

DProf thesis

Guts, brains, complexity and creativity: immersive living and learning through the critical lens of first-person inquiry
Toribio-Mateas, M.

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Guts, Brains, Complexity and Creativity: Immersive Living and Learning Through the Critical Lens of First-Person Inquiry

*A project submitted to Middlesex University in partial fulfilment of the
requirements for the degree of Doctor of Professional Studies
(Gut Microbiome & Mental Health)*

Miguel Angel Toribio-Mateas BSc (Hons) MSc
M00606726

School of Health and Education, Middlesex University
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**To my mum and dad Encarna and Ezequiel,
and to my sister Pepa, for always encouraging me to believe in
myself. And to my husband Steve for being my rock.**

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Abstract

I am a transdisciplinary practitioner who is deeply engaged in multiple professional fronts, driving the production of scientific and practice-based knowledge in the emerging field of the microbiome-gut-brain axis, also referred to as “microbiome, mental and gut health” whilst being embedded in projects spanning the subject disciplines of clinical, applied, affective, and cognitive neurosciences, applied microbiology, health informatics, food science and technology, and human nutrition.

When I started my professional doctorate I was deep-rooted in a positivist worldview that was preventing me from flourishing as the professional I am today. I found myself in a state of oscillating liminality, torn between the perceived need for disembodied objectivity – demanded from me by academic and work peers – and an intense craving for exploring my innate creativity as an individual, acknowledging that reality isn’t single, tangible and fragmentable, but multiple, constructed, and holistic, and that we co-create it as we live / experience it.

This thesis aims to illustrate my process of becoming a transdisciplinary practitioner with heightened awareness of the complex processes of interpretation, reflection, and action I engage in as part of my professional practice. In order to achieve that objective, I take a researcher-as-bricoleur stance, assembling a methodological framework that draws from constructivism, phenomenology, learning and social feminist theory, action research, systems thinking, complexity science, and even Japanese folklore. I use examples based on professional roles, work activities, and research projects as vehicles of inquiry that I look at them through the critical lens of first-person action research. I embrace radical creativity

and “heartful autoethnography” and storytelling as devices to help reveal diffractive patterns in my behaviour with the purpose of facilitating both personal and professional transformation, featuring unique angles such a neurodiverse perspective as a factor contributing to quality in taking an attitude of inquiry.

The methodological lens and the narrative inquiry about my becoming a transdisciplinary practitioner who embodies the coexistence of the dissimilar represent my contribution to knowledge and to practice. Key outcomes of my research include a significant advance in my aptitude to theorise the processes that underlie my professional practice, coupled with my development of superior skills to verbalise them eloquently, even in novel situations where the vocabulary available to describe them is still nascent. Ultimately, the most significant result of my thesis action research project is a substantial improvement in my ability to transform my practice, brought about by my immersion in a body of literature that provided room for creative and innovative ideas grow, and for new values to emerge. A clear example with high impact potential is my development a refined creative edge in presentational knowledge that has already enabled me to translate complex scientific concepts into practical applications with use in real-world settings, thereby democratising access to it by a larger, more diverse audience.

Foreword

“It is the tension between creativity and skepticism that has produced the stunning and unexpected findings of science.”

Carl Sagan in “Broca's brain: Reflections on the romance of science” (1979, p. 169)

Being a self-confessed nipponophile, I often look to Japanese culture for inspiration in all sorts of facets of my life. The concept of *Mā* (間), meaning “empty space and/or time”, has been of particular interest to me for years. According to Japanese linguistic scholars *Mā* is equivalent to the Sanskrit words *shūnya* and *shūnyatā*, meaning “zero or nothing” and “nothingness”, respectively. And this is interesting because *Mā* is an essential part of the *modus operandi* in Japanese daily life, where it can be found as an omnipresent metaphor for the materialisation of potential events, representing the suspended time and space that connects objects, people and actions (Elias and Arantes, 2019, p. 127). There is *Mā* in the fluidity of the real world because situations are subject to continuous unpredictability and rapid change, and in the silence that fills the space between an ending and a new beginning.

This thesis is about new beginnings and about the collaborative functioning of systems that – sometimes gently, sometimes abruptly – give rise to emergent behaviours. Right from day one of my professional doctorate I knew I wouldn’t just “studying for a doctoral degree”. My choice of a professional doctorate (DProf) versus a traditional PhD was driven by the understanding that the level of criticality and analysis I would develop throughout the programme would enable me to engage with the “value-laden and political nature” of my own practice (Hynes, 2013, p. 54), and to draw from my scientific knowledge as much as from my “moral compass” (Kristjánsson, 2015, p. 302) in order to make decisions that affect me and those within, across and beyond my communities of practice. That much was clear to me right from the outset, but when I got the Santander Universities “Work Based Learning Award” for my research project proposal in 2016, I hadn’t anticipated the transformation that I was about to experience over the following 5 years of my life.

I was deep-rooted in a positivist worldview that was preventing me from flourishing as the practitioner I am today, but the lens through which I was looking at the world had managed to obscure its limitations. All I could think about was collecting data and analysing it using some sophisticated statistical methods that would allow for an “aha moment” to emerge. That moment never quite happened, at least not as I had expected, anyway. Meanwhile, I found myself being attracted to an inclusive, wide, and diverse body of literature that span across different schools of thought, including constructivism, phenomenology, learning and social feminist theory, action research, systems thinking, complexity science, and even Japanese folklore. I became completely immersed in books and papers where the authors shared their intersectional experiences of oppression. Their context was different to mine but identifying myself in their stories helped me broaden my awareness of the privilege and power dynamics of science, particularly the “hard sciences”, as I will elaborate upon later. In true ADHD fashion, I went about soaking up their teachings by hyperfocusing, one of the superpowers of attention deficit and hyperactivity disorder folk. Suddenly nothing *in the world* was more important than finishing *that* book by Donna Haraway, reading *that* paper by Varela, or learning about the Japanese concept of time.

Hyperfocus is strong characteristic of my own neurodivergence. When I enter that zone, I am absorbed into complete time blindness. There’s no time or space, just me and whatever my mind is laser focused on. Albeit annoying for those around me, hyperfocusing meant that I was able to devote myself completely to “reprogramming” the way I saw the world as a scientist, unlearning as I constructed a new lens for me to look through and learn again in a completely new way I hadn’t given much thought to before. Out of nowhere emerged that elusive “aha!” I so desperately had been seeking, making me realise that I probably hadn’t found for it before because I’d been looking for it in all the wrong places.

Suddenly, it all made sense. What I had done in the real world was great, and I was right to be proud of my professional achievements, but *they were not* my doctoral thesis.

I was my thesis, or rather, my transformation as a practitioner was, as was the lens through which I was seeing the world and that had facilitated the radical change in me and my practice.

I wanted to share that realisation within the first couple of pages of my thesis because I believe it is a key consideration that will enable you to better understand my work. It ties in beautifully with the differentiation between the core and the thesis projects as two distinct but complementary pieces contributing to demonstrating my doctorateness, as discussed by Coghlan et al (2019) building on the original work by Zuber-Skerrit and Perry (2002) . The authors differentiate between core action research, which they describe as “collaborative, participatory action research in the field, aimed at practical improvement in a learning organisation”, and thesis action research, defined as “independent action research in preparing the thesis” that’s “aimed at making an original contribution to knowledge” (Zuber-Skerritt and Perry, 2002, p. 171). The reason why I believe this is an all-important reflection to underline is simple. Throughout this thesis, and particularly in [chapter 3](#), I will be discussing a myriad of professional activities that I’ve either led or that I’ve been immersed in during my DProf. I see every one of them as essential building blocks that have made me the professional I am today. However, those activities are *not* my doctoral thesis. They are the core action research project. They represent examples of my planning, acting, observing, and reflecting on professional and organisational practices that have enabled me to learn and develop myself as a practitioner in a wide range of contexts. Most importantly, they are the

vehicles that have enabled me to delve into what it means to me to be a transdisciplinary practitioner. And that's what my thesis action research project is all about. It's about my journey of realisation that the original contribution to knowledge I had received an award for that was more aligned with a lab-based PhD project in the health sciences, whilst the professional landscape I share with you in [chapter 3](#) is deeply embedded in the real world, floating between, above and beyond specific subject disciplines. However, looking at the world through a different lens meant that I had shifted my focus to developing myself as a transdisciplinary practitioner, something that I couldn't have imagined as I started my DProf. That's when it became clear to me that I'd be developing along two different paths – represented by the core and the thesis projects – that cross as often as they depart from each other. The outcome of those self-deliberations was my “taking a chance” and going on to write my thesis as **first-person practitioner inquiry**. I do that using the newly acquired language I learnt by engaging with the [key ideas and big voices](#) I'll discuss in chapter 3 to describe what it means to me to flourish as someone whose professional situatedness spans across disciplines.

So why the long discussions about my professional activities? That is a great question! The professional contexts I had been immersed in throughout my DProf had afforded incredibly rare opportunities to drive the production of scientific, practice-based knowledge, from its conceptualisation to its translation and dissemination in real world settings. From roles in gut microbiome biotechnology to clinical practice in psychiatry-led teams dealing with addiction and mental health patients and new product development consulting in the nutraceutical industry, the diversity of my professional landscape has provided me with a fertile ground for enhancing my technical expertise in subject disciplines I've simultaneously *drawn knowledge from* and *created knowledge in* as part of my daily work activities. **These disciplines**

include clinical, applied, affective, and cognitive neurosciences, applied microbiology, health informatics, food science and technology, and human nutrition, with an added layer of business acumen and entrepreneurship. Just like *Mā* is the time-space that enables the coexistence of the dissimilar, I felt that reflecting on those activities as I carried them out was the perfect complement to my first-person inquiry.

It was that reflection that helped navigate across multiple fields, thereby allowing me to develop the ability to harness uncertainty by imaginatively exploring it “in all its details and nuances” (Shotter and Tsoukas, 2014, p. 240), i.e., making sense of the world in a way that works for me and my practice. Inspired by *Mā*, my reflection on that practical contact with reality outside of the lab is that all aspects involved in knowledge creation are as much science as they are art, and that my creative entrepreneurial attitude to work-based research has been the golden thread that’s enabled me to find value at the intersections of different branches of knowledge, where dissimilarities coexist, waiting to be explored by a curious practitioner with an open mind. Therefore, I hope this introduction provides some context to illustrate the recurrence of complexity, creativity and innovation as concepts that will surface throughout my doctoral thesis. I posit that these soft skills are essential for professionals who, like myself, have a pressing need to manage real world problems that are seldom as clear cut as they might be in a textbook.

Further, I have written my thesis in the first person as a means to explore and express my unique personal narratives *explicitly* whilst engaging with the cathartic process I have experienced throughout my DProf, breaking away from the conventional separation between the *researcher* and the *researched* (Bochner, 2012) that I just took for read 5 years ago and that makes me feel rather uncomfortable now. There is ample evidence that the writing style I’ve

used throughout the thesis project can help heal from physical and emotional pain (Hovey et al., 2018, Mason et al., 2019, Muneeb et al., 2017), both of which I have had my fair share of during the last 5 years. 2019 and 2020 were dark years in my life for a number of reasons. Allowing myself “to write from the heart” (Pitard, 2019, p. 1830) means that I have shared the frustrations of travelling across murky territory and how that made me feel. I do admit to my tendency to ruminate in some of my writing, and to focus on negative events and emotions, their occurrence, causes, and consequences (Gidron, 2013, p. 1694). However, I believe that I have been able to balance out my preoccupation with the negatives with plenty of positive pondering and joyful “eureka” moments that permeate throughout my narrative.

But I didn’t just want to tell a story. I wanted to draw valuable insights from my lived experience, using the knowledge I have “*become with*” (Haraway, 2008, p. 4) through multiple cycles of iterative interplay between action and reflection in order to answer a fundamental “research question”: **how can I become more aware of the complex processes of interpretation, reflection and action I engage in as part of my professional practice so that I am able to theorise them, verbalise them, and, ultimately, transform them?**

It is worth noting that this research question is situated within the context of my being a transdisciplinary practitioner in the emerging field of the microbiome-gut-brain axis, applying scientific knowledge on the human gut microbiome and mental health in real-world settings.

So how is the Japanese concept of *Mā* likely to enable me to answer my research question, you may be wondering? It's a fair question that I hope to answer before the end of this foreword. In a recent paper about artistic creation and next generation computing, phenomenologist Tetsuya Kono describes *Mā* as “a phenomenon which cannot be well seized by dualistic conceptualisation of object and subject” because it is “the empty time–space that produces an event and rhythms” (Kono, 2019, p. 260). The Japanese philosopher writes about how “rhythm is not only found in sounds”, but also in diverse sort of phenomena such as the transition from day to night and from one season to the next, the movement of the sun, moon and stars, the tides and waves of the sea, the change in the direction of the wind, the growth of fruits and vegetables, the rhythm in colours, lines and patterns, the rhythms of the body, e.g. heartbeats and breathing, “the rhythm in a poem, and so on” (Kono, 2019, p. 259). Kono – whose research interests lie in philosophy of the mind and theoretical psychology as well in phenomenology – goes on to remind us of the fact that “rhythm is never a repetition of the same” (Kono, 2019, p. 247). but a return of the similar in a renewed form. Rhythm is thus a phenomenon of temporalisation which introduces a future event, “making the present in the process of having been” (Kono, 2019, p. 250).

