context. For instance, by denaturalising the aforementioned discursive practices I uncover a set of background assumptions as internalised societal messages which reflect structural factors as dominant power relations. Through these assumptions I infer the influence of the broader societal context both in the way that discourses are constitutive of it and have constructive effects on it. Firstly a discourse of flexibility is underpinned by assumptions whereby the brain is a resource which drives individual behaviour, neuroscience findings elucidate a supposed scientific means to improve the brain and can cultivate plasticity as a useful capacity. The second discourse constructs instrumentalism. Through inferring a range of background assumptions, coupled with textual properties (DFs and DPs) my analysis shows that neuroscience findings are convened as being practical and actionable, with well-defined steps which eliminate the need for scientific expertise, and can provide novel metrics through which performance and/or improvements might be measured. The final discourse, scientism, firmly grounds neuroscience in the field of the natural sciences, replicating societal assumptions concerning the position of science as the means of generating reliable knowledge. Assumptions which posit the high status of scientific knowledge, an ability to render behaviour more concrete (through observable brain activity), as well as notions of futurity and pragmatism combine to a discourse of science. Further, in Chapter 8 I also highlight excluded or overlooked aspects of each discourse which might otherwise serve to undermine them. The final move in this section of the chapter is to make connections between the discourses (as the link between analytical categories) and what I describe as structural factors in society. Following a structural conceptualisation of power as set out in Chapter 3, I argue that my analysis highlights the signs of dominant neoliberal and managerialist positions, coupled with a human capital perspective and a predisposition toward more positivist forms of knowledge such that texts might be described as (in part) manifestations of structural power. Whilst these particular structural

factors are unlikely to be exclusively involved in translation, in Chapter 8 I describe how and where I see their effects.

Taken together my findings demonstrate that it is possible to uncover the presence and influence of structural factors in the translation of findings from neuroscience research into prescriptions for practice through a continual iteration between a close (micro level) examination of texts, their (meso level) production processes, and a macro level perspective, guided by critical discourse analysis as well as the notion of critique or denaturalisation from critical theory. The essence of denaturalisation, as set out in Chapter 3, is a 'suspicious stance' coupled with challenge. As an example, in Chapter 8 I describe how I use discursive features identified in the texts as a start point for denaturalisation, such as the way in which translators define neuroscience (DF1.1). That texts generally offer no definition evokes suspicion and raises questions as to what assumptions might underlie this choice. A number of possibilities arise. Are translators not able to provide a definition? Do they consider it irrelevant or unimportant? Is there some benefit in the lack of specificity? A critical perspective has a particular interest in assumptions as internalised societal messages, and ultimately I argue that a lack of definition enables more freedom and in turn contributes to a broader discourse of flexibility. The concept of discourse provides a crucial link between all three levels and also enables me to maintain the connection between texts and structural factors, as summarised in Table 23 below.

Further, this synthesis of my findings highlights the way that a CDA facilitates an examination of translation. Each of the three levels of analysis offers a distinct but complementary contribution to our understanding of translation and together they enable us to see the ways in which the translation of neuroscience research findings into prescriptions for practice is less a mechanistic and more a political process, whereby some aspects (of neuroscience findings) are brought to the fore whilst others are backgrounded. I will now consider how the findings help to address this study's research question, firstly through a discussion related to my first sub-research question, which asked "what factors steer the translation of findings from neuroscience research into prescriptions for practice in organisations?"

Table 23. Synthesis of findings

Micro level		Meso level	Macro level	
Text properties		**Production processes**		**Structural factors**
Discursive features: Lacking definition Treatment of methods Use of references "Not a neuroscientist" Curated content Confident claims Restraint/diffidence Foundational knowledge "Wrong people"	**Discursive practice:** Neuroscience findings as an abstract concept **Function:** Attributes of science whilst simplified, supports unwarranted claims	**Composition:** informative, accessible, persuasive **Connection:** to pre-translated neuroscience **Author/translator**: non-neuroscientist consultants **Audience/Organisational practitioner**: Direct and indirect novice users, busy, rational	**Discourse: Flexibility** Neuroscience findings as adaptable and facilitative of adaptability as a capacity in people **Background assumptions:** People (and brains) as assets Brain drives behaviour Individualism Plasticity becomes flexibility Face validity	**Dominant ideas:** Human as capital Brain as cognitive capital Individual as having choice and responsibility Employability Plasticity as means and justification Translators as entrepreneurial
Discursive features: General usefulness Focus on outcomes Commercial advantage Packaged neuroscience Labelling erstwhile User friendly	**Discursive practice:** Neuroscience findings as a means to an end **Function:** Ease of application of neuroscience as a solution	**As above**	**Discourse: Instrumentalism** Neuroscience findings as a solution **Background assumptions:** Commodification Client preference for practical Standardised tools Quantification Novel solution	**Dominant ideas:** Commodification (of science) Rational approach Tools as efficient means of applying science Knowledge for practice not wisdom Generalisability and universality

Micro level		Meso level	Macro level	
Text properties		**Production processes**		**Structural factors**
Discursive features: Emphasise scientific foundations Assert superior status Represents progress Evidence base	**Discursive practice:** Neuroscience findings as scientific evidence **Function:** Advantageous and trusted body of knowledge	**As above**	**Discourse: Scientism** High quality and status derived from association with science **Background assumptions:** Scientific knowledge is best Makes behaviour tangible General preference for positivist knowledge Future will reveal more about the brain Common sense	**Dominant ideas:** Science, positivism Commercialisation of science Rational and pragmatic Usefulness as evidence base

9.3 Structural factors steer translation

With respect to the first sub-research question and as argued above I contend that my findings reveal a range of structural factors likely steer the translation of findings from neuroscience research into prescriptions for practice. These are hidden from view, but made visible through an iterative critical analysis. It is not my intention to claim that such factors are the sole influence on translation, rather that because they are difficult to see it would be easy to overlook them and to normalise their effects. The argument for structural factors is outlined below.

As a reminder, the notion of structural factors was introduced in Chapter 1 and further elucidated in Chapter 3 as well as described above. I use it as an umbrella term which encapsulates the critical idea that hidden or unseen societal forces or factors constrain us, and have been normalised to the extent that we accept them as reality. Jermier (1998, p. 240) suggests that:

> the people that critical theorists study may be unable to articulate the structural conditions responsible for their situation for a variety of reasons: they may not apprehend the larger structure; they may apprehend the structure but have no words for it; or they may have been socialized to accept their situation as part of the natural order.

As such, these conditions or factors must be uncovered. In relation to translation this disclosure can highlight what has been taken for granted, as natural and normal but which steers translation in such a way that it serves to both produce and reinforce the status quo in which dominant interests and asymmetrical power prevail (Clegg 2011).

In Table 23 above I synthesise my findings to demonstrate a connection between the texts at the micro level through to societal context at the macro level. For example I show how a text can be connected to dominant ideas in society via discourses which arise by uncovering the background assumptions associated with their discursive features and practices.

My analysis shows three discourses associated with translation: i) flexibility, ii) instrumentalism and iii) scientism. I argue that through these it is possible to infer the influence of privileged or favoured interests in society. In particular, and as alluded to in Chapter 2, the translation of findings from neuroscience research takes place in a context in which ideas from neoliberalism, managerialism, cognitive capitalism, human capital theory

and scientism are especially prevalent and also normalised to the extent that they go largely unseen. I now briefly touch upon each of these, in no particular order, to demonstrate how my findings show that it is possible to assert that translation is effectively steered by their influence. These accounts should be read in conjunction with previous discussions concerning the context of translation in Chapter 2 as well as with connections previously made in Chapter 8.