Mā is like a boundary zone in which meaning is constructed and reconstructed (Valsiner, 2002). According to Masayoshi Morioka, a Professor of Clinical Psychology at the Faculty of Developmental Science of Kobe University, *Mā* is an openness to uncertainty in living conversation, a meaning-generating space (Morioka, 2015). In contrast, Sanjoy Mazumdar, Professor of Architecture at University of California Irvine, describes *Mā* as “*negative space that allows creativity, reflection, and coexistence of dissimilar items with cultural meanings*”

in a way that “*its absence can be sensed*” (Mazumdar et al., 2020, p. 616).



Figure 1. *Mā* as a creation pathway

Brazilian performance artists Cristina Elias is seen here applying *Mā* as a creation pathway during one of her art installations, “Music Box” at Studio Stefania Miscetti. Rome (Elias, 2017).

Was improvisational violinist and author Stephen Nachmanovitch writing about *Mā* when he was telling us that “for art to appear, we have to disappear”? (Nachmanovitch, 1991, p. 75). In his book “Free Play: Improvisation in Life and Art”, Nachmanovitch wrote about how ideas take shape as a creative process where an amalgam of attention and inattention coexist, yielding something great out of sheer nothingness (Nachmanovitch, 1991). Whether that was his intention or not, it is clear that the concept of *Mā* as an enabler of the happy coexistence of the divergent, enthralls a wide range of professionals. They all describe it from their own vantage point, but a there is

one thing that really sticks out. Regardless of their walk of life, they are all referring to the same phenomenon in their own words: the living pause, the one impermanent point where time and space are suspended as a zone where endless rearrangement of possibilities is allowed to take place, never finished. Just like Donna Haraway describes knowing, “always constructed and stitched together imperfectly” (Haraway, 1988b, p. 586), always in progress but at ease with its own incompleteness. To me this is as fascinating as it is relevant to this thesis because I can sense *Mā* at the intersections of seemingly disparate knowledge domains and areas of expertise, as the gap between what I already know and what I haven’t yet had the chance to learn, as emptiness that fills itself with significance with every iteration of my being exposed to knowing and unknowing.

Fortunately, my 30-year-long professional life has provided me with a wealth of opportunities to reflect on how the boundaries that span multiple fields of study are *as important* as the actual fields themselves. Some refer to this lived experience as “know-how” (Braude, 2015, p. 3). I prefer to call it *phronesis*, a Greek word translated as “wisdom acquired from learning and experience of practical matters” (Lee, 2020, pp. 1-3). I believe that *phronesis* is at the heart of my practice as a transdisciplinary practitioner. It’s the kind of reflective and practical judgement that emerges out of a momentary pause so that I can make sense of world around me in the midst of a complex situation, acting like a sort of invisible glue that binds together the generation of knowledge in professional scientific practice (Kinsella, 2012, p. 112). I see *Mā* in that almost ethereal break between thought and action and in the translational bridge between research and practice that links science and its application to the real world.

Just like the space between the stepstones in a river crossing (Isozaki, 1979) or the pause between breaths used in meditation and yoga (Pilgrim, 1986) *Mā* balances the pace in the continuum that stretches across knowing and doing, as a “relational interplay of attractions and aversions” that resists “reduction to a common denominator, essential core, or generative first principle” (Jay, 1984, p.14).

In a paper entitled “In Search of Phronesis: Leadership and the Art of Judgment”, John Shotter and Haridimos Tsoukas of the London School of Economics and Political Science and Warwick Business School, respectively, wrote about how “phronesis inheres in the ability to allow for the fluid, indeterminate nature of the circumstances in which we must act, and to accept that, each time we act, we must, in a sense, start afresh” (Shotter and Tsoukas, 2014, p. 240). There is *Mā* in the fluidity of the real world because situations are subject to continuous unpredictability and rapid change. *Mā* is the silence that fills the space between an ending - sometimes gentle, sometimes abrupt - and a new beginning. Right from day one of my professional doctorate I knew I wouldn’t just “studying for a doctoral degree”.

Using practical examples from work projects, organisational problems and academic conundrums, I attempt to illustrate how myself and my research are intrinsically entangled, and how that relationship continues to shape each other through the process of inquiry (Lincoln and Guba, 1985, p. 37). I hope that the answers to my research questions will empower me to changes how I go about my practice, based on evidence that is contextually relevant to me. Additionally, I would hope these answers help me influence how other professionals in similar circumstances go about their own practice,

now and in the future.

Most significantly, researching across disciplines I was faced with the problem of choosing between what sociologist Stephen Cole calls “hard” and “soft sciences” (Cole, 1983) epistemological and methodological approaches. Problem solving in the real world “requires flexibility, resilience, resourcefulness, and a certain degree of creativity” (Sarathy, 2018, p. 1), so I adopted a “researcher-as-bricoleur” stance (Zipf, 2016, p. 60) to assemble a methodological framework that allows for quality assurance and rigour in my inquiry. I wanted to develop “practical as well as conceptual contributions by doing research *with*, rather than *on* people”, which is why I have borrowed heavily from the wide “family of approaches and practices” known as action research (Bradbury and Reason, 2003, p. 156) with the intention of revealing the transdisciplinary learning that lies at the intersections of ostensibly unrelated fields of knowledge.

My experience of a practice-based doctorate has been akin to that of looking through a zoetrope with a myriad of images in perpetual dynamic motion. Using this optical toy as my last metaphor for *Mā* in this section, I believe it is easy to obsess over what the most important element of the system might be. In the case this 19th century toy invention. Is it the cuts in the cylinder or the images within it that matter the most? If it is indeed the images, which one in particular? After a lifelong journey across entrepreneurship, research technology, knowledge management, nutritional medicine, microbiology and clinical neuroscience, my realisation is that without the cuts in the cylinder I wouldn’t be able to see the images at all, and that if any one image was missing, the harmonic flow in their movement would be broken.

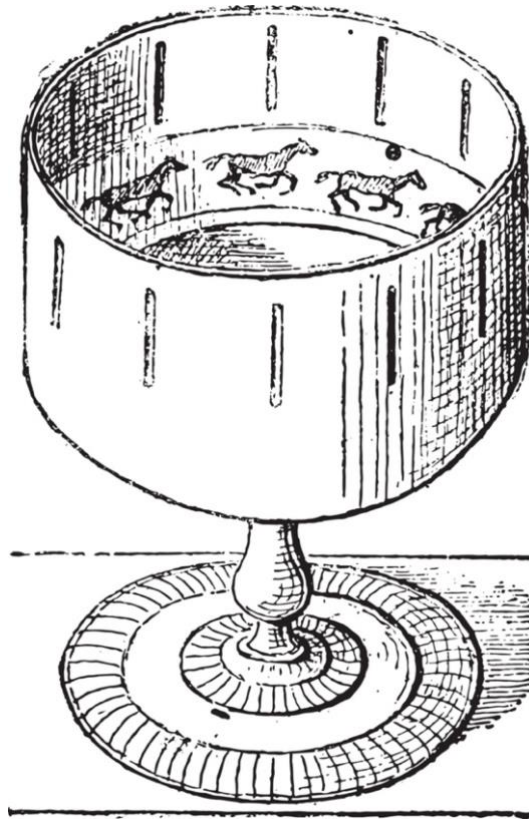


Figure 2. A zoetrope as a metaphor

A vintage illustration of a zoetrope producing the illusion of horses in motion. Image source: Adobe Stock.

In addition, just as the zoetrope needs an observer for its motion to be observed, as a practitioner-researcher I cannot separate myself from my research, which cannot be disembodied from my life. Being immersed in my research has required me to use a great deal of “imagination, creativity, listening and noticing” (Miller, 2020b, p. 149), amalgamating histories, traditions and expectations (Lotrecchiano and Misra, 2019) in order to adapt and to co-evolve along with the systems I’ve been trying to make sense of.

Ultimately, my aim at the start of this journey was to be find solutions to complex problems by creating innovative transdisciplinary knowledge that bridges the gaps between research and practice. Reflecting on the 5 years of my DProf journey, I can see even more clearly now that problems seldom occur in isolation. They are part of a system that's often entangled with other problems, people, and systems in the messy network of interrelationships that is the real world. The thesis you are about to read is my humble attempt at providing a critical account of my experience as a practitioner in an emerging field that sits above, beyond and between disciplines, bringing about new shared understanding that connects the dots between professional and academic realms whilst acknowledging the unpredictability characteristic of the systems I continue to be embedded in. The uniqueness of my approach lies in my using my professional activities as tools that have facilitated my taking an attitude of inquiry that was transformed by my DProf journey, blending “soft and hard” elements of research to come up with my own diffractive method of looking at the world, and doing so unapologetically. Ultimately, I would love for my work to inspire fellow practitioners who may wish to venture into similar transdisciplinary journeys of discovery, generating interest in new forms of knowledge creation within, across and beyond my communities of practice.

M.A. Toribio-Mateas

[Click to go back to the table of contents.¹](#)

¹ In order to help you navigate through this thesis more easily. I have included a link at the end of each chapter that enables you to navigate back to the table to contents.

Chapter 1. Setting the Scene

“To the individual who devotes their life to science, nothing can give more happiness than when the results immediately find practical application. There are not two sciences. There is science and the application of science, and these two are linked as the fruit is to the tree that has borne it.”

Louis Pasteur (Pasteur, 1872)

1.1. What's Chapter 1 about?

This chapter focuses on my engagement with the various theories of knowledge that have fertilised my blossoming into a transdisciplinary practitioner as an emergent property of my DProf. As I mentioned in the [foreword²](#), I have been immersed in a wide range of professional contexts throughout my DProf. To illustrate the diversity of my professional landscape, I have created a diagram that lists all my professional roles from September 2016 to June 2021. It is important to emphasise that the professional activities featured on this landscape are to be seen as vehicles for my first-person action research. Each of them is indeed part of the core action research project that has enabled me to delve into what it means to me to be a transdisciplinary practitioner and, whilst they are not to be seen as projects I am claiming academic credit on, they are to be seen as two sides of the same coin.

1.2. Transdisciplinary thinking

At risk of covering aspects beyond the scope of this thesis, I could have started my professional landscape timeline in 2010. This was the year I left my role as Senior Training and Research Manager for one of the world's leading scientific publishers (Wolters Kluwer Health, the owner of the OvidSP healthcare information system and the Lippincott Williams Wilkins journals) to open my own consultancy business. I had been wanting to fly the corporate nest for years to do “my own thing” but instead I decided to go back to university part time to widen my career options. I handed in my notice the very same day I finished my honours degree in Nutritional Medicine.

² These cross-links allow you to jump back to the relevant sections of this thesis. You will find those in blue font colour that is bold and underlined.

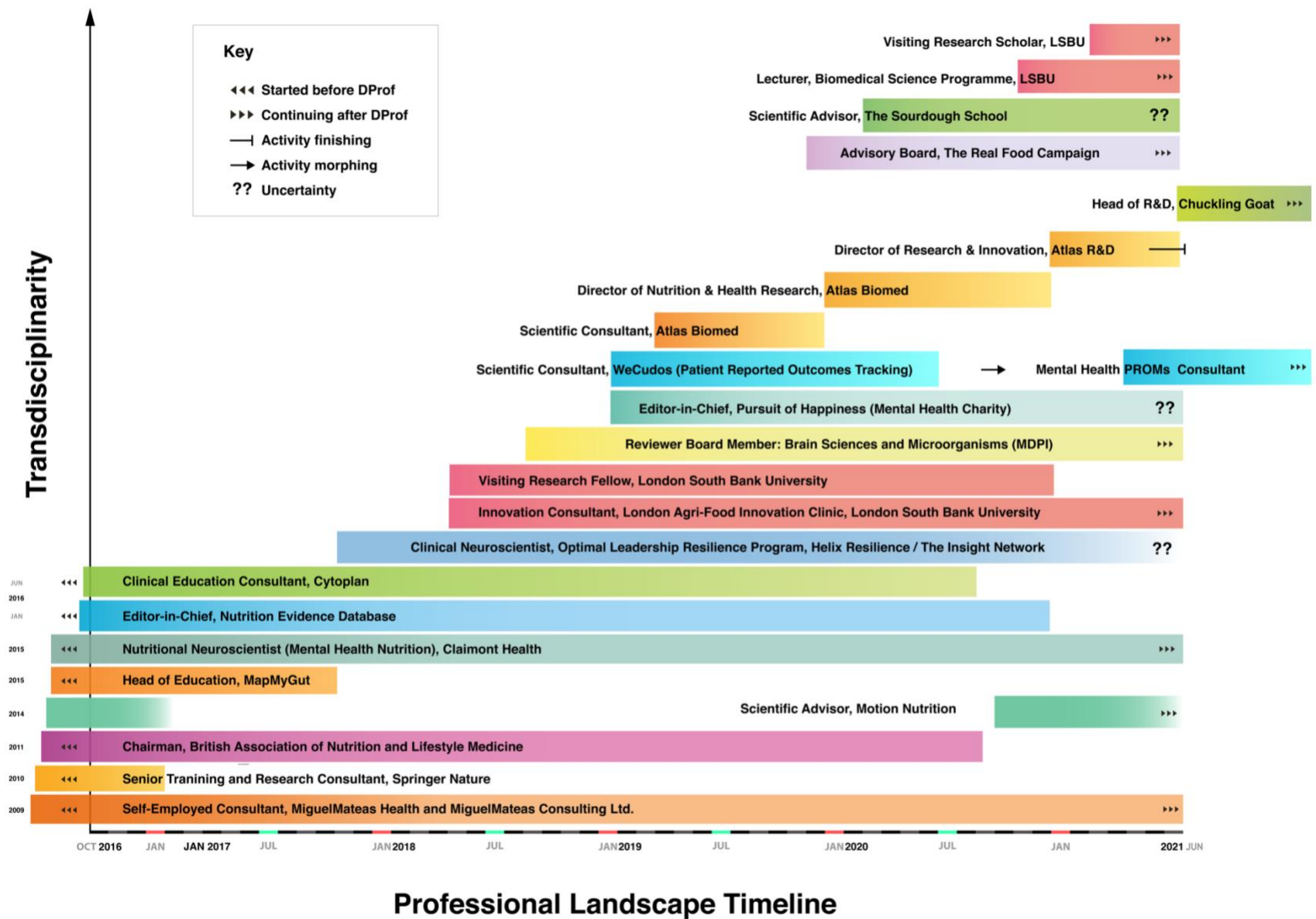


Figure 3. Professional landscape timeline

A timeline diagram illustrating the transdisciplinary nature of my professional activities throughout my DProf.

Reflecting on my entrepreneurial instinct and my integrative attitude towards work, learning, life, and inquiry, I believe that leaving my longstanding full time employment in health informatics was the turning point that enabled my transformation into a boundary spanning professional, learning as I co-create knowledge, products, and services across diverse professional and organisational boundaries. Fast forward to 2021, and after several more years of education – including thousands of hours of postgraduate continuing professional development and a master’s degree in clinical neuroscience – I embarked on my professional doctorate (DProf) journey.

However, what I wasn’t expecting was for the DProf to provide me with the ability to challenge my own self-understanding from day one, questioning my assumptions about the models of scientific practice I felt comfortable using, and embracing myself as a research instrument, co-constructing new relationships between theory and practice that carry “significant implications for positioning and critical reflexivity” (Burnard, 2016, p. 15). Until I started my DProf I was focused on tangible “research outputs” and was pretty obsessed with before and after clinical experiments that would lead to peer-reviewed publications and conference talks.

An essential part of the shift that was triggered by the transdisciplinary approach of the Middlesex DProf was to make me feel at ease with the fact that research practices are multiple, fluid, and adaptable. This rekindled my interest in methods of inquiry with a strong critical thinking and self-reflective component more typically used by social scientists than by those in the natural sciences. In the early 2000s I had studied “Systems Thinking and Practice” at the Open University and my reading materials

included books and articles by Lewin, Argyris, Torbert, Checkland and Holwell, to name but a few, so I wasn't new to this way of finding meaning in the world around us that systems practice is based upon. This was a long while back, but I still remember reading Peter Checkland's "Systems Thinking, Systems Practice" book (Checkland, 1999) several times from 2001 to 2003 and finding it absolutely fascinating. In this book Checkland – emeritus professor of systems at Lancaster University and one of the greatest British management scientists – discussed his "soft systems methodology", a method of inquiry where "the researcher enters a real-world situation and aims both to improve it and to acquire knowledge" whilst being part of it (Checkland and Holwell, 1998, p. 9), engendering "a process of on-going (cyclic), coherent, structured learning which feels natural, and which can surface previously unexamined assumptions, thus creating an arena in which accommodations can emerge which enable and motivate "action to improve" to be taken" (Checkland, 2000, p. 799). This made a lot of sense to me, but for about 15 years of my professional life I hadn't stopped to consider how inquiring into my engagement with the "value-laden and political nature" of my own practice (Hynes, 2013, p. 54) complemented my working and co-inquiring with others, co-creating knowledge with the potential to effect change beyond those directly involved in the process, and "knowing and learning as creative action" (Stoller, 2014, p. 55).

In action research literature, these three dimensions of research practice are referred to as *first*, *second* and *third person inquiry*, respectively (Gustavsen, 2001, Reason and Torbert, 2001, Varela and Shear, 1999a, Whitmore and Mckee, 2001). I will come back to those very shortly, but before I do that, I would like to tap into Reason and Bradbury's theories of how these three modes of inquiry integrate as part of a "participatory,

democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview” (Reason and Bradbury, 2001, p. 1). In their landmark “Handbook of Action Research”, the authors emphasise the connection between action and reflection, theory and practice, in participation with others, and the nature of inquiry carried out “in the pursuit of practical solutions to issues of pressing concern to people”, “growing out of a concern for the flourishing of individual persons and their communities” (Bagger-Sjöbäck et al., 2015, p. 1) and providing an opportunity for revitalising the purpose and practice of scientific research. They also state that “first person inquiry is the foundation for all good action research” and that they see second person inquiry as “the arena where the most energy and practical opportunity for really impacting practice occurs” (Bradbury and Reason, 2003, p. 169). Bradbury and Reason finally acknowledge the value of third person inquiry, for it “affects the conditions which ultimately shape the future context” in which first and second person inquiry can take place (Bradbury and Reason, 2003, p. 169). In my own experience, the boundaries between these modes are fuzzy because I have taken an attitude to personal and professional development that wholly embraces inquiry as a life process beyond self-reflective practice. Despite my natural affinity for this approach, it has taken years for me to feel comfortable seeing myself as an action researcher, and even longer to accept first person inquiry as a valid method of inquiry, as I discuss further in upcoming chapters.

For a lot of my professional life, I believed that when I was looking within, I was “just reflecting”, i.e. I wasn’t really “doing inquiry”. How could I be “doing neuroscience research” (or microbiology, mental health, or nutrition research, for that matter) whilst

focusing on my beliefs, values, and assumptions as a practitioner? I continued to be conflicted by this argument for a long time during my DProf, well into the fourth iteration of my thesis writing process. I found myself “entering liminal states, experiencing ontological insecurity and oscillation (Land and Meyer, 2011, p. 102) where I swung like a pendulum fluctuating between the two ends of a spectrum, both with a strong gravitational pull, but for different reasons. I wrote pages and pages only to bin them once I reviewed them, then to retrieve them from the bin and use some of the arguments, refining them and critiquing them as I went along.

At one end of that oscillatory liminality I referred to above there was classical positivism, based on premises such as:

1. “the only true or positive knowledge is knowledge based on observed facts gained through scientific investigation” (Nelson, 2014, p. 1437),
2. “everything is subject to natural laws that are a temporal and invariable” (Faulconer and Williams, 1985), and
3. introspection is rejected as a non-valid method “concerned with nonmaterial mental and psychological phenomena”, the basic tenet of mechanistic naturalism (Nelson, 2014, p. 1438).

At the other end of the spectrum, there was a constructivist epistemological approach that I felt a natural affinity with, where:

1. knowledge is actively construed, and reality is not independent of who observes it, interprets it, and experiences it, i.e. “what we consider reality corresponds with our experience and, consequently, with our knowledge of it” (Giliberto, 2014, p. 311) or, in other words,
2. “what we call “knowledge” is something that a creature cannot find precast, but a construction specified by the internal knowing structure of the same organism (Von Foerster, 2003), and
3. facts (not knowledge) emerge as significant from our experience and are the product of our constructive activity (Glaserfeld, 1989) as the focus shifts from observing as a tool for knowing to “knowing how we know” (Maturana and Varela, 1987, pp. 17-32).

1.3. Coexistence of the dissimilar

I was torn between the perceived need for disembodied objectivity – demanded from me by academic and work peers – and an intense craving for exploring my innate creativity as an individual, acknowledging that “reality is always someone’s reality, constructed in and through particular intentions and interests, and from particular locations on multiple networks of power relations” (Ellsworth, 1997, p. 179), i.e. reality is situated because it is intrinsically linked with my own situatedness. But was this division really such a bad thing? Just as *Mā* enables the coexistence of the dissimilar, harmoniously incorporating polar opposites as a vessel containing a mix of oil and water, why couldn’t I embrace being split rather than torn? In Donna Haraway’s words, “the split and contradictory self is the one who can interrogate positionings and be accountable, the one who can construct and join rational conversations and fantastic imaginings that change history” (Haraway, 1988b, p. 586). And that’s exactly what I wanted to do. I wanted to bring about change that went beyond personal growth and translate it into making a difference for those around me in the real world.

By the end of the third year of my DProf I recognised that knowing as an emergent property of my own experience (Stoller, 2014, p. 56) and it was clear to me that the kowtowing to technocratic rationality I had done for years in my previous academic past wasn’t something I wanted to engage with for the rest of my life as a practitioner-scholar. Instead, I wanted to gain a better understanding of myself and my peers, not with the purpose of changing each other’s mind, but aiming to enter a dialogue that “might lead to transformation” (Ryan and Natalie, 2001, p. 78). In this context, splitting

is “about heterogeneous multiplicities that are simultaneously salient and incapable of being squashed into isomorphic slots or cumulative lists” because “the knowing self is partial in all its guises, never finished... is always constructed and stitched together imperfectly, and therefore able to join with another, to see together without claiming to be another” (Haraway, 1988b, p. 586). And “the known”, aside from also being partial, can often be contradictory and irreducible in a way that we can’t make sense of easily (Ellsworth, 1989).

In her book “Sister outsider” Black American poet Audre Lorde wrote about the complexities of intersectional identity, challenging racism, classism, homophobia, and ageism. “Difference is that raw and powerful connection from which our personal power is forged” writes Lorde, who discusses the how differences are often seen as “causes for separation and suspicion” (Lorde, 1984, p. 112), whereas they should be considered as a strength, as a force for change. Reacquainting myself with systems practice literature and discovering social feminist epistemology made me reconsider the way I approach my research. I have learned that my inquiry is non-binary because it takes place in the real world, which is complex, non-conforming and doesn’t lend itself to being observed through the lens of a microscope because, even with changing the levels of magnification, the outcome is always a reduction which misses out the observer and their situatedness within that reality, always evolving like a knot in motion (Haraway, 2008, p. vii).

I explore these and other complexities of the real world in [chapter 2: Real World Problems](#). For this particular chapter I travel to a time just preceding my enrolment at Middlesex to build a cohesive storyline by reflecting on past events and their relationship with the present and the future. Looking into events that took place immediately before starting my DProf provides context to where and who I am today and enables me to “re-author the future in the mirror of the past” (Peters and Thier, 2019, p. 121) in following sections.

Implementing self-reflective practice as a key component of my *modus operandi* is perhaps the most significant change resulting from my DProf experience. However, without going as far as to share Haraway’s concerns about reflection creating a reproduction of the same that’s linked with Western patriarchal narratives (Haraway, 1992, p. 300), I have to admit to have wondered whether I was “missing the point” by making *me and my practice* the focus of my inquiry. What allowed me to resolve this inner conflict was my awareness of how all entities involved in my research are interconnected, mutually shaping each other through the process of inquiry, triggering change in me (the researcher) as well as in those “being researched” (Lincoln and Guba, 1985, p. 37). On that basis, I do agree with feminist philosophers of science like Barad (Barad, 2010) and Kirby (Kirby, 2011) that reflection as a metaphor for inquiry might not fully acknowledge “substantive entity that emerges from the enfolding” of a reality that is entangled with nature and culture (Dixon-Román, 2016, p. 157). Reality is filled with multiplicities requiring me - a practitioner-researcher embedded in multiple professional activities - to be acutely attuned to “thinking the unstable and

heterogeneous structuring of everyday life with flexible arrangements of conceptual grip and creative association” so that I am able to “unpick the structures, dynamics and ruptures that ultimately make up the social” (Dewsbury, 2011, p. 149). Deleuze and Guattari refer to this fluid combination made up of a myriad of “imaginative, contingent articulations” (Slack and Wise, 2014, p. 156) as an *assemblage*, “an increase in the dimensions of a multiplicity that necessarily changes in nature as it expands its connections” (Deleuze and Guattari, 1987b, p. 8).