Neoliberalism. My findings demonstrate an association between a range of neoliberal ideas and prescriptions for practice. Firstly, even that prescriptions for practice are produced and encourage an engagement with neuroscience in the organisational domain is likely shaped by neoliberal ideas about commodification and instrumentalism. Findings from neuroscience are seen as something to be utilised as a means to an economic end.

Secondly, prescriptions individualise. The focus of attention is shifted from organisational issues to the individual who, with their unique and plastic brains, have autonomy and choice and above all responsibility to look after (and develop) their brain. Pitts-Taylor (2010) notes that neoliberalism creates a 'neuronal self' in which we are situated in "a normative, neoliberal ethic of personal self-care and responsibility linked to modifying the body" (Pitts-Taylor 2010, p. 639). She contends that body/self-maintenance have become the new duties of the neoliberal citizen whereby in looking after oneself one avoids being a financial liability to the state (Beddoe and Joy 2017) and it is in our economic best interest. Prescriptions for practice reflect notions of competition, both through entreaties to make use of neuroscience information which might offer competitive advantage and also through the ways that consultants embrace it as a means of differentiating themselves from potential competitors.

Human capital theory. Notwithstanding a range of issues and challenges with HCT, including the way it individualises and responsibilises the workforce (Fleming 2017), it remains a dominant set of ideas in society because:

> HCT is not a mere theory in economics. It is a comprehensive approach to analyze a wide spectrum of human affairs in light of a particular mindset and propose policies accordingly (Tan 2014, p. 411).

As previously described, the essence of HCT is that people are conceptualised as a resource, like any other, to be developed with the promise of return on any investment by way of

improved employability, higher salaries and, collectively increased productivity at the level of the firm or even the nation.

As a concept HCT has been widely used as an instrument to shape educational policies (Tan 2014), so why not the translation of findings from neuroscience research? I suggest that HCT steers the translation of neuroscience research findings through ideas related to individualism whereby individuals are urged to play their part in bettering themselves and can provide the means of doing so – an instrumental way of maximizing their own economic interests. My findings show how neuroscience findings must be rendered "beyond interesting" (C10) and into something practical and utilitarian, frequently reformulated as a set of tools and models. Further, individualism deflects attention away from the need for any structural or organisational adjustments, and is arguably reinforced by the neuroscience topics which make it into prescriptions. For instance individuals are, seemingly in their own best interest, schooled in ways to avoid an amygdala hijack arising from a stressful situation which overlooks any contextual origins of such stress and reinforces the need to maintain productivity nevertheless.

Cognitive capitalism is, I suggest, one aspect of HCT and holds that the modern workplace, and especially management roles, require cognitive rather than manual skills (Smith et al. 2021). Further cognitive ability is a decisive factor of a nation's wealth (Rindermann and Thompson 2011). Therefore not only is a person human capital, but the brain is recast as a resource in its own right which means that the more we know (about findings from neuroscience research) the better we can be. As such making your brain more efficient and effective will drive productivity and both justifies prescriptions for practice which in turn offer a means of so doing. I suggest that prescriptions for practice present information about the brain as foundational knowledge which reflects ideas from cognitive capitalism, as do the ways in which they effectively decontextualise us from our workplace, and emphasise plasticity as a means of reinforcing our responsibility to "leverage and optimise our greatest asset" (Chapman et al. 2019, p. 270).

Managerialism holds that management and associated techniques are important, especially in a business environment characterised as fast paced with rising uncertainty, because good management leads to good performance (Shepherd 2018). A number of core tenets are associated with managerialism, particularly that management is i) a function or profession

in its own right, separate from workers, ii) rational and value neutral, iii) generic and universally applicable. I suggest that we can see these ideas in prescriptions for practice which position neuroscience findings as providing a universal and commonsense approach to addressing management and organisational challenges and suggest neuroscience tools as a standard and efficient way of putting them to use.

Further, managerialism is a multifaceted framework which combines several logics, one of which is a focus on the "specifically human attributes of working subjects" (Costea et al. 2008, p. 662). As such it incorporates into a managerial repertoire a range of 'leitmotifs' which focus on the individual. According to Costea et al. (2008) this includes initiatives such as 'wellness' and 'mindfulness' which in Chapter 1 I suggest as examples of 'foreign' ideas. Whilst such ideas or initiatives might commonly be dismissed as fads, Costea et al. (2008) posit instead that they accomplish new forms of governance. This is consistent with the idea, also put forward in Chapter 1, that prescriptions for practice might act as a 'Trojan horse' for dominant interests whereby on the surface they purport to be relevant neuroscience information, but instead induce additional imperatives and responsibility:

> Simply understanding a little more about how our brains work can help us to work with the brain, rather than despite it
>
> There's a real win-win here. (Article 19).

As such, individuals are exhorted to work on themselves in order to improve their capacity to contribute.

Scientism. Finally, prescriptions for practice reinforce the central importance of science in society, even in the assumption, described above, that neuroscience findings are of relevance to an organisational audience. In prescriptions for practice scientific knowledge is explicitly presented as the strongest form or knowledge and therefore neuroscience approaches are superior to other approaches, for instance when it comes to leadership development. Neuroscience information is derived from research in the natural sciences and as such is objective and rational; it comprises 'facts and not just someone's opinion', as expressed by this interview respondent:

> our society has … we're in … a pivotal moment where people want … the science, … they want something that kind of is more than one person's opinion (C6).

Interestingly Poole (2012) posits that 'neuro-scientism', which is essentially 'self-help armoured in hard science', is ultimately anti-science. This is because "writers tend to reach for just one functional story about a brain subsystem – the story that fits with their Big Idea – while ignoring other roles the same system might play" (Poole 2012). This 'one functional story' is something that is evident in prescriptions for practice, for instance in their narrow range of included neuroscience findings, the tendency to reverse inference and the simplistic mapping of brain regions to function or even to behaviour.

Taken together this discussion of structural factors, coupled with findings described in Chapter 8, demonstrates how the translation of findings from neuroscience research into prescriptions for practice is revealed to be less about neuroscience findings per se and more about sustaining and reinforcing dominant but unseen assumptions and ideas. As a result I argue that the translation of neuroscience research findings is misleading and not neutral and that the content put forward in prescriptions for practice is not actually neuroscience research findings. Instead prescriptions come to comprise a Trojan horse - another means of imposing demands on employees, identifying and highlighting their deficiencies and instilling anxieties about being left behind or not maximising their abilities and potential. In effect, these are an expression of the world in which we live and in which translation takes place.

The stability of the structural factors identified, in terms of the way they continue to exert such an influence despite 'warnings' issued by Ghoshal (2005) almost 20 years ago is notable. It suggests that the 'worldview of managers', as a set of core ideas and assumptions remains much unchanged. In particular Ghoshal (2005) points to a 'pretense of knowledge' as resulting from adoption of the scientific model, and an 'ideology-based gloomy vision' as a view of human beings derived from an economic perspective which pervades management theory and thence practice; both are in evidence in this research.

I will now situate my empirical work in relation to the literature by considering translation theory in its different guises and in particular how, if translation is not neutral, how extant translation theory can account for that. I offer a critical perspective on translation as a contribution to TT.

9.4 Problematizing translation theory

In Chapter 4 I describe how translation theory (TT) in management studies (MOS) incorporates a number of different approaches with a broad consensus around four main perspectives: i) actor network theory (ANT), ii) Scandinavian Institutionalism, iii) organisational boundaries and knowledge based perspectives, and iv) diffusion. Each perspective approaches translation in a different way, underpinned by different ontological and epistemological commitments resulting in a differing empirical foci. As such, it is worth briefly considering what each of the perspectives might tell us about the translation of findings from neuroscience research into prescriptions for practice in organisations.

For ANT the focus is at a micro level of an empirical actor-network as comprising an instance of translation. With its intensive methods and in-depth examination of how interests are enrolled and modified in a network that enables a successful implementation of an idea, ANT would elicit a detailed description of precisely what happens and when, but exclude non-empirics (such as actant motivation) and be unable to address 'why' questions. As such, whilst ANT could provide a fascinating account as to what happens in the translation of neuroscience research findings into prescriptions for practice, for example, describing observable factors in the network which steer that particular instance of translation, it does not denaturalise and is unable to address the paradox. ANT has a focus on associations (through the network) and argues that there is nothing but associations, since new entities are created through connections. Whilst power is of central to interest in ANT, it is at the local level of the particular empirical network and not directly concerned with a more macro level perspective.

Scandinavian Institutionalism. An approach to the translation of findings from neuroscience research into prescriptions for practice based on a Scandinavian institutionalist perspective would similarly focus on a local level. It is concerned with the dis-embedding and re-embedding of neuroscience ideas as they are formulated into a prescription or made to fit and institutionalised into their new context. This approach includes scrutinizing local practices, often undertaken by specific organisational actors. This perspective would likely take the 'prescription' – even if it is a translation of translations - at face value, providing a detailed description of the practices (often discursive) that actors engage in to reshape ideas

to a local context, but similarly would be unlikely to engage in critique or consider the effects of the broader societal context.

Organisational boundaries. An organisational boundaries perspective would, meanwhile, attend to what facilitates the transfer of neuroscience knowledge, particularly through the meanings constructed between groups of people at the boundaries of organisations and how they negotiate meanings. Again, this perspective attends to local level interactions between different groups and might focus on how a prescription for practice is transferred across boundaries at a local level.

Diffusion. The final perspective is that of diffusion, which differs markedly from other approaches as it does take a more macro level view of translation but essentially is concerned with ascertaining how far an idea has spread or diffused and how this diffusion has been achieved. If applied to the translation of findings from neuroscience research into prescriptions for practice, research in this vein would be interested in quantifying the extent to which 'practitioners' have engaged with a prescription(s), and how that has been achieved. For example, it might ask what routes have the prescription(s) taken and of those which are more or less successful. If power were to feature in diffusion research, it is likely restricted to a perspective based on Lukes 1st level, as described in Chapter 3, whereby agentic power is derived from access to resources.

I explicitly problematize translation theory following Locke and Golden-Biddle (1997), and argue that it is incomplete as it lacks a perspective on translation in which structural power is adequately accounted for, coupled with an explicit conceptualisation of translation as a political process. In Chapter 4 I develop a critical perspective on translation with the intention to offer a contribution to translation theory and in Table 24 below, I show how a critical perspective is able to add to our understanding of translation.

In particular I build on the description provided in Chapter 4 concerning how approaches to translation can consider a variety of factors or facets of translation regardless of their theoretical archetype (O'Mahoney 2016). In Table 24 I elucidate these facets as a means of illustrating how a critical perspective is different from, and adds to, extant approaches to translation. For instance, whereas extant approaches would view actors or agents as individuals in various locations, a critical perspective is interested in the role of structural

factors. Further, a critical perspective denaturalises the objective of translation and the source of an idea in a way that extant approaches do not and does this from a position in which such ideas are held to likely 'manipulate' workers in service of reinforcing the status quo. Overall Table 24 summarises the way that a critical perspective, which exemplifies a number of critical characteristics and beliefs as developed in Chapter 4, can contribute to translation theory by explicitly conceptualising translation as purposeful and political, pointing to the role of the broader societal structures within which managers and organisations function, and by challenging the taken for granted (Adler et al. 2007). Further, this contribution is timely as I suggest that that the translation of findings from neuroscience research into prescriptions for practice is unlikely to be an isolated example of the translation of foreign ideas into the organisational domain as a means of reinforcing the status quo.

Finally I suggest that the CDA offers a fruitful empirical approach to a critical perspective on translation since, as described above, it has the capacity to incorporate the critical characteristics which I set out in Chapter 3. For instance a CDA encompasses a central role for language, a requirement to denaturalise or critique the surface level so as to uncover background assumptions, including the typically unseen but normalised role of societal context (by way of structural factors) in shaping and reinforcing the status quo, and micro-emancipation through this uncovering or raising of awareness.

Table 24. How a critical perspective adds to extant perspectives on translation

Facet or aspect of translation	Extant accounts of translation	Critical perspective on translation
Actor or agent	Consultants as change agents or opinion leaders, in a micro network, or at the boundary of organisations, or as diffusers of information, or as editors	Dominant interests expressed through structural factors which constrain (but do not determine) the agency of individual translators
Object of translation	Neuroscience as a source of knowledge or a new (foreign) management idea, taken at face value	Knowledge from the natural sciences with perceived high status and in need of denaturalisation
Audience	Organisational members and employees as or as rational adopters, constructed subjects or innovators. In other words as human capital with the choice and responsibility to act on the prescriptions for practice	Compliant employees and workers unaware of the extent to which their normalized environment influences and controls, even against their own best interests
Source or origin of an idea	Ostensibly the field of neuroscience as innovation or foreign idea to be reshaped for local context or interests	Recognised as approximation of neuroscience research, revealed to be translations of translations, divorced from scientific foundations

Destination or receiving context	Local level context such as a local unit or subsidiary, or a macro level as channel for spreading innovation	Context dominated by normative ideas – i.e., the neoliberal organisation
Tools or resources through which ideas are revised	Enrolment in a network, negotiation between groups, reconstruction, or institutionalisation	Language and discourse: versatility, commodification, instrumentalism, quantification,
Mobilisation: how it leaves one place and moves to another	Dis-embedding and re-embedding, Negotiation between groups at boundaries Diffused through various channels over time	Interests and structural factors construct an imperative for prescriptions for practice
Outcome: what demonstrates that translation has taken place	How far neuroscience has diffused, where it has travelled to and how, its meaningfulness to involved groups, how it is established through local practices, fit with local and particular interests	Prescriptions for practice reinforce structural factors, interests, and dominant ideas

9.5 Denaturalising the paradox

In this section I look more closely at the paradox with respect to sub-research question 2, "what does a critical approach to translation reveal about the paradox that translated prescriptions for practice bear little or no relationship to the neuroscience findings that they purport to translate?" Ultimately I argue that a critical perspective, which uncovers the role of structural factors in translation, also reveals their role in the construction of the paradox. In other words it is possible to see how, in the translation of findings from neuroscience research into prescriptions for practice, the effects of the aforementioned structural factors supplant fidelity to the original science. I will now describe how this is the case.

In addressing this second sub-research question I contend firstly that a critical approach reveals the paradox in more detail. In particular this detail is revealed through analysis of the corpus at a meso and micro level which allows me to describe it more fully - for instance through the specific discursive features and practices set out in the Chapters 6 and 7. These findings demonstrate that prescriptions for practice are imprecise, lack definitions, qualification and contextualisation and clearly do not adhere "to the conventions of 'true' scientific discourse'" (Thomm and Bromme 2012, p. 187).