I have soaked up all of these influences, adopting a “researcher-as-bricoleur” stance (Zipf, 2016, p. 60) to assemble a critical, non-confirming lens through which to look at the real world. If this lens had been manufactured in a hi-tech factory, it would come with multiple ways of knowing “enabled by default”. It’s a tool that allows me to express myself by drawing from a heterogeneous epistemological repertoire curated as the kind of “intellectual bricolage” characteristic of Lévi-Strauss’ (Lévi-Strauss, 1966, pp. 16-17) or indeed as an example of John Heron’s “extended epistemology” (Heron, 1996, p. 52). Ultimately, this diffractive lens is a tool that enables “the generative, creative role of the human mind in all forms of knowing” with “epistemological validity that is not inherently connected with objectivism or power” (Heron, 1996, p. 158). **I delve into all aspects related to the theory of knowledge in relation to my practice in [chapter 3](#), which I entitled “Professional Knowledge Landscape”.**

1.4. The rhythm of renewal

Barad refers to assemblage as diffraction, a collection of patterns of repetition that are fuzzy and indeterminate because what is being repeated isn't a reflection of the same, but new entities that are assembled as different waves interfere and are superimposed (De Freitas, 2016, p. 7). There's an element of rhythm in diffraction which I find rather interesting because both Haraway (Haraway, 1997, pp. 268-274) and Barad (Barad, 2007, p. 73-94) consider diffraction as an alternative methodological stance to critical reflection, and thinking about this from the *Mā* angle I explored earlier, I can really understand what Kono meant when he wrote that "rhythm is never a repetition of the same but a return of the similar in a renewed form" (Kono, 2019), just as a diffracted wave is defined as "one whose wave front has been changed in direction by an obstacle other than by reflection" (2009a), i.e. splitting in a multiplicity of directions, all with different meanings, all happening at the same time, thus "making the present in the process of having been" (Kono, 2019).

Hillevi Lenz Taguchi – a Professor of Transdisciplinary Studies in Communication and Learning-Brain-Practice at Stockholm University – believes that thinking diffractively has the ability to "make visible new kinds of material-discursive realities" with potentially "transformative and political consequences" (Taguchi, 2012, p. 265). Quoting Karen Barad, when we think diffractively "we engage in a process of co-constitution, investigating the entanglement of ideas and other materialities in ways that reflexive methodologies do not" (Barad, 2007, p. 74). Applying this to my practice, the multiplicity of knowledges that are entangled in my brain are, in Elizabeth Ellworth's

words, often contradictory, partial, and irreducible (Ellsworth, 1989). They have been incorporated into my grey matter by means of multiple ways of knowing. For that reason, I myself prefer to think of diffraction as an opportunity for integration rather than as a substitute for my reflexive method of inquiry. Just like Lorde, “my fullest concentration of energy is available to me only when I integrate all the parts of who I am, openly, allowing power from particular sources of my living to flow back and forth freely through all my different selves, without the restrictions of externally imposed definition. Only then can I bring myself and my energies as a whole to the service of those struggles which I embrace as part of my living” (Lorde, 1984, pp. 120-121).

Throughout my DProf I have done a lot of “taking one step forward and two steps backward”. A lot of iteration. A lot of repetition. As a living example, this is the 10th version of this introduction chapter. I have attempted to engage with my practitioner inquiry using a diffractive lens *as a counterpoint* to my self-reflective practice because diffraction doesn’t just “bring the reality of entanglements to light, it is itself an entangled phenomenon” (Barad, 2007, p. 73). Having experienced my own struggles being pulled in different directions, and having had to make decisions in order to make sense of my practice and the world around it, I have realised that, like Lorde, only when I do what I do best, i.e., being creative and “in the moment” without worrying about methodological labels, do I “become with” my research (Haraway, 2008, p. 4). In the words of Judi Marshall, I have learned to respect “how inquiring is a core of my being and that my full being is involved in any “researching” I undertake” (Marshall, 2001a, p. 438). In fact, it was only by “living my life as inquiry” (Marshall, 1999b) that I experienced “the serenity that comes when heart, will, and mind are on the same page”

(Ribera and Ceja, 2018, p. 91) that Mihaly Csikszentmihalyi calls *flow* (Csikszentmihalyi, 1975). I like to believe that I've gone about my research in ways that would make Judi Marshall proud because, in her own words, "I have not distinguished readily between "research" and the rest of my life, experimenting with the translation processes between the two, with how they are interwoven and inform each other" (Marshall, 2016, p. xvi), using creativity as a tool to weave in hard scientific evidence and lived experience as if they were seamlessly bound, much like the two sides of a coin; "contrary, complementary, but perhaps also interdependent" (Carroll, 2013, p. 1).

In the course of *becoming* a practitioner whose situatedness flows across diverse professional and organisational boundaries, I have learned to trust my own ability to navigate not just uncharted, but unpredictable waters, being forced to act autonomously and creatively in order to remain agile and able to "respond flexibly to emerging patterns and opportunities as they arise" (Plsek and Greenhalgh, 2001b, p. 628). These navigational skills have developed over time as a result of lifelong learning, reflection and practice, fitting almost perfectly the definition of the Greek word *artios* (Worrall, 2019), from which the English word *art* originates. Engaging in iterative cycles of action and reflection with myself and with others have been essential parts of that navigation, as has the dissemination of my work beyond those who are directly involved in it, i.e. in publications and public speaking engagements, thereby contributing to the co-creation of communities of practice and inquiry (Coghlan et al., 2019).

I have adopted a pluralist methodological approach that recognises multiple ways of knowing. That includes making most of the figures in this thesis, which I like to see as metaphors of aesthetic creation” that help me share my experiential knowing of the world by turning it into presentational knowledge (Heron and Reason, 1997, pp. 280-281).

I have also created a companion website to this thesis with the purpose of hosting the research papers, chapters, and other creative outputs such as videos, blogs, or podcasts that I mentioned in this chapter and henceforth. The design is all mine and I’ve built it from scratch, i.e., built it and coded it all myself. I could have added further resources in an appendix, but I came up with the idea of the website early in my thesis-writing process as an outlet for my creativity, and as a means to engage in self-reflection by entwining presentational, experiential, practical and propositional ways of knowing, as per Heron & Reason’s insights from “A Participatory Inquiry Paradigm” (Heron and Reason, 1997).

In parallel to these first, second and third person modes of inquiry there have been two dynamic framings that Marshall describes as “inner and outer arcs of attention” (Marshall, 2001b, p. 433-434). **These are some of the key components of my methodology, which I discuss in detail in [chapter 4: Methodological Framework](#), and that I’ve attempted to capture in figure 4 below.**

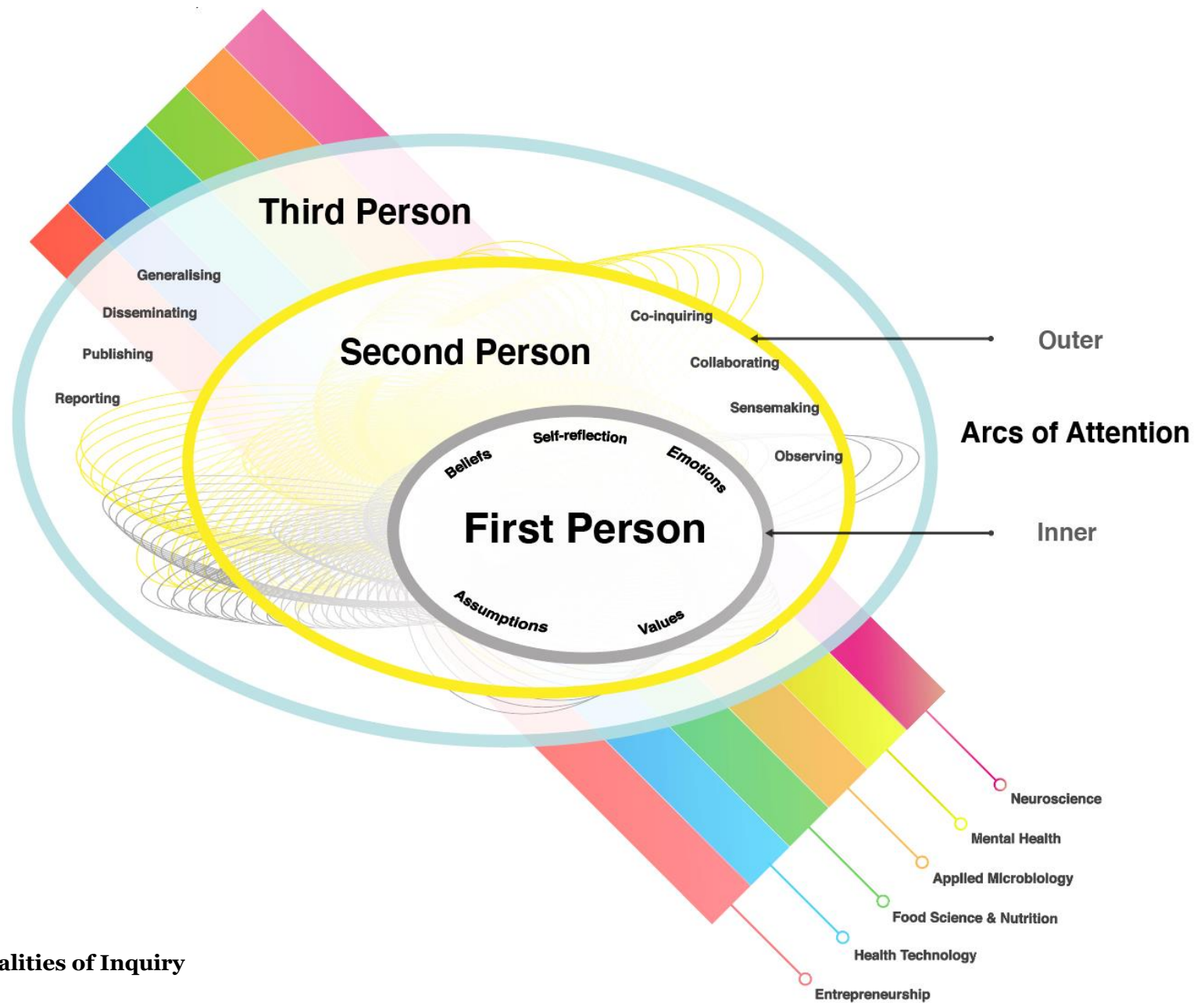


Figure 4. Modalities of Inquiry

An attempt at capturing the different modalities of inquiry
I've drawn from as part of my methodological framework.

I have called my companion website “**The Creative Scientist**”, a nickname that quite a few people know me by, so much so that I decided to trademark it last year. The URL is <https://thecreativescientist.co> and the site is password protected, so you will need to type **thesis2021** when prompted. Please note that the password is case sensitive. From the home page, please feel free to read the introduction, where I share some projects that I am really proud of, or use the menu to navigate to <https://thecreativescientist.co/creations> where you’ll be able to browse by chapter and find a range of interactive supplementary materials.

1.5.A fertile landscape

The bulk of my lifelong learning experience has been exceptionally rewarding despite the challenges posed by the blurred lines between my study, my work, my research and my personal life, separated only by the kind of distance that has “*the power or tension*” to split one domain from another whilst holding and entangling them together, another quality of *Mā* according to Kono (2019). Having been a freelancer for the last 12 years I’ve learned to accept the ephemerality and uncertainty of my work. Some contracts last longer than other. Some are easy, and some are politically charged. The main issue for me is that different work strands are frequently intertwined and exhibit co-dependencies. A perfect example is my work at Atlas Biomed and my academic position at London South Bank University (LSBU). My ability to carry out microbiome research

with human participants as part of my Atlas role as Director of Research and Innovation is almost entirely dependent on obtaining ethical approval for these projects through the School of Applied Sciences Ethics Committee (SASEC).

My link with the SASEC is based on my part-personal, part-professional relationship with one key agent, an academic at LSBU whose ideas about research have evolved radically over the last 3 years. The person I am referring to is completing her PhD and has been pushed hard to engage with quantitative research methods to generate huge amounts of numerical data to substantiate her research findings.

The result is that she has grown increasingly positivist in her approach as I have grown a closer affinity to constructivism, so we often clash about matters such as the value of qualitative data, or whether a study really needs to be double-blind, and placebo controlled. But even in the face of adversity, I've been able to find some pearls of wisdom. As a matter of fact, learning how to navigate complicated circumstances like these has empowered me to develop a more mindful, inquiring approach to my own life and to conduct my practice in ways that are "informed, aware and purposeful" (Coghlan, 2007). **I discuss this and other aspects that illustrate the entangled multiple professional fronts I've engaged with throughout my DProf in [chapter 3](#) Professional Knowledge Landscape chapter, and in [chapter 5: Stories of Inquiry](#).**

A big part of the transformation I've experienced as a result of the DProf is seeing every professional engagement as an opportunity for work-based learning, looking at situations from different angles and immersing myself in iterative cycles of inquiry. One of the key coping mechanisms for doing inquiry in the diverse real world contexts that characterise my professional landscape was developing an ability to ignore my "inner saboteur" (Kreuter, 2013, p. 83). This is the name I've given to the voice in my head that kept telling me to come up with hundreds of pages of dense quantitative data to validate the *doctorateness* of my work (Trafford and Leshem, 2009, Wellington, 2013), making me feel completely stressed out every time the trajectory of my inquiry changed in order to adapt to the ever-changing circumstances around me. As an example, I spent a whole year working as a consultant for a clinical symptom tracking company. Within the space of 2 months, I went from consulting 2 days a week, to being office-based on a full-time basis. I lived and breathed mental health outcomes, which felt like an absolutely wonderful opportunity because patient-reported outcomes (PROs) were the subject that I intended to focus on right from the start of my DProf and I had written about this extensively in my research proposal. However, so many additional facets of my professional life emerged during the four and a half years of my journey to becoming a doctorate professional that I had to decide which situations best illustrated the transformation I experienced as an actor with a personal stake in my inquiry; as a person who has evolved in response to the volatile nature of the living systems within which my research projects exist (Bartunek, 2008, Kacen et al., 2006).