My findings also demonstrate how discursive moves effectively disconnect prescriptions from the original science. For instance scientific texts (journal science) have particular features or conventions in the way that they share information which allows judgements concerning their credibility to be formulated. This includes the use of references to embed any work into an overall body of work, as well as a detailed description of methods used to arrive at particular results (Thomm and Bromme 2012). These conventions contrast with prescriptions for practice which, as described, both use references and treat methods in ways that are not consistent with them whilst still emphasising their 'scientific-ness', as described in Chapter 7, through recourse to scientific foundations. As a result a paradox arises whereby although prescriptions for practice are not scientific texts they do assert their scientific-ness.

Might we then see them as examples of popular science? As discussed in Chapter 4 popular science also exhibits certain characteristics. Certainly, prescriptions for practice do engage in

simplification and reductionism, and they do use discursive moves designed to appeal to their audience. Further:

> there have long been concerns about public representations of biomedical research …. the science is often oversimplified and its social implications—both good and bad—overstated (Caulfield et al. 2010, p. 13).

Whilst there are parallels with prescriptions for practice and these ideas might form the basis of an interesting debate, it offers nothing substantial to our understanding of the paradox since it restricts our attention to the surface level characteristics of prescriptions for practice vis a vis both scientific texts and/or popular scientific texts.

This paves the way to the need to challenge or denaturalise the contradictory characteristics which comprise the paradox as a way of shedding further light on it. Here we can derive some deeper insight from a critique of scientific popularisation when Caulfield et al. (2010, p. 13) assert that:

> the presence of the profit motive tends to nudge representations of science in a predictable direction: toward an overstatement of benefits and a minimization of risks and limitations [and further that] academic researchers are under constant pressure to commercialize their research.

I contend that denaturalisation points to the role of structural factors and particularly to neoliberal demands on science whereby not only the form that 'representations of science' take, but that they arise in the first place can in part at least be attributed to the marketization of science. As a result, and particularly in relation to the paradox, I suggest that it arises as a result of structural factors including neoliberalism, earlier described as an ideology (see chapter 2.3.2) which promotes the interests of the group which espouses it (Wallace et al. 2023). For example, neuroscience findings become performative, science is celebrated if not reified, individuals are enrolled in a commitment to develop themselves (their brains) so as to sustain productivity, prepare for an uncertain future and sure up their own economic position. More particularly, the paradox arises because of the particular status of science in society, whereby prescriptions for practice endeavour to retain an association with science because it is seen to confer greater reliability and credibility (Beddoe and Joy 2017). Research findings from neuroscience then are performative in two ways, firstly as a set of ideas for practice, and secondly as a way of legitimating dogma arising from dominant ideologies (Alvesson and Willmott 1992).

In essence, this research demonstrates how a critical approach to translation can help understand the paradox at the centre of this research by uncovering dominant (hidden) priorities in prescriptions for practice and showing how structural factors are privileged over and above fidelity to neuroscience findings, but yet that scientism encourages a claim to science. Further, as I have already alluded, it highlights the ability of a CDA to provide the link between the micro and the macro and in so doing render visible both the nature of the paradox in more detail, as well as its connection to structural factors.

9.6 Summary

In this chapter I have synthesised the research findings from three empirical chapters and in so doing make a number of contributions. I make substantive contributions through addressing the two sub-research questions. Firstly I discuss how my findings demonstrate a role for structural factors in steering the translation of findings from neuroscience research into prescriptions for practice. Secondly I discuss how a critical approach to translation reveals that the paradox at the centre of this research is similarly accomplished by the privileging of ideas from structural factors over and above any concerns to fidelity or reliability. I also make a theoretical contribution by offering a critical perspective on translation as an addition to extant approaches. I discuss how these existing perspectives can be supplemented by a critical approach which explicitly conceptualises translation as a political rather than a neutral process, which incorporates a view of power as systemic and structural as well as using denaturalisation as a means of uncovering structural factors which are typically normalised and hence hidden from view. Further, I make a methodological contribution by demonstrating how a CDA allows for a detailed elucidation of translation.

In the next, final chapter, I conclude this thesis by providing a brief overview of its contents as a means of demonstrating how my research has answered the research question before presenting some implications, including possible emancipatory steps, as well as directions for future research. Some final reflections with regards to the research bring the thesis to a close.

Chapter 10 - Conclusion

In this concluding chapter I firstly revisit the aims of this research and elucidate how they are addressed in light of the contributions made by it. Next I draw out the implications of the study from a theoretical, substantive, and practical perspective, before moving on to discuss how, following reflexive deliberation, I see that the particularities of my approach give rise to a number of limitations. This leads on to suggestions for some directions for future research, arising from the identified limitations of the study. I close this chapter, and this thesis, with some concluding comments.

10.1 Understanding translation

The aim of this study was two-fold. Firstly, to understand why the translation of findings from neuroscience research into the organisational domain occurs as it does, and in particular why its translation into prescriptions for practice in organisations comes to take the particular form that it does, including accounting for the paradox whereby such prescriptions both are and are not neuroscience. And, secondly, to demonstrate how the development and use of a critical perspective could contribute to our understanding of the translation process.

The research put forward the following research question:

> how and why do translated prescriptions for practice in organisations take the form that they do in making their key contribution to the translation of neuroscience research findings into the organisational domain?

The study drew on critical theory, incorporating a number of critical concepts into a critical perspective on translation as a contribution to translation theory which, following problematization I found to comprise multiple extant versions but not one which explicitly considered translation to be a political process along with a role for structural factors in explaining and accounting for how translation is undertaken. Using critical discourse analysis, the empirical focus of this research was prescriptions for practice in organisations as the location or manifestation of translation efforts. Through a multi-level analysis it sought to connect prescriptions to their broader societal context and to uncover contextual influences on them through the notion of structural factors.

With respect to understanding why prescriptions for practice come to take their own particular form, the research empirically demonstrated the role of structural factors, whereby it is possible to connect texts, as micro level 'discursive events' (Fairclough 1992), to macro level societal context by uncovering discourses associated with both the properties of the texts and their hidden assumptions as internalised societal messages and uncovered by denaturalisation. Of note, on view were a range of dominant ideas and perspectives arising from structural factors including neoliberalism, managerialism, scientism, and human capital theory incorporating cognitive capitalism. The influence of structural factors, as normalised or taken for granted positions, but representing the status quo in terms of dominant interests in society, allowed the study to highlight the hidden role of structural power in translation.

Further, and in respect of the paradox, the critical perspective to translation both illuminated and denaturalised how prescriptions for practice aver to be neuroscience whilst encompassing discursive moves which disconnect from it. One aspect of this is how prescriptions imply that they constitute literal translations of neuroscience research findings whereas, because of the gap between neuroscience as a natural science and the organisation as a social domain, they can only be metaphorical. For example, whilst there might be some parallel between neuroscience research findings which highlight a capacity for neuroplasticity in the human brain and notions of flexibility or agility, an appropriate invocation of these neuroscience findings is metaphorical and not literal. In other words neuroscience findings about neuroplasticity are not scientific evidence of flexibility or agility and the use of neuroplasticity (as a source) to illuminate flexibility (as a target) fails to consider the huge gap between the source and the target. That is not to say that the idea of neuroplasticity is unhelpful in the organisational domain. Indeed as a metaphor it might prove instructive, however it should be acknowledged as such in order that the limitations associated with a metaphorical understanding are also explicit. This research showed how the suggestion of a literal translation similarly reflects and privileges structural factors, whereby fidelity to the originating science is supplanted by, for instance, a neoliberal impetus to commodify neuroscience coupled with a scientistic prerogative to capitalise on a positivist bias in the context in which translation takes place. As such it is apposite to argue that the translation of neuroscience research findings into prescriptions for practice is

organisations effectively serves as a Trojan horse, supporting and reinforcing key ideas from said structural factors. In these regards the study makes a substantive contribution to our understanding of the translation of findings from neuroscience research into the organisational domain.