1.6. *Becoming-with*³

Was I challenged by this constant change, most of which was beyond my control, e.g., when losing a work contract that would have given me a fertile ground for inquiry? Of course, I was! Was I challenged by the fact that the living systems I have been embedded in featured multiple actors and spun across diverse disciplines and organisational settings? I most certainly was. But I was inquiring as I was working and living, so giving up my research just because my situatedness changed wasn't an option. I couldn't throw the towel just because I wasn't quite allowed to finish a project I had started. I was forced to learn to get the most out of the process instead of focusing on the finished product. I had to learn to trust my competence in facilitating and capturing the never-ending evolution of my research field. Ultimately, I had to learn to adapt my inquiry to "become with" whatever environment I was embedded in. According to David Coghlan, developing this skillset is in itself an integral part of a candidate's doctorateness (Coghlan et al., 2019). It was also Coghlan who said that the work of practitioner-researchers can feel like a "messy, iterative groping in the swampy lowlands" (Coghlan, 2013), and I couldn't agree more. Coghlan's words resonate with the state of oscillating liminality I referred to previously, and with the fact that reality isn't "single, tangible and fragmentable", but multiple, constructed and holistic (Lincoln and Guba, 1985, p. 37), and that we co-create it as we live it / experience it.

³ A concept from Donna Haraway' "When species meet" that refers to becoming attuned to something or someone Haraway, D. J. (2008). When species meet. Minneapolis; |A Bristol: University of Minnesota Press, pp. 27..

To illustrate the messiness of work-based research, I have selected a number of example situations that I've lived in and inquired into throughout my doctoral journey. Some were meant to be essential parts of this thesis and then were relegated to a much smaller role for various different reasons. Conversely, other situations unfolded in such insightful ways since I started my write up that I was really compelled to include them. One such example is my involvement as scientific advisor in an R&D role with a company for which I developed two award winning brain health food supplements, only to leave because of contractual reasons (I was hired by a rival company) and to then join them again years later to carry out a major piece of research funded by a grant from the European Regional Development Fund. Another example is my contribution to the machine learning algorithm that provides an “anti-inflammatory potential index” for users of a gut microbiome test, and how I had to fight internally for this feature to be released, bypassing some of the company's protocols. Another is my being the creator of a neuroscience-based employee wellbeing educational programme that I've delivered to over 2,500 employees of a global bank, how the project has evolved over 3 years and how I've ended up having the opportunity to incorporate elements of participatory action research into this process.

I delve into all of these situations and more in [chapter 5: Stories of Inquiry](#), focusing on the transdisciplinarity that has characterised my professional landscape throughout my doctoral journey and on what it has felt like not to know how to define myself because I am a mix of a scientist, an educator, a researcher, a student, an agent of change and “just a regular person” with my own interests, values and beliefs that are entwined with those of all of those other parts of my professional self. I believe the literature defines individuals in similar situations as “boundary spanners” (Keszey, 2018).

1.7. Rigour, reflection, and insight

I enrolled on the DProf programme straight after finishing my master's in Clinical Neuroscience, where the knowledge transfer model was based on academics entrusted with the task of presenting students with objective, universal knowledge. I wasn't encouraged to exercise practical judgement. Instead, I was expected to observe and absorb from those in a position of power. From a Foucauldian perspective, I wasn't being given the tools to grow as a practitioner. I was simply being shaped as a subject by the knowledge transfer process in that I was supposed to feel that knowledge was power and thus, in turn, its acquisition would make me powerful (Foucault, 1982a, p. 208-226). This calls for attention to "the ways in which discourses of power act upon the subject and form the subject, such that thinking about scientists' practitioner judgement must also bring to the fore a critical consideration of discourses of power and the ways in which the scientist as practitioner is formed in the context of power relations". This is a deeply insightful comment because it was actually written by a scientist - Canadian Theoretical Physicist Farrukh Chishtie of University of Toronto - in a paper discussing Foucault's stance on phronesis and the practice of science (Chishtie, 2012, p. 111).

I do however worry about what others think about the validity of my methods, perhaps because I assume the expectation is for me to treat reality as "single, tangible and fragmentable", rather than multiple, constructed and holistic (Lincoln and Guba, 1985, p. 37). Similarly, even though I have been immersed in plenty of situations where I've seen knower and known as interconnected and inseparable entities, I keep getting a positivist voice in my head reminding me of the importance of remaining detached from

the process and just observing the behaviour of people and organisations as I would observe neurones under a microscope, aseptically, from the outside, without getting involved. Do I want my relationship with science to be based on anonymised data sheets, participant codes and a dualistic “me/them” power relationships? Does my engagement with the professional contexts that I have been inquiring into violate the principles of validity and reliability expected from a researcher in the life sciences? Am I anxious about what others might think of my approach to inquiry? What do those assessing this thesis, but also my current and prospective employers, as well as academics and professionals in positions of power compared to mine think about my work? What will they think of a neuroscientist talking about self-reflection and knowledge? Will they consider my research to be rigorous? Also, what is my research? Is it the work that I do daily at work, where I plan and implement research activities? Or is it this thesis? Can the two be different and still coexist under the umbrella of first-, second- and third-person action research?

I believe these are profoundly political dilemmas with personal ramifications inherently attached to process of becoming a scholar-practitioner whose professional context is constantly being moulded by the messiness of the real world. These are conundrums make me question my professional values as well as my personal beliefs on a daily basis, triggering emotions that - under a positivist paradigm - I should just ignore because they risk tainting my research integrity. Yet it is clear to me that objectivist, foundationalist, and universalist approaches to scientific inquiry lack responsiveness to the “meaning-laden dimensions permeating socially constructed realities” (Susen, 2015, p. 48) that characterise real world problems. This is a predicament discussed at length

by social scientists Lincoln and Guba (Lincoln and Guba, 1986), whose naturalist inquiry approach has influenced my practice since I discovered them a couple of years into my DProf.

Briefly, aside from the multiple nature of reality and the interwoven knower/known that I mentioned before, the authors propose an additional 3 “naturalist axioms” that describe how:

- no inquiry can be value-neutral or value-free. All inquiry is value-bound.
- all research questions are time- and context-bound, and thus susceptible to change. This has been one of the biggest challenges for me to deal with throughout the doctorate and I finally believe I am at ease with this uncertainty, so I will expand on this throughout the thesis.
- all entities involved in a process of inquiry are interconnected and shape each other throughout the process, i.e. naturalist inquiry has the ability to change the researcher as well as those “being researched”. (Lincoln and Guba, 1985, p. 37).

The whole of my thesis has ended up being a lot more reflective in tone than I had anticipated. Perhaps writing during the COVID-19 pandemic has had something to do with that. Or perhaps it is simply down to the fact that I have experienced an incredible professional transformation through the DProf, coupled with similarly extraordinary level of personal change alongside it. Be that as it may, I will wrap up the summary of my doctoral work with an “inspection and evaluation of my thoughts, feelings and behaviours”, a process defined by the Encyclopaedia of Personality and Individual Differences as “self-reflection and insight” (Phillips, 2020).

I delve into reflections on my DProf experience and on the actual thesis writing process in [chapter 6](#): Insights.

Chapter 1 summary

In this chapter I aimed to convey my wonderment about the creative role of the human mind in all forms of knowing, and particularly in transdisciplinary research. I have drawn from some key ideas by the big, inspiring voices of authors such as Haraway, Barad, Ellsworth, Marshall, Reason, Heron, Coghlan, and Polanyi – to name but a few – to highlight the significance of epistemic plurality, and that illustrate that objectivism is not an inherent requirement for epistemological validity.

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Chapter 2. Real World Problems

“Every now and then a man’s mind is stretched by a new idea or sensation, and never shrinks back to its former dimensions.”

Oliver Wendell Holmes in "Autocrat of the Breakfast Table" (1892, p. 468)

2.1. What's Chapter 2 about?

This chapter focuses on the inherent messiness of professional practice, and particularly on my lived experience as a transdisciplinary practitioner with an urge to embrace radical creativity whilst being immersed in projects that were deeply rooted in positivism as an epistemological stance. I elaborate on the meaning of professional situatedness, and cover what I believe to be the 5 key real world problems transdisciplinary practitioners are likely to come across.

2.2. Entangled knowledges

For this chapter I go back to the year preceding my enrolment at Middlesex, reflecting on the events that took place immediately before starting my DProf and exploring their relationship with the present and the future. My goal is to delve into some of the moral dilemmas that I confronted then, documenting successes, and reflecting on failures and how all of those experiences have contributed to turn knowledge into action.

To begin with, I jump back to early 2016. I had just started working as part of a multidisciplinary clinical team led at Claimont Health (2018), a specialist medical company led by a consultant psychiatrist providing specialist support for patients living with mental health conditions and addiction issues. I provided specialist nutrition advice for Claimont patients. One day, one of the doctors in the team asked me to share my opinion on fish oil supplements. One of our patients didn't like fish, but he was happy to take a supplement if this was prescribed by the clinical team. He also mentioned that, based on my advice, the patient might just force himself to have fish

once or twice a week. I pointed my colleague to an article entitled “*Fish oil: friend or foe?*”, published on the Harvard Medical School website, and written by Howard LeWine, M.D., who happens to be the Chief Medical Editor of Harvard Health Publishing. Based on the evidence available on the therapeutic value of fish oils, LeWine’s conclusion was that there was more than omega 3s in oily fish, and that other nutrients in whole fish, such as vitamins, minerals, protein, etc. probably played an important role in the benefit that studies had attributed to the oils. Hidden under the surface of what sounded like a rather sensible piece of advice, was in fact a description of the characteristic behaviour of a complex adaptive system where, due to a phenomenon referred to as emergence in systems sciences (Sturmberg et al., 2017), i.e., a situation where interactions amongst the individual components in a system result in outcomes that are greater than the mere sum of all the contributions by each of the individual parts (Hurford, 2010). Aside from serving as a reminder of my appreciation for systems thinking, the icing on the cake in LeWine’s article was his admission to the fact that “*how food and its component molecules affect the body is largely a mystery*” (Lewine, 2013).

This was really useful because of the particular patient I am referring to. He fitted the typical profile served by the clinical team at Claimont. He was living with chronic depression and had chosen to seek private psychiatric support. He had a higher-than-average level of literacy when it came to his treatment options and could be a little pushy when it came to his treatment choices, specifically around blood and other tests. Many biochemical tests that check for nutritional status are expensive to run and lack robust translation into clear recommendations, so they aren’t available on the National Health

Service (NHS), but they are available from private laboratories. I had made this point several times before to the doctors in the team but, because of their medical training, I was aware of a temptation to do blood tests for nutrients such as omega 3 fatty acids. These are undoubtedly well researched nutrients, so it did make sense for the psychiatrists in the team to want to prescribe a supplement on the basis of the clinical evidence, which happens to be relatively good for issues such as depression in adults (Guu et al., 2019) and the elderly (Bae and Kim, 2018). But I didn't necessarily agree with the prescription of nutrients in this isolated fashion, whether on the basis of a blood test or not, and I felt that for a medical professional of LeWine's calibre to display the candour of acknowledging the messy nature of nutrition science was incredibly refreshing, so his feature provided me with the perfect substantiation to my argument. I did ask for feedback on LeWine's feature from the medical team and the one doctor who had been quite vocal about the omega 3s said "I think you may be right. Let's focus on the wider picture", which felt like a small win.