With respect to the development of a critical perspective on translation which was outlined and used in this research to examine prescriptions for practice as described above, this additional perspective provides a contribution to translation theory. Although TT is rich in multiple perspectives on translation with differing theoretical bases (Spyridonidis et al. 2016) extant approaches cannot account for the effects of societal context on translation. A critical perspective highlights how the effects of societal context are normalised and imperceptible and yet are powerful in regulating the way we think and behave – including in relation to translation. By offering a critical perspective and demonstrating how it adds to extant approaches this research contributes to the literature on translation theory.

The research also makes what Bergh et al. (2022) class as a 'modest methodological contribution' which can "offer a methodological advance that does not stand on its own but ….accompanies a substantive theoretical contribution" (p. 1838). It does this by suggesting and demonstrating the use of critical discourse analysis to investigate a new theoretical domain, that of translation, coupled with a novel substantive area, that of neuroscience research findings as an example of a phenomenon whereby foreign ideas or interventions are prescribed for practice in the organisational domain.

Taken together this overview of the key contributions demonstrates that the aims of the study have been achieved.

10.2 Implications

From the contributions summarised above a number of implications arise from this research. The main theoretical implication of this thesis is the contention that a critical perspective on translation adds to translation theory. It allows us to see translation as a political process underpinned by systematic and structural factors as dominant ideas from the societal context in which translation takes place. This study demonstrates how neuroscience findings are translated into prescriptions for practice in a way that privileges and reinforces these dominant ideas. As such a critical perspective on translation is required

and can be put to use in research into the translation of other foreign ideas so as to uncover deep structures and reveal the interests which might shape their translation.

The main substantive implication arising from this research concerns the ways in which scientific knowledge is appropriated into an organisational domain and more broadly the use of other foreign interventions which, for example, purport to offer an indirect means of improving efficiency or productivity. For instance, evidence-based management might be seen as a prescription for practice in organisations which has arisen from the translation of another foreign idea originating from positivist science such as evidence-based approaches to medicine. Further, Karjalainen et al. (2019) raise questions over the use of mindfulness techniques, and in particular the scientization, instrumentalization, and commodification of mindfulness programmes. Costea et al. (2008) posit that whilst it is easy to dismiss such things as harmless fads this is to overlook their role in sustaining dominant power interests.

From a practical perspective, the findings of this research point to how there is a need to reconsider translation and to explicitly recognise it as a political process. Whilst on the surface it looks like translation, in this instance of findings from neuroscience research into prescriptions for practice, might appear to be primarily an exercise in neutrally simplifying complex (scientific) material, at a deeper level this research demonstrates how prescriptions for practice come to convey ideological messages with concomitant repercussions. Further through raising awareness about translation such that organisational practitioners might choose to question or resist the products of it, this study effectively constitutes a 'transformative redefinition' as a form of micro-emancipation.

10.3 Limitations

Despite assertions as to both the contributions and implications of this research, it would be a mistake to consider it (or indeed any empirical research) to be beyond any scope for improvement. Therefore it is important to critically consider how the very particularities of this study might impact on both the findings themselves as well as on any ability to extrapolate them.

In this section I firstly acknowledge some limitations of this empirical study on a theoretical level by recognizing that so-called prescriptions for practice are only one aspect of a broader process of translation. In delimiting the empirical focus of this research to such prescriptions

it runs the risk of excluding other aspects or stages of the translation process. Further as empirical material the articles are written by translators and supplemented by interviews with consultants, who are essentially interested in promoting their services, including neuroscience based services. As such it is perhaps unsurprising that aspects of commodification are on display and a paradox is constructed. That said, these empirical shortcomings do not repudiate the theoretical contribution because the research findings do demonstrate that a critical perspective on translation is able to add to our understanding of translation by highlighting a role for structural factors.

Similarly I acknowledge some limitations with this research on a practical level, in the way that the research was conducted. In particular I point to the practical challenges of conducting a critical discourse analysis where, although it is a "well-established approach" it has similarly "embraced a high degree of diversity in both theory and method" (Leitch and Palmer 2010, p. 1194). In particular a CDA is resistant to "rigorous methodological protocols" (Chouliaraki and Fairclough 2010, p. 1214). This leads to some vagueness or even inconsistency in the scholarly literature, for instance in what the micro, meso or macro levels specifically comprise. Ultimately, and given the volume of empirical material collected, I formulated my own analytical categories based on both a reading of the literature and on my own experience as I analysed the empirical material. Whilst these might not precisely overlay the micro, meso or macro they do encapsulate all the levels overall and further enable me to present the findings with some sort of clarity. In addition to this, the notion of intertextuality is difficult to signal explicitly in the presentation of findings. Whilst intertextuality does form part of my analysis (for instance in the connections between translators, and any additional material they had penned) it is not always highlighted but is instead incorporated more implicitly into the findings chapters.

Finally, I acknowledge some personal limitations in regard to this research. These limitations are related to my position as a researcher and also a former consultant, in a position not dissimilar to that of my interview respondents and which likely caused some personal bias. More particularly I found it especially difficult, during analysis, to identify the background assumptions underpinning the discourses en route to connecting them to structural factors. Whilst intellectually I knew to critique and even how to critique, I found it to be extremely difficult not to 'succumb' to background assumptions which appeared to me as normal if not

reasonable; a testimony to exactly how pervasive they are. My solution to this was to iterate through the empirical material time and again, circling through closeness to and distance from it as a means of making some sense of the material.

10.4 Directions for future research

As a result of this research, and given the aforementioned limitations, I now put forward some suggestions as to potential directions for future research. For instance, scholars might engage in empirical investigation of different aspects of the translation process. For example one could conduct an ethnography of a training intervention based on neuroscience findings or knowledge and which might include an observation of the intervention, analysis of any course materials and interviews with participants and trainers, perhaps ex ante and post-hoc. Whilst the empirical material for this research comprised 20 articles and (ultimately) 12 different translators, a detailed analysis of multiple components of one instance of translation could allow a more intense investigation. Another approach might be to undertake an in-depth analysis of one keynote conference speech concerning findings from neuroscience research as related to practice in organisations again using critical discourse analysis but, in light of the difficulties and complexities of managing a large volume of data, this might allow for more detailed intertextual analysis. One final suggestion is to examine how different types of translators might approach the translation of findings from neuroscience research into prescriptions for practice in organisations. In Chapter 5 I described how I went as far as to interview a range of translators but ultimately limited my analysis to consultants as the most active translators. Analysis of this additional empirical material may elucidate differences in approaches to translation and, in light of this research, perhaps variations in the influence of structural factors as dominant contextual ideas.

10.5 Final considerations

I would like to conclude this thesis by offering some final reflections on this research and particular on the implications for the practical application of neuroscience findings in organizations. As described in the first chapter of this thesis (see 1.6) the aims of critical research are three-fold; to provide insight, critique, and transformation (Myers and Klein 2011) and the latter arises through the development of a new understanding which enables change. As such the findings from this research have a number of implications for the

practical application of neuroscience research findings in organizations where, as has been shown, they are typically 'operationalized' in a number of ways.

Firstly, there is a need for more transparency, or a better understanding, about the nature of 'neuroscience' applied in organizational settings. I use the term 'prescriptions for practice' to describe recommendations relating to the application of neuroscience findings in organizations and, in this research, show how they do not comprise neuroscience. In other words, prescriptions for practice and neuroscience are distinct; the former are not a faithful rendition of the latter even though they are reliant on it. For example, I have shown that flexibility is not the same as brain plasticity, despite being reductively presented as such in prescriptions for practice. As a result practitioners would do well to understand what constitutes a reliable source of neuroscience expertise and also to consider the likely effects of translation. That said the way that 'neuroscience' is presented in prescriptions for practice serves to reduce the scope for critical reflection amongst practitioners in that it likely reinforces prevalent ideas, messages or assumptions that are present beyond these prescriptions and this, in turn, might suggest some sort of role for exponents of critique.

A second implication is that critique is important, but not purely - or even - one with a focus on the efficacy of the practical application of neuroscience findings in organizations, because even if prescriptions for practice fail to bring about the changes or improvements which they purport, they are not neutral or without any effect. Instead, practitioners might engage in critique to uncover the 'other' consequences of prescriptions for practice – those which are not obvious at a surface level but which nevertheless leave their mark. For example, prescriptions for practice may prove to be counterproductive in the way that they seek to expand organizational demands into all aspects of their workers' lives by instrumentally claiming brains as levers of (improved) organizational performance. This could engender resistance on the part of workers in the form of damaging their engagement or even increasing turnover as they feel dehumanized and commoditised.

Thirdly, we see how 'scientism', which simultaneously raises the expectations of some organizational interventions and diminishes others, plays a significant role in the practical application of neuroscience research findings in organizations (even though, as described above prescriptions effectively do not constitute neuroscience). The high status of science in society contributes toward the appeal of scientific solutions to organizational problems,

whilst a more limited understanding of the limits of scientific knowledge means research findings are misinterpreted or made to overreach and meanwhile other, perhaps more appropriate, organizational interventions are set aside.

To conclude, whilst translations of neuroscience findings purport to offer something novel and compelling to the organisational practitioner, what this research has shown is that beneath the surface what they actually offer is more of the same by effectively, and perhaps unknowingly, shoring up the status quo.

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Appendices

Appendix 1. Glossary of key concepts

Concept	Description
Background assumptions	invoked by social context and are visible in the properties of a text. In a critical discourse analysis (CDA), uncovering background assumptions facilitates the identification of discourse(s)
Critique	From critical theory, critique is an activity of unveiling or debunking what appears as reality. See also *denaturalisation*
Corpus	In a CDA a corpus (of texts) comprises the collective body of texts to be analysed. See also *texts*
Denaturalisation	A term which encompasses the notion of critique and is a central concern of critical management studies as well as featuring in CDA as a means of uncovering the role of discourse
Discourse	Discourse in the context of a CDA is a composite of three elements; the properties of a text, production processes, and its societal context as discernible through background assumptions. A discourse both reflects reality and constructs or reproduces it
Discursive practices (DP)	In a CDA discursive practices are enacted by the discursive features of a text or corpus. Together such features instantiate discursive practices which effectively accomplish some sort of outcome or achievement for the text or corpus
Discursive features (DF)	In a CDA close textual analysis, at a micro level, identifies discursive features in a text or corpus. These features might include notable vocabulary used, metaphors and

	technical terminology, as well as the grammar and structure of a text
Emancipation	From critical theory, the idea that the lives of individuals are subject to forces which shape the decisions they can make and that insight into these conditions might facilitate some degree of emancipation from them and allow more individual choice and control
Foreign idea	Those ideas, concepts or phenomenon which originate from outside the organisational domain and are subsequently appropriated within it
Findings from neuroscience research	Distinct from the field of neuroscience, the particular claims to knowledge made in peer reviewed scholarly publications
Macro level	Based on Fairclough's (1992) three-dimensional view of discourse, the macro level of a CDA is concerned with the broad societal context of a text or corpus. See also *structural factors*
Meso level	The meso level of a CDA is concerned with patterns across and between texts which can elucidate how and where they have come into being. See also *production processes*
Micro level	The micro level of a CDA is concerned with the text itself whereby micro level analysis comprises close textual analysis
Paradox	An inconsistency or contradiction. In this research a paradox refers to the way in which neuroscience findings are translated into prescriptions for practice and both lay a claim to be neuroscience whilst simultaneously being so altered from it as to be not just different in degree but different in kind
Power	Power as a pervasive effect which shapes our circumstances and, from critical theory, the idea that

	power is structural in that it arises not from specific actors but from the very structure of society, which over time has come to reflect the interests of the privileged in society. See also *structural factors*
Prescriptions for practice in organisations	The term adopted to describe material(s) targeted at organisational practitioners and about neuroscience findings, and which include can written articles, presentations, and executive education for example
Production processes	At the meso-level of a CDA, between texts at the micro level and context at the micro level. Production process is akin to Fairclough's 'discourse practices' and is interested in what leads to the way that texts are produced or constituted and how that can be seen or interpreted in the texts themselves
Structural factors	An umbrella term which I use to encapsulate the idea, from critical theory, that unseen societal factors constrain us and have been normalised to the extent that we accept them as reality
Text	In a CDA a 'text' is an individual instance or discursive event. It can comprise written language but also other ways or examples of communicating meaning, such as presentations or interviews. Consistent with a view of language as constructive, a text is seen to have causal properties
Text properties	In a CDA, discursive features and discursive practices together constitute what I describe as the properties of a text
Translation	A process by which content of some kind is moved from one location to another and often assumed to be neutral. I argue that translation is a political process in which some aspects of a translated idea are privileged over others

Appendix 2. Ethical approval

Cardiff Business School

Ysgol Busnes Caerdydd

Brown, Virginia
Cardiff Business School
Cardiff University

4 March 2019

Dear Virginia,

Ethics Approval Reference: 1819016
Project Title: The translation of natural scientific 'facts' into the organisational domain:

I would like to confirm that your project has been granted ethics approval as it has met the review conditions.

Should there be a material change in the methods or circumstances of your project, you would in the first instance need to get in touch with us for re-consideration and further advice on the validity of the approval.

I wish you the best of luck on the completion of your research project.

Yours sincerely,

Electronic signature via email

Dr. Debbie Foster
Chair of the School Research Ethics Committee
Email: CARBSResearchEthics@cardiff.ac.uk

Appendix 3. Research summary

Research Project Outline – For Research Participants

Cardiff Business School
Ysgol Busnes Caerdydd

The translation of natural scientific 'facts' into the organisational domain: how and why are neuroscience ideas translated into organisational practice?

Purpose and Focus of the Research

This exploratory study is concerned with developing an understanding of how and why scientific facts journey from their originating disciplines and into organisational life, using neuroscience as an example. This journey is evident, for instance, in the range of material written for an organisational audience which sets out neuroscience facts and topics, and such writing is qualitatively different from that produced within the discipline of neuroscience. Adjusting, or 'translating' neuroscience facts is an intrinsic part of the journey, and this study comprises a detailed exploration of the 'translation', by looking at both translated materials, and by engaging with those involved in the process.

The research is being undertaken by Virginia Brown, a doctoral candidate at Cardiff Business School, Cardiff University, and funded by the Economic and Social Research Council (ESRC).