A couple of years later, I was delivering a workshop entitled "Nutrition Interventions for Enhanced Cognitive Performance" that I created for Lloyd's Bank "Optimal Leadership Resilience Programme" (2018). This is an educational programme that is part of a wider employee mental wellbeing initiative at Lloyd's and that I have been part of since November 2017. Since then, I have had the opportunity to share my insights on this topic with over 3,000 Lloyd's Bank employees in group workshop settings. In addition, I have had over 250 one-to-one interviews with individuals in senior and executive roles. During my presentation, one of the delegates pointed out to how much variation in response to different foods there was amongst people. She also asked whether nutrition

was really “a hard science” or whether it was open to a lot of subjectivity and interpretation. This triggered a brief discussion about the rigour of different scientific disciplines, and whether some of them were “sloppy”, which I found mildly amusing given I was running my workshops at a bank. But I guess science has become a “trending topic”, and these were educated people. Nevertheless, LeWine’s article popped straight into my head, but I had to think twice before answering because this particular delegate was rather clued up and I wanted to provide her with a solid answer. I did the opposite of what I had just preached that very morning and ate lunch at my computer whilst reading through some papers, searching for an intelligent response. This is when I came across Martin Kohlmeier’s inaugural article as Editor-in-Chief of the “BMJ Nutrition, Prevention and Health” journal, entitled “*Nutrition is a hard science*” (Kohlmeier, 2018). It was an opinion piece where Kohlmeier, a Professor of Nutrition at University of North Carolina at Chapel Hill, discussed how nutrition science “is *difficult to do*” because it “*requires significant resources*”, which means that it “*can lead [one] astray before providing clarity. It is definitely not an undertaking for faint-hearted and easily discouraged researchers. Careful study and the acquisition of required skillsets are essential*” (Kohlmeier, 2018, p. 1). I went back to the delegate with that quote, and she agreed with me on the fact that nutrition science was difficult and required a certain level of proficiency to make sense of. The lady in question happened to have a background in cell biology, a career she had abandoned over a decade ago when she started working in banking. We had a very interesting chat about nutrients and cells, which I had to bring to an end with a gentle reminder that the module she was attending was entitled “Delivering Clinical Neuroscience in the Workplace” and that we were focusing on the most appropriate foods and behaviours to maximise psychological resilience and mental performance.

Little did this lady know that she'd help me express the overarching problem I've encountered throughout my career in science thus far. Richard Rorty, explains is rather eloquently in his philosophical papers on "Objectivity, relativism, and truth". In his words:

"in our culture, the notions of 'science', 'rationality', 'objectivity', and 'truth' are bound up with one another. Science is thought of as offering 'hard', 'objective' truth: truth as correspondence to reality, the only sort of truth worthy of the name"

(Rorty et al., 1991, p. 35)

It is interesting in itself that the lady who brought up the question about the hardness of nutrition science still held her identity as a cell biologist so close to her heart, even though she hadn't worked in a laboratory for over 10 years, as if this gave her the power of standing closer to the truth compared to other of her peers. During our brief conversation, her line of inquiry was very much about whether something like fish oils worked or not, and she politely disregarded the personal narratives of those at the same table who had a story to tell about *how*, *when*, and *why* they might have worked for them. She had taken a position of power as someone with a background in "hard science" and she wasn't ready to argue with her colleagues, and "by 'arguing with others' I mean, more specifically, criticising them; inviting their criticism; and trying to learn from it" (Popper, 1985, pp. 6-7). But perhaps the most interesting thing of all is that her peers – a roomful of around 200 delegates with mixed backgrounds, but mostly not in the hard sciences – showed her respect for her for her "hardness", as in "she must know what she's talking about if she used to be a scientist".

I have been in rooms full of “hard scientists” before, and it was difficult to explain what my job consisted of because my practice cuts across disciplines. The moment they heard the word “transdisciplinary”, or phrases such as “a holistic approach to X, Y, or Z”, the atmosphere thickened so much I could almost cut it with a knife. Some were terribly nice and really interested in what I did. Some were a lot more sceptical. But the common assumption was that doing “soft research” – or looking into a hard scientific field with a “soft angle” must be easier – and therefore second class to - than doing “proper research”. Some saw the mix of methods from social and life sciences a bit of a sloppy hotchpotch which could easily be fudged. It’s as if the level of confidence of people in one’s scientific approach were positively correlated with the level of hardness of that particular scientific field of study. Conversely, the exact opposite tends to happen when that scientific approach encourages flexibility or creativity. Only too frequently do hard scientists think that a researcher must just be “winging it”, and their confidence in the rigour and the precision of the researcher is lost.

In a short editorial piece entitled “In Praise of Soft Science”, published by in Nature in 2005:

“Hard’ scientists should stop looking down their noses at social scientists, and instead share methods that could help them address pressing societal problems. On the campuses, meanwhile, ‘hard’ scientists need to get over their disdain for their ‘soft’ colleagues. The study of society can’t just be left to poets and politicians. As the almost boundless complexity of physical and biological systems becomes increasingly apparent, along with the pressing

need to better understand patterns of human behaviour, now is as good at time as any for a rapprochement between the two wings of the scientific academy” (2005, p. 1003).

Real World Problem Number 1: *There’s a multidimensional divide - hard/soft, objective/subjective, natural/social, qualitative/quantitative - in science that can act as barrier to practising interdisciplinarily* (Lélé and Norgaard, 2005).

2.3. Unfolding realisations

The stories I’ve just shared are only a couple of the kind of real-life situations I’ve been experiencing throughout my professional life, which started in information systems and technology in 1996 and that’s taken me on a journey of exploration across to knowledge management, health information systems, personalised medicine technology and clinical practice in nutrition with a focus on the connection between gut health and mental health. Hence why I find it difficult to define myself with a simple “I am a [*enter profession name here*]” when anyone asks me “what do you do?”, largely because my sense of identity isn’t attached to any one particular facet of my professional self with enough pull to draw me into a single pigeonhole. In addition, the stability of identity interacts with the impermanence of time or, in the words of Professor Evangeline Wheeler of Towson University:

“Identity is constructed from the narrative of memory. Memory provides the evidence for a strict identity of self across time.”

(Wheeler, 2017, p. 16)

I have always found it difficult to provide a binary kind of answer to identity questions for most aspects of my life. But society tends to like unequivocal labels, so for a few years I called myself a “nutrition practitioner”. However, that leaves out my mixed professional and academic background, rooted in a mix of social and life sciences, and my drive to translate science into real world applications. To add yet another layer to this already heady mix, I have always been mesmerised by the aura of mystery surrounding the human brain, so I went back to university at the age of 43 to study clinical neuroscience. For a long while I had been interested in learning all about the nuts and bolts of how the nervous system works, and what it can be done to repair it when it goes “faulty”. Some of the reasons behind my interest in this field of knowledge included having elderly parents. My dad had his 88th birthday only recently, and my mum is 84. I also have a really close friend who was diagnosed with Parkinson’s disease (PD) at 48, only to be told two years later, when his treatment stopped working, that he was in fact experiencing the symptoms of a condition called “progressive supranuclear palsy (PSP)”. PSP can resemble PD at first, but it develops much more aggressively, affecting the person’s quality of life dramatically and reducing their lifespan substantially to the point that life expectancy after diagnosis is less than 10 years (Fiorenzato et al., 2019, Xing and Litvan, 2019).

I had hoped that a master's in clinical neuroscience would provide me with rich insights into how I could recycle the nutrition knowledge I felt confident using after years in private clinical practice to focus on neuroprotection, i.e., the kind of therapeutic interventions aimed at preventing or slowing down neurodegeneration (2009b). Having had a diagnosis of Attention Deficit and Hyperactivity Disorder (ADHD) as an adult in my 40s, my fascination with all things brain-related seems even more justified. I'd like to think that I was destined to become a neuroscientist so that I could understand my own brain better, but I feel as though this is going a little *off-piste* here, so I'll delve deeper into these insights in more contextually relevant sections of this thesis.

I did learn a lot during the 2 years of the master's programme. Some of the highlights included learning how to measure these proteins called "transcription factors" in mitochondria, tiny semi-autonomous organelles located within the cytoplasm of every living cell and tasked with supplying energy to cells so that they can carry out their specific functions (Schirmacher, 2020). Mitochondrial transcription factors provide clues about whether mitochondria are healthy or stressed (Cherry and Piantadosi, 2015, Sepuri et al., 2016). Some well-known transcription factors that have made it to mainstream news include nuclear-related factor 2 (Nrf2)(Esteras et al., 2016) and forkhead box O3 (Shang et al., 2009). They protect mitochondria from damage by oxidative stress, thereby extending their efficiency and lifespan (Runkel et al., 2014). Mitochondrial health is important for all types of cells, but it plays a particularly important role in brain cells (Federico et al., 2012). As an example, if mitochondria in neurones are damaged by stress they can become dysfunctional, and this can contribute to the development of neurodegenerative diseases such as Parkinson's, Alzheimer's

(AD), and Huntington's diseases (HD) (Arun et al., 2016).

I am really grateful for the vast amount of academic knowledge I acquired during my time at Roehampton University, as well as for the learning that took place over 2 years of engaged observation and practice at the neuroscience lab, the kind of technical know-how that Hunter calls “situated knowledge” (Hunter, 2009).



Figure 5. Me in the neuroscience lab

This is me feeling incredibly accomplished in the neuroscience lab, cloning cells for my experiments.

Having said that, I agree with Kate Maguire on the existence of knowledge both outside and within the academy, and with the fact that “they’re not necessarily the same thing” (Gibbs and Beavis, 2020). Indeed, the most precious bit of learning I experienced during this time wasn’t delivered in a lecture, and it didn’t arise out of hand on practice at the lab either. For the summative assignments I researched the interface between nutrition, neuroscience, and psychology, delving into the transdisciplinary field of study that has been defined as “health neuroscience” (Erickson et al., 2014).

Exploring the overlaps between disciplines was fascinating and it made me realise the extent to which knowledge is interconnected, which makes it difficult to attribute any particular piece of knowledge to any one single field of study. As Nicolescu puts it:

“Transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge.” (Nicolescu, 2010, p. 20)

Whilst reflecting on of the “shifting entanglement of knowledge” (Solli, 2019) and how to use it both within *and* outside the academy, yet another important realisation emerged for me. Namely, that putting knowledge into practice:

- is a skill that can take years to develop,
- can’t just be learned in a classroom or in a lab, and that
- the translation of knowledge into real world applications isn’t always dependent on factors that the practitioner-researcher can control.

In the words of Professor Riccardo Viale, a psychiatrist-turned-philosopher who has published extensively on the cultural and cognitive aspects of knowledge transfer between academia and industry, “*there is a tacit component to knowledge that cannot be transmitted formally, but only through practical learning and direct contact between researchers*”, even “*in scientific disciplines such as medicine or life sciences*”, or indeed “*harder sciences like experimental physics.*” Viale argues that “*practical knowledge, and intuitive, manual skills play a fundamental role*” (Viale, 2013a, p. 200). According to Nonaka and Takeuchi, tacit knowledge is embedded in personal experience, which is intrinsically entwined with the practitioner’s worldviews, beliefs and values which, notwithstanding, do not prevent tacit knowledge from being converted to explicit knowledge (Nonaka and Takeuchi, 1995).

But does purely tacit or purely explicit knowledge exist? Whilst Polanyi was of the opinion that all knowledge is rooted in tacit knowledge or, as he puts it, that “the process of formalising all knowledge to the exclusion of any tacit knowledge is self-defeating” (Polanyi, 2009, p. 20), knowledge management scholar Murray Jennex believes that there is a knowledge continuum where purely tacit and purely explicit form the end points, with knowledge existing somewhere on the continuum between the two (Jennex and Olfman, 2008). This concept resonates with Meyer and Sugiyama’s proposed third dimension to knowledge, theorising that *implicit* knowledge sits somewhere along that continuum between tacit and explicit, based on how easy it might be to be coded or structured, a property that they refer to as codifiability (Meyer and Sugiyama, 2007).

In addition to this, continuum, the Encyclopaedia of the Sciences of Learning defines “bottom-up” and “top-down” learning modes:

“Bottom-up learning refers to learning implicit knowledge first and then learning explicit knowledge on that basis (i.e., through “extracting” implicit knowledge).

Top-down learning refers to learning explicit knowledge first and then learning implicit knowledge on that basis (i.e., assimilating explicit knowledge into an implicit form).” (Sun, 2012, p. 479)

In my own experience as a lifelong learner, this leads me to the second problem.

Real world problem number 2. *Knowledge is inextricably interwoven into the rich contextual fabric that is the practitioner’s experience of learning.*

2.4. “This is science, not business”

Not all students on the Clinical Neuroscience MSc programme had the chance to work with neural stem cells in the lab. The reason why I had the opportunity was play around with these rather expensive cells from mouse brains was the fact that I was employed as a consultant by a Spanish nutraceutical company called Vitae International (also known as just Vitae) (Vitae, 2021a), that specialised in natural products for mental energy, manufactured to pharmaceutical grade and sold exclusively via pharmacies in Spain.

Their flagship product, called ReConnect® (Vitae, 2021b), was marketed for “mental energy”, i.e., to support memory, mental agility and attention throughout the day. It contained a combination of coenzyme Q10, nicotinamide adenine dinucleotide (NADH for short), ascorbic acid (vitamin C) and the amino acid L-serine, with NADH as the star ingredient. NADH is a compound that is biochemically very close to niacin (vitamin B3) (Bogan and Brenner, 2008). Niacin health claims approved by the European Food Safety Authority (EFSA), which means that a manufacturer using niacin can claim their product has the ability to reduce tiredness and fatigue, to contribute to normal energy-yielding metabolism and to normal psychological function (Efsa Panel on Dietetic Products and Allergies, 2010, Efsa Panel on Dietetic Products and Allergies, 2015). However, NADH itself, despite being related to niacin and being documented in a plethora of studies for its beneficial properties, doesn't have any approved health claims. The principal reason for this is that NADH's ability to promote healthy brain ageing (Xu and Sauve, 2010) and to afford neuroprotection (Chi and Sauve, 2013) is largely based on its mechanism of action seen in test tubes (in vitro) or in animal studies (Winkler and Hirrlinger, 2015, Ying, 2007).