Research Activities and Feedback

Two research methods are being employed. First analysing a range of relevant texts about neuroscience that are in the public domain. In particular the study will focus on material that is intended for an organisationally based audience, or has been referenced by/used as a source for such material.

Second, conducting individual, confidential, face-to-face (or Skype) interviews with a small number of individuals identified as having been involved in bringing neuroscience facts to an organisational audience, whether as scientific writers, editors, authors or consultants, for example.
The thrust of the research is to build an understanding of what the process of translation entails, and to what end. A summary of the findings will be made available to research participants.

Contact Information
Virginia Brown
Cardiff Business School
Cardiff University
Colum Drive
Cardiff
CF10 3EU

Tel: +44 7764 182026

Email: brownvl@cardiff.ac.uk

Appendix 4. Informed consent form

CARDIFF BUSINESS SCHOOL

RESEARCH ETHICS

Cardiff Business School Consent Form

This research focuses on how ideas from natural sciences are translated and make their way into organisational practice. It will pay specific attention to how ideas from neuroscience have made their way from a scientific context into a business context. In order to do this, the researcher will examine what has been written about neuroscience in different contexts as well as interviewing some of those involved in the process of translating findings into organisational practice.

I understand that my participation in this project will involve an individual face-to-face (or Skype or Zoom) interview with the researcher, lasting approximately 45 minutes, exploring my experience of the process of translating scientific facts into organisational practice.

I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason.

I understand that I am free to ask any questions at any time. If for any reason I have second thoughts about my participation in this project, I am free to withdraw or discuss my concerns with Professor Tim Edwards (EdwardsTJ@cardiff.ac.uk).

I understand that the interview will be audio-recorded, but that I can refuse my permission for such recording, in which case the researcher will take notes during the interview. I understand that information provided by me will be held confidentially and securely, such that only the researcher and can trace this information back to me individually. The information will be retained for up to 3 years and will then be deleted or destroyed. I understand that if I withdraw my consent, I can ask for the information I have provided to be deleted or destroyed in accordance with the General Data Protection Regulation (GDPR) 2018.

I, _____(*NAME*) consent to participate in the study conducted by Virginia Brown (Brownvl@cardiff.ac.uk), PhD candidate of Cardiff Business School, Cardiff University, under the supervision of Professors Tim Edwards and Dirk Lindebaum.

Signed:

Date:

Appendix 5. Informed Consent Declaration - For Research Participants

This study is being conducted by Virginia Brown, PhD Student at Cardiff Business School at Cardiff University under the supervision of Professor Tim Edwards who can be contacted via the following email address: EdwardsTJ@cardiff.ac.uk and Professor Dirk Lindebaum who can be contacted via the following email address: mail@dirklindebaum.eu .

Participation in the research project will involve an individual, face-to-face (or Skype) semi-structured expert interview to explore the way in which ideas from neuroscience are being translated into organisational practice.

Participation in the study is entirely voluntary and participants can withdraw from the study at any time without giving a reason. Participants may also ask questions at any time and discuss any concerns with either the researcher (Brownvl@cardiff.ac.uk) or the supervisor listed above.

The findings of the study will form part of the research assignment.

The interview will be audio-recorded, unless permission to do so is refused by the participant, in which case the researcher will take notes during the interview. The information provided by participants will be held confidentially and securely, such that only the researcher can trace it back to participants. Information will be stored in accordance with the current General Data Protection Regulation (GDPR) 2018.

Participants can request information and feedback about the purpose and results of the study by applying directly to the researcher via email (Brownvl@cardiff.ac.uk).

February 2020
Researcher – Virginia Brown PhD Student
Cardiff Business School
Cardiff University
Aberconway Building
Colum Drive
Cardiff
CF10 3EU

Appendix 6. Interview schedule

Introduction

- Signed consent, anonymity, timing, permission to record
- Preamble - purpose and content of research

Opening –background and current role

1. Tell me about your general background and current work

Translating Neuroscience – how is it used in their work & why

2. How does neuroscience feature in your work?

3. Why is that? *What's your interest in it?*

4. What are your sources? Why those (books, journals, people)?

5. What are the particular challenges in working with neuroscience?

6. How do you go about bringing it to an audience who knows nothing?

7. What makes a good, or bad, example of translated neuroscience?

Benefits/limitations of neuroscience

8. What is it about neuroscience overall that makes it interesting to business? Why?

9. What do people want to know? Why is that?

10. Which organisational issues can neuroscience address?

11. How has including it affected your work?

12. Who has it been most beneficial to and why?

13. What does it supersede or replace? Why? What does it add?

14. What are the potential downsides?

15. Are people generally using it in a way that you'd expect

16. How influential do you think neuroscience is?

Close

Is there anything else that you feel is relevant, that you'd like to add?

Or something that you wish I'd asked you?

Do you know of anyone else I could speak to?

Appendix 7. Analysis of production process of prescriptions for practice

Article Number	Title	Author	Organisation or publication	Composition and connections	Audience
1	Neuroscience for leadership and management	Peter Hirst – academic dean (executive education)	MIT – high ranking US university	Feature article on MIT website positioned as 'insight' from the dean, effectively marketing MIT leadership courses with neuroscience content, citing MIT 'experts'. Enthusiastic tone, neuroscience as biological proof, reinforces the need for appropriate (MIT) expertise	Alumni Future students HR or L&D professionals
2	Neuroscience in performance management	Kim Royle - consultant	Association for Talent Development – US based professional body for talent management	Feature article providing 5 recommendations of how neuroscience improves performance management processes. One of 4 neuroscience-based articles written by the author for this outlet. Author gives factual advice based on neuroscience and is scathing in tone toward traditional approaches which universally fail. Implicit connection to SCARF model categories. Author has an executive certificate in NeuroLeadership	Managers HR professionals
3	Neuroscience in action: Applying insight to L&D practice	Ruth Stuart – researcher Paul Howard-Jones – academic (educational psychologist)	CIPD – UK professional body for human resources	Lengthy white paper/report based on case study research exploring who uses neuroscience and how in 8 organisations. Structured as description of research findings, including introduction & conclusion, citations, and references. Style implies neutral reporting of findings, although respondents include consultants framed as 'experts'. Findings include value of neuroscience as evidence base to enhance credibility of HR function. Simplistic understanding of neuroscience. Recommended reading primarily David Rock's work	CIPD members (100,000+) HR or L&D professionals
4	How can HR use neuroscience?	Nick Martindale - journalist	HR magazine – for leaders and HR professionals	Feature article purporting to question relevance of neuroscience. Structure dominated by citations from expert sources (consultants not neuroscientists), and emphasis on Rock's work as influential as author reports the views of others and hesitates to make any recommendations. Simplistic and inaccurate definition of neuroscience	Magazine readership – managers and HR professionals
5	How brain science found its way into	Seb Murray - journalist	The Financial Times – daily business	Feature article about executive education and how neuroscience now frequently features. Sources include	Wide range of business executives and

Article Number	Title	Author	Organisation or publication	Composition and connections	Audience
	business school (Feature article)		newspaper (and website)	more than half a dozen top business schools (mainly American), & author cites both academics and clients. Neuroscience includes mindfulness as well as wearable technologies measuring physiological responses. Author does not question or challenge, leaving the reader to assume that it must be valid, since such big names endorse its inclusion in the name of doing business better	professional, interested in management related topics
6	How neuroscience is being used to spread quackery in business	Matt Wall – academic (neuroscience)	IFLScience – website popularising science	Feature article which puts forward various examples where the appearance of science misses key elements and is not therefore scientific. Tone is one of scepticism in relation to flawed neuroscience at workplace, repackaging of psychology as neuroscience & general lack of ability to critique in lay population. Points to NLI business model as marketing tactic	Niche audience, those interested in science popularisation more generally
7	Is neuroscience being dumbed-down for the business world?	Stephen Fortune - consultant	Oxford Group (owned by City & Guilds)	Blog article based on conversation with Patricia Riddell, consultant with a neuroscience background. Criticism of reductive approach to neuroscience of many; dangers of oversimplification but which transitions into critique of other providers who 'hijack' neuroscience but without the expertise of someone like Riddell. Style, based on questions, suggests open and curious, but ultimately self-serving as seek to convince reader of their superiority in terms of (borrowed) expertise	Clients or potential clients of Oxford Group
8	How neuroscience can help leaders	Ray Williams – coach	business.com – business to business website providing resources and advising on business growth	Feature article providing advice for leaders in bringing about organisational change. Style is pseudo academic as he cites wide range of 'research' (not all relevant, most not neuroscience) including from PWC, HBR and strategy+business articles and NLI, as well as peer reviewed articles to argue that traditional approaches to change fail. Tone aims for assertive and advisory, but content engenders confusion	General business audience, readers of business.com resources
9	Why neuroscience should change the way we work	Louise Altman – coach, trainer	Intentional workplace	Blog article which enthuses about the potential of neuroscience and condemns old management approaches. Quotes Rock and other NLI associates as revealing	Narrow website readership, likely

Article Number	Title	Author	Organisation or publication	Composition and connections	Audience
				fundamental new facts and evidence, but lacks precision, misspelling names, not linking to specific research (despite claims to do so) and providing confused account	mainly existing or potential clients
10	Beyond Brain Basics: 5 Neuroscience Lessons for Leaders	Not specified – but further search identifies author as Andy Nelson, content writer at Hppy	GetHppy – HR & employee engagement community which welcomes contributors & allows them to cross-promote their content targeting HR community	Listicle as part of neuroscience series. Purports to teach readers 5 lessons. Positions neuroscience as complex, but is overly simplistic. Science is alluded to but unusually uses no citations or connections to any other material or expert. Structures lessons as evidence followed by implications. Inconsistent use of technical terminology. Author positioned as teacher to readers, as engaged learners.	HR community Managers and leaders
11	Neuroscience and leadership	Not specified	Centre for creative leadership (CCL) – consulting group	Bullet pointed overview of ongoing research project, including developments in application of neuroscience for leaders. Positioned as information for those interested in how it can accelerate leadership development. Identifies lead researchers, encourages collaboration, positions CCL as taking an objective, scientific approach, disparages traditional, assumes leaders have untapped potential. No citations.	Organisational representatives,
12	Neuroscience for Leadership	Not specified	Leadership Development Ltd (LDL)	Information on training course run by Dr Bigdeli positioned as a PhD neuroscientist, who actually is a member of NLI with a PhD in the neuroscience of leadership and organisational development. Course promises exciting and latest science, providing competitive edge that can be immediately applied, albeit in a vague way	Potential clients
13	The neuroscience of leadership	David Rock – coach and consultant, founder of the NeuroLeadership Institute (NLI)	Psychology Today – US publication focussed on psychology and human behaviour	Blog post from regular contributor, informally written to persuade readers that neuroscience fills the knowledge gap left by previous approaches to understanding leadership. Draws heavily on 'research', prioritising NLI associated researchers and anonymising others, as evidence for his claims, implies that SCARF is based on studies. Tone and structure are authoritative	General audience of those interested in psychological and behavioural science, not directed oriented to a business readership

Article Number	Title	Author	Organisation or publication	Composition and connections	Audience
14	The neuroscience of strategic leadership	Art Kleiner – journalist Josie Thomson – coach Jeffrey Schwartz – neuroscientist	Strategy+Business - business magazine focusing on strategy and management owned by PWC	Feature article with an intention to make neuroscience relevant to business readers, use of example to illustrate practical application of mindfulness, supported by underlying brain-based explanation. Lengthy, detailed and thorough including reference list and acknowledgement of need for caution. Rational explanations. 3rd author is co-founder of NLI, 2nd author trained at NLI.	Decision makers in businesses and organisations More than 1m weekly readership
15	The Neuroscience of Trust	Paul Zak – consultant and academic (psychology & economics)	Harvard Business Review – general management magazine providing ideas and advice for leaders	Lengthy feature article positioning oxytocin, a neurochemical, as a correlate of trust in organisations, and in turn trust as a correlate of performance. Structured to build the case for oxytocin then trust, followed by advice - 8 behaviours to foster trust. Author set up as expert & knowledgeable, with track record of experimental work, use of technical terminology, tone is energetic, style is logical & rational – evidence supports argument, cause & effect, 'return on trust'. Authored peer review papers in neuroeconomics	Professional and executive interested in general management topics
16	How organizational cognitive neuroscience can deepen understanding of managerial decision making	Michael Butler – academic (business) Holly O'Broin – academic (business) Nick Lee – academic (business) Carl Senior – academic (life sciences)	International journal of management reviews – academic journal	Scholarly paper in peer reviewed journal, suggests practice is running ahead of academic & there is a role for cognitive neuroscience. Reviews empirical evidence, concludes neuroscience is helpful, seeks to persuade peers that this is the case	Peers – primarily business school academics, not experts in neuroscience
17	Neuroscience and organisational values	Jan Hills – consultant & coach	Head Heart Brain	Long blog or feature article which adopts a pseudo-scientific style, using citations (albeit inaccurately), summarising research, using terminology to demonstrate specialist knowledge. Not wholly coherent in argument about values and neuroscience, but instead wordy, confused, vague and repetitive. Deferential toward scientific research but use to warrant claims is	Existing and potential clients

Article Number	Title	Author	Organisation or publication	Composition and connections	Audience
				unconvincing. Endeavours to be directive but imprecision renders it tedious. The author has an NLI qualification	
18	Q&A with IBM's Gary Kildare: Neuroscience, employee co-creation	Rachel Montgomery-Young	HRD Connect – organisers of HR summit	Structured in a question and answer (Q&A) format with a senior HR professional, positioning him as high status on the HRD speaking roster as busy professional, with full HR agenda. Neuroscience headline of 3rd 'Q' belies lack of neuroscience content, which instead comprises growth mindset. Showcases IBM HR	HR professionals
19	The impact of organisational change on the brain	Hilary Scarlett – consultant & coach	HR Zone – online resource for HR and business leaders	Feature article positioning insights from neuroscience as informing organisational change. Repetition of central terms such as the brain and (un)certainty & the effects of the latter on the former. Single & unlikely citation from journal article concerning Huntingdon's disease. Attempt to offer direction through 3 things to do (only lists 2). Author has NLI qualification, and collaborated with UCL based neuroscientist	Business leaders and HR professionals
20	Is organisational neuroscience on your radar	Trent Rosen – consultant	LinkedIn Pulse – online news aggregation feed for members to share self-published content with target audience	Blog post on LinkedIn, building the case for relevance of neuroscience before promoting a briefing event for (potential) clients. The author endeavours to set out a problem for which neuroscience is the answer, although long and confused sentences suggesting confusion. Further, the author plagiarises from another in this sample. Neuroscience seems primarily to offer a commercial opportunity for the author/organisation, with evidence of limited understanding on his part.	Initially LinkedIn contacts plus organisational followers

HR = human resources. L&D = learning and development