In addition, Vitae had just funded an 8-week randomised controlled trial on 73 Spanish patients with chronic fatigue syndrome (CFS) where the intervention group - treated with 2 tablets of ReConnect® (Vitae, 2021b) (containing Coenzyme Q10 100mg, vitamin C 80mg, serine 20mg and NADH 10mg) experienced a reduction in fatigue symptoms along with some beneficial effects at biochemical level, leading the researchers at the Vall d'Hebron University Hospital in Barcelona the hypothesis that supplementation with ReConnect® “could confer potential therapeutic benefits on fatigue and biochemical parameters in CFS” (Castro-Marrero et al., 2015, p. 679).

At the time I was working closely with the clinical team who conducted the study and Vitae really liked the fact that I had access to the neuroscience lab at Roehampton University, so asked me if I would do some experiments with ReConnect® to figure out what the effects would be on brain cells. This sounded exciting to me because, as I saw it, it would enable me to combine my awareness of what a commercially available product did to real people in the real world, whilst allowing me to create new knowledge in the lab. Vitae donated a few thousand euros to Roehampton for the raw materials and the lab equipment, i.e., pipettes, test tubes, etc. and the test kits for the experiments with mitochondrial transcription factors. These were quite expensive, so my supervisor was delighted because he had been wanting to do these experiments for a long time, but the university wouldn't fund them. It sounded like happy days for everyone. The trick was that Vitae was expecting my 15,000-word master's dissertation to translate into publishable science that would directly contribute to the sales of ReConnect® but, sadly, it wasn't quite as straightforward as that.

As the months went by, Vitae's business development team got increasingly inquisitive about the outcomes of my experiments, which my supervisor had forbidden me from sharing until I had finished writing them up, ready to be published. The very same day I got the marks for my dissertation, entitled "Investigating the Effects of Coenzyme Q10 Plus NADH, Ascorbic Acid and L-Serine on Cellular Metabolism and Mitochondrial Unfolded Protein Response Transcription Factor Activation in Murine Neural Stem Cells" - a title that made me feel rather grown up - I was summoned by Vitae into quite a formal meeting for me to brief the board on the results, and how I was planning to use them to support the commercial support of their product. I remember scratching my

head thinking hard about how I would translate all of this hard science into something that had any meaning for laypeople out there who simply wanted to take a pill to feel their brain “working better and faster” as well as ageing less rapidly.

To this day, a paper by neuroscientists Franco and Cedazo-Minguez (2014) springs to mind. It discusses why so many experimental therapies for neurodegenerative diseases are successful in a test tube but fail to translate into effective drugs. In the “Themes for Debate” section of this article, the authors pose 10 different questions about how new therapies, including nutrition-based therapies, could be used in future studies.



Figure 6. When science is lost in translation

A cartoon I created inspired by the paper by Franco and Cedazo-Minguez (2014).

The paper featured a really cute cartoon with a scientist and 2 laboratory mice asking him questions which inspired me to create figure 5 as a metaphor to illustrate the lack of success in finding solutions for neurodegenerative conditions and how what might work in a test tube might never even work for a mouse, let alone humans. Inspired by paper by Franco and Cedazo-Minguez (2014). I did share the cartoon at the meeting, alongside a summary of the results from my thesis, which seemed to generate even more questions. To illustrate this point, I include below the final paragraph in the conclusion section of my master's thesis:

“Further research involving in vivo protein folding assays as well as genetic testing of mitochondrial transcription factors would be worthwhile undertaking as a means to acquire more precise knowledge of the crosstalk between the unfolded protein response and other cellular stress responses, as well as of the potential therapeutic impact of ReConnect® as a modulator of the various pathways involved in the complex web of interconnected biochemical processes that characterise neurodegeneration” (Toribio-Mateas, 2016).

Every single scientist has read hundreds of papers that conclude “more research is needed”, but I hadn't anticipated to summarise 18 months of hard work in a short paragraph that basically said I needed to do it all again. However, reflecting on this years later, it makes total sense, not simply because further research was indeed needed to demonstrate the efficacy of the compounds I was using, but because you gain a little bit more practical wisdom every time you repeat the same process, and this makes you see the same situation in a different light. In his book "Democracy and Education", John

Dewey wrote about how “when we experience something we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return: such is the peculiar combination” (Dewey, 1916, p. 16). That is precisely the angle I am referring to.

But the Vitae team wasn't happy. Their expectations were far too high, and I left that meeting overwhelmed with mixed emotions. The elation of finishing a massive piece of research work and getting a 75% mark on it was dampened by a sinking feeling of being stuck between Vitae's board of directors and my supervisor at Roehampton. Vitae were looking for catchy science that translated into more sales in the shortest space of time possible, whilst my supervisor - a neurobiologist who saw the commercial world as the antithesis of academic rigour - was not interested in the commercial ramifications of my research at all. As a matter of fact, my commercial interests were clearly a problem. I still remember the conversation I had with him when I was preparing for my meeting with Vitae. I was hoping for some insight on the translatability of my findings. Instead I got a lecture that sounded like Seeböhm in his book “History as a Science and the System of the Sciences: Phenomenological Investigations” (Seeböhm, 2015). “I should remind you that neuroscience is a hard science, and you can't bend the results of your research to sell a product”, he said. He explained how my research questions made assumptions that I had articulated in mathematical terms, and how he had guided me on how to formulate sound hypotheses that I had then tested at the lab, establishing some degree of confidence in the repeatability of my methods. He also said that science couldn't play into the hands of business, and that I would need to repeat the same experiments I had completed about 10 times to ascertain that the results across all of those iterations were comparable, and only then move onto the kind of next steps that Vitae wanted to start working on straight away.

I lost my consultancy contract with Vitae shortly after. I was disheartened because I felt as though that the scientific rigour that I was expected to abide by as a “custodian of academic integrity” by the University could have been more compatible with my interests in the real world. I felt I had failed to provide a scientifically robust, yet commercially appealing translation of my research work. By this time, I had completed my master’s and I was told that the University’s lab couldn’t be used for commercial purposes, so that was the end of that journey.

What is uniquely interesting about this story is that the tension between the science and business has continued to repeat itself in slightly different ways throughout my career. Indeed, looking at this from the $Mā$ angle I explored earlier, similar problems have returned in renewed forms. The challenge I've faced is that solutions to the older versions of those problems no longer worked. On the flipside, practical wisdom accumulates year after year, and tapping into this has enabled me to create creative solutions for the many tangled situations that I discuss throughout this thesis.

Real world problem 3: *Knowledge translation into real world applications can be extremely difficult, particularly when there are conflicting expectations by stakeholders in positions of power.*

2.5. Professional or academic?

I probably shouldn't have been surprised by my supervisor's response. A few months before, another company I consulted for had offered to fund a PhD for me to work closely with Professor Dale Bredesen looking into nutrition-based approaches to neuroprotection in brain ageing. Cytoplan is a British nutraceuticals manufacturer with a focus on supplements that practitioners such as nutritionists and integrative medicine doctors use in their private clinics (Cytoplan, 2021a). Bredesen is a neurologist who has been described as "*an internationally recognised expert in the mechanisms of neurodegenerative diseases such as Alzheimer's disease*" (Gustafson, 2015). He was the founding president and CEO of the renowned Buck Institute for Research on Aging in Novato, California (Institute, 2008) and has published extensively nutrition and lifestyle medicine interventions to help slow down cognitive decline (Bredesen, 2009, Bredesen, 2014, Bredesen, 2015, Bredesen et al., 2016), so this offer was like a dream come true for me. However, the University had concerns about the commercial sources of the funding, even though Cytoplan was (and still is) a wholly owned subsidiary of a registered charity called "The AIM Foundation" that had provided funding for nutrition and educational projects such as the Alzheimer's Research Unit at the University Lancaster, The Lighthouse Project, and The Children's Society.

I could sense the disinclination to allow me to carry out my PhD research at the neuroscience lab because of the connection with Bredesen, a bona fide medical professional who's served as Chief Resident in Neurology at the University of California, San Francisco (UCSF), worked as a Postdoctoral Fellow with Nobel laureate Stanley

Prusiner at UCSF, and held academic positions at UCSF, University of California, Los Angeles (UCLA), and the University of California, San Diego . The mistrust was triggered by a conversation between Cytoplan and my supervisor about the fees for my PhD. Cytoplan's CEO at the time mentioned that Dr Bredesen was planning to engage the company in the manufacture of a range of specialist dietary supplements containing natural ingredients that he had worked with during his long life as a laboratory scientist, and that he had started to test in human participants with some really encouraging results. Bredesen wanted Cytoplan to create a number of products containing vitamins, fish oils, probiotics and botanical extracts (phytonutrients), some of which had a history of traditional use in Ayurvedic medicine (Bredesen and Rao, 2017), e.g., *Bacopa monnieri* (Cicero et al., 2018, Zanotta et al., 2014), *Gotu kola* (*Centella asiatica*) (Gray et al., 2015, Gray et al., 2018, Shinomol et al., 2011), and *Ashwagandha* (Choudhary et al., 2017, Zahiruddin et al., 2020). His goal was to provide top quality products with combinations of the ingredients he had researched and knew had the power to promote healthy cognitive function in older adults without a neurodegenerative diagnosis, as well as to help those who had been diagnosed with mild cognitive impairment (MCI) (Bredesen, 2021, Bredesen et al., 2016), defined as “a decline in cognitive performance beyond that expected as a result of normal ageing without the loss of functional independence which is characteristic of dementia” (Murphy et al., 2020, p. 1).

All of this sat too much out of the comfort zone of a faculty that saw the interaction with certain industry sectors as a controversial, which probably gave me an aura of unorthodoxy, of being too commercial, and that wasn't acceptable. In order to avoid risk, my supervisor wanted my research project to be almost 100% different to the one

we had discussed originally. The new version entailed 3 days per week of lab-based work and was so far removed from Bredesen’s and Cytoplan’s vision that the PhD opportunity didn’t materialise.

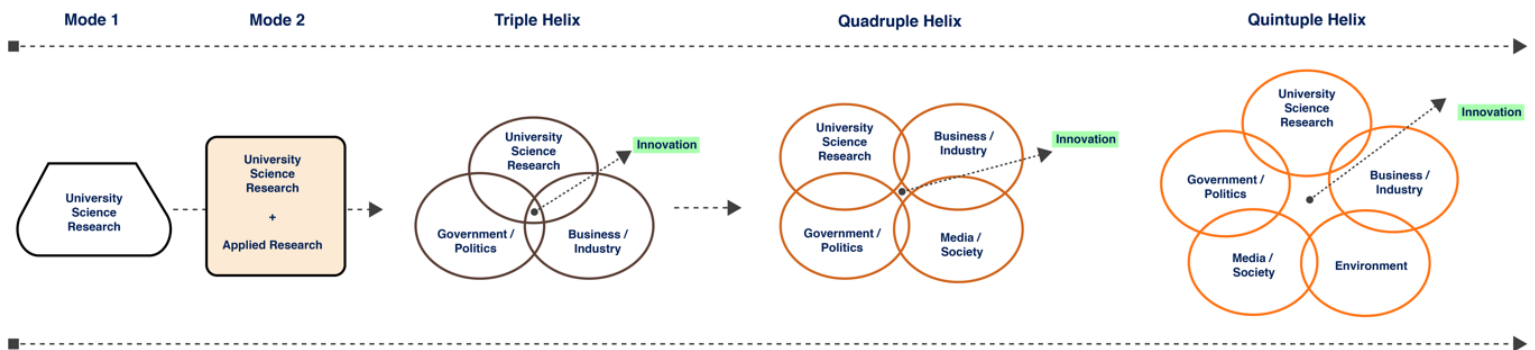


Figure 7. From Mode 1 to Quintuple Helix.

A diagram I adapted from “Academic Entrepreneur, Academic Entrepreneurship” (Barth and Schlegelmilch, 2020).

Missing out on doing a PhD with Bredesen felt disappointing at the time, and so did losing the Vitae contract. In the words of Laurens van der Post in “Patterns of Renewal”, I have just been witness to how “modern man has lost the sense of wonder about the unknown and he treats it as an enemy” (Van Der Post, 1962, p. 2). But the two events happened in such close succession, that they forced me to reflect on the tension between academia and industry from a close distance. In a study consisting of face-to-face survey interviews with 104 chemical science professors in Japan, Singapore, and Taiwan, researchers from Texas A&M International University set out to investigate how future scientists are mentored and trained, based on their mentors’ keenness on

bridging the gap between research and practice (Del Rosario Benavides and Ynalvez, 2018). The authors tapped into the “Triple Helix Model” by Etzkowitz and Leydesdorff (Etzkowitz and Leydesdorff, 2000) to define the dexterity of scientific knowledge producers who thrive in a demanding environment with expectations from at least two out of the three sectors in the helix, namely university, industry and government, and concluded that doctoral science training should be intentionally designed so that students see jobs in industry “as equally respectable and meaningful career paths to scientific life” (Del Rosario Benavides and Ynalvez, 2018, p. 88) as jobs in academia. This trait in academic mentors to doctoral candidates is referred to as “ambidextrous behaviour” by the authors (Del Rosario Benavides and Ynalvez, 2018).

The autoethnographic account of my experience during my master’s isn’t meant as criticism of the academic institution or their staff. It is provided as an illustration of the tension within a system firmly established in the normative structure of science proposed by Merton, where openness, universality, objectivity, and critical inquiry (Merton, 1973) where the outputs generated by the discovery of knowledge become “scientific commons” (Badcott, 2016, p. 619). Universities are indeed centres of knowledge production, thus the reluctance to engage in the creation of knowledge that was “embedded in commercial possibility [...] for the benefit of the public benefit” (Zhu and Hawk, 2016, p. 1498) might be explained by the threat of “commodification of scientific research” (Vermeir, 2013, p. 2486) or, even worse, of “commercialisation of research”, defined by Jacob as the situation where the “selling of knowledge remains dependent on the presence of the creator” e.g., with explicit involvement of training programs, tuition fees, etc. (Jacob, 2009, p. 398)

Based on literature by Gibbons et al (Gibbons et al., 1994), Etzkowitz and Leydesdorff (Etzkowitz and Leydesdorff, 2000) and Carayannis and Campbell (Carayannis and Campbell, 2009) creation of innovative knowledge is highly dependent on an organisational flexibility or “elasticity”, as well as in the desire to promote the cross-integration of different knowledge innovation modes (Carayannis and Campbell, 2010) as seen in Figure 3 above. I am particularly drawn to Campbell and Güttel’s view that an individual can operate simultaneously as academic and commercial actor, with aligned intellectual and business interests. They refer to this persona as an “academic entrepreneur” (Barth and Schlegelmilch, 2020, Campbell and Guttel, 2005), a concept that I will come back to frequently throughout this thesis.

Real world problem 4: *The tension between academia and industry adds complexity to research projects that lie somewhere between the two.*

2.5. Thresholds and crossroads

The context I had found myself in at the end of my master’s is beautifully described by Sociologist Patricia Gumport in her book “Sociology of higher education: Contributions and their context” where she wrote:

“practitioners sit at the crossroads of action. They have to make things work”
(Gumport, 2007, p. 322).

That's precisely where I was at, trying to balance my drive to change things (Cryer, 2006) and "to make a difference" in my professional world (Potter, 2006, p. 34) with a whole load of expansive of links amongst different aspects of my life that made up my identity. I was at the intersection of an expansive web of interconnections between my mind and various different social, environmental, and cultural pulls and pressures that one could call "my situatedness" (Costello, 2014, p. 1757). Finding balance in this space was tricky. It was full of real-life challenges such as those of being a mature student with a life to tend to outside the university, and the ever-present pressure of being a full-time freelance practitioner. Baitenizov et al refer to freelancing as "a creative mode of self-employment" in today's economy, characterised by the demand of knowledge-intensive services that demand high levels of training and education from its workforce (Baitenizov et al., 2019). Being a full-time freelancer with a portfolio career poses its own challenges (Durand, 2019), most notably because jobs are, according to Higgs (2019) in the "Encyclopaedia of Educational Innovation":

"fundamentally different to many existing corporate structures". They "typically involve temporary positions where organisations contract independent workers to undertake specific short-term tasks" (Higgs, 2019, p. 5)

Freelancing has plenty of well-known positives, including a feeling of freedom from being able to choose jobs or "gigs", often with flexible arrangements with regards to fees, location, etc. (Sinicki, 2019). But working for yourself can also mean feeling overwhelmed (Pickerell and Neault, 2019), most often from the pressure of been available 24/7, working long hours in order to maximise the chances of the longevity of

the contract by keeping employers happy (Quelch and Knoop, 2018a, Quelch and Knoop, 2018b). Therefore, albeit stressful at the time, the period of turmoil I had just experienced with my Vitae and Cytoplan ordeals had triggered a really acute awareness of the kind of research degree I *didn't* want to enrol in. I was really driven by my passion to find real world applications of the science that I was so enthralled by, to the point that I feel it was that passion that enabled me to absorb as much knowledge as I did during the taxing two years of my master's.

Knowing my own brain better as I do now, I can relate to the work by neuroscientists Bridekirk et al (Bridekirk et al., 2016), who argue that passion is particularly important for those with ADHD, particularly when it is in harmony with one's core values. This type of passion then becomes a source of pleasure and meaning from which people with ADHD derive better attention, executive functioning, and life quality (Bridekirk et al., 2016). Back then, I had shifted from thinking that the divergent thinking and nonconformist adventurousness that I had shut down the last two years were a problem. Instead, I realised that they were core pieces of my value system, as was my ability to hyper-focus when I found something I was "really into". Now I know that these traits are largely based on neurochemistry for ADHD folk (Sedgwick et al., 2019), which explains feeling of being straightjacketed. I was "in transition between identities" (Şar, 2017, p. 277), longing to embrace a different set of "beliefs, attitudes, opinions" and emotions upon which to build my own "meaning scheme" (Mezirow, 1991, p. 223).

Difficult situations can sometimes provide us with a turning point, with an opportunity to reframe our life meaning, our goals, and expectations (Wozniak and Allen, 2012), allowing us to acquire a new sense of self, and to create a brand new personal narrative (Ruini et al., 2016). I felt immersed in a “transformative, irreversible, integrative, bounded, potentially troublesome, discursive and reconstitutive process” (Rutherford and Pickup, 2015, p. 706) that Meyer and Land call liminality (Land et al., 2014, Meyer and Land, 2005), and being forced challenge my own assumptions about myself and about my practice made me realise I no longer had the time or energy to be stuck in situations that stifled my creativity.

In the words of Professor Karen McArdle in “Freedom Research in Education: Becoming an autonomous researcher” I had come to terms with my need to enjoy “freedom from orthodoxy” (McArdle, 2018b, p. 23) as a professional practitioner-researcher. I realised that I wanted to conduct high quality, pragmatic research that was creative and imaginative and yet cogent, robust and justified (McArdle, 2018a, McArdle, 2018c). I was drawn to the view that it is impossible to understand the world around us just by reducing it to small pieces that are removed from their social and cultural context, on the basis that we are embedded in that world. My naturally inquisitive mind needed to gain an understanding of the world around me that didn’t rely solely on positivist binary outcomes such as efficacy, i.e., whether something worked or not. I was also interested in who for and why something had worked or not (Khanna, 2019). And with that realisation I was ready to move onto the next chapter of my professional life as a “creative scientist”.

On the basis of these insights arising from my conscious reflection on the situatedness of my practice, I needed to find a doctoral programme that was flexible enough to accommodate my circumstances, and I was looking for university that was happy to challenge the “traditional notions of doctoral work based on research” (Lester, 2004, p. 757), because there was one thing I was absolutely clear about, and it was the fact that I saw myself as a lot more as a researching professional, and a lot less as a professional researcher. This may appear as a subtlety, but it is an aspect of paramount importance in the narrative that differentiates traditional PhDs and Professional Doctorates (PDs) (Bourner et al., 2001, Doncaster and Thorne, 2000, Wellington and Sikes, 2006). Because of my background, the more conventional training on academic research skills was more of a “nice to have” compared with the practical application of this training in real-world settings (Schildkraut and Stafford, 2015). Having a faculty with a mix of PDs and PhD academic staff who understood how mature doctoral candidates have “many roles and responsibilities, personal and professional, which compete with their research student role (Pope, 2017, p. 121), was the overriding consideration for me. My outlook on life is most certainly pluralistic. I tend to thrive on situations where I can operate autonomously. I also have what contemporary ADHD researchers refer to as “an abundance of attention” (Halowell, 2020), as opposed to a deficit of it. My challenge is how to channel it I can stay focused. Intuitively I knew I needed the freedom to explore divergent interests and activities that were important to me (Deci and Ryan, 2000), with rigour, but creatively, led by passion, transforming myself and my practice by immersing myself in “a provisional, exploratory space with unexplored possibilities – theoretically, an almost perpetual liminal state of creativity” (Land, 2015, p. 22).

Within a month of my “awakening” I had registered on the Professional Doctorate programme at Middlesex University, and two months later I received the “Santander Work-Based Learning Award 2016” for doctoral research, a scholarship by Santander Universities . This prestigious award did more than cover part of my enrolment fees. It gave me a sense of achievement that was bigger than just being able to describe myself as a Clinical Neuroscientist enrolled in a doctoral research programme. I was actually excited by my realisation that this didn’t mean I was complete or ready-made, but that instead I was a professional “in continuous formation through choice of action” (Dewey, 1916), and that my choice was to operate at the intersection between academia and the real world.

I had literally just found my call for transforming knowledge into action with the aim to share my learning with those who were on similar discovery paths to my own, and I was ready to deal with real world problems by:

- *being creative and taking risks by “making unlikely connections” and accepting that the “impetus to create” I rely on can bring about failure as well as success (Grierson, 2011, p. 349)*
- *constantly questioning my approach and re-structuring my actions by being present, though not necessarily able to articulate my learning in precise words at all times (Schön, 1987),*

Real world problem 5: new problems require creative solutions that are sometimes difficult to verbalise because they materialise whilst practitioners explore the professional context they operate in.

2.7. Arpeggiated chords

You may be wondering why I've felt the need to go back to the past in order to find the problems that I have showcased in this chapter. The reason is simple. These problems aren't locked to the past. They are woven into clusters of events, activities, people, and organisations that I like to see as constellations in perpetual rearrangement. Every iteration of the different permutations in which these constellations continue to reorganise themselves forms patterns that help me stay "attentive to what gets excluded as well as what comes to matter" (Barad, 2012, p. 52-53) in the world around me over time and space. And that's why I sometimes find it useful to go back to the past, not only to "reflect" on it, but to remind myself of the extent to which life – both professional and personal, as they are intertwined – is characterised by "heterogeneous histories and/or qualitative multiplicities instead of "reflections", an eloquent remark on diffractive thinking by Chessa Adsit-Morris, Director of the Center for Creative Ecologies at the Santa Cruz University in California (Adsit-Morris, 2017, p. 102).

Patterns are amongst the most visible outcomes of emergent self-organisation in complex systems (Sturmberg, 2021). An example I love is arpeggiated chord notes. They encompass both the similarities as well as the differences of the meaning they convey. They may be played in a different octave or scale to add texture to the melody, engendering multiple potential outcomes. When a complex system reaches a state such that multiple possible solutions are feasible, that system splits, generating a number of new stable states. This phenomenon is known as bifurcation and is widely observed in nature (Prigogine and Nicolis, 1985, p. 3-12).

Professional practice is a perfect example of complex system that continues to split and to generate new states, some more stable than other, forcing practitioners to remain creative in order to respond flexibly to emerging patterns and opportunities as they arise (Plsek and Greenhalgh, 2001b). For all these reasons, I will tap into the concepts of reorganising patterns and iterations throughout this thesis, and I have a dedicated a whole section to these entangled matters in my [Professional Knowledge Landscape chapter \(Chapter 3\)](#).

Chapter 2 summary

In this chapter I shared my experience as a practitioner who is concerned with that which is at once between, across and beyond a wide range of disciplines. I explored my situatedness in an inherently chaotic professional world, and my attempts – some more successful than other – to embrace radical creativity as a means to navigate uncharted waters. Each of the five sections in this chapter concludes with a reflective piece that I've translated into a real-world problem that I have come across numerous times, both before and during my DProf. Ultimately, transdisciplinary practice is not about striving for perfection, but about striving to find creative solutions to challenging, emerging problems.

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Chapter 3. My Professional Landscape

"Wisdom comes not by accumulation of more and more experiences but through discerning pattern in the deeper mystery of what is already there."

Mary Catherine Bateson in "Full circles, overlapping lives: culture and generation in transition" (Bateson, 2000, p. 242).

3.1. What's Chapter 3 about?

With this chapter, I hope to take you on a journey of discovery throughout which I weave in my diffractive approach to inquiry. Reflection is a great way to identify similarities in patterns of behaviour. Reflexive practice goes further to identify differences as well as resemblances. Looking at my professional practice in the emerging field of the microbiome-gut-brain axis – also referred to as “microbiome, mental and gut health” – through a diffractive lens, I aim to go beyond reflection and reflexion to map differences as well as their effects, analysing the role they have on me as I develop as a transdisciplinary practitioner. For that purpose, I use professional roles, activities, and projects as vehicles of inquiry that enable me to elaborate upon what it means for me to live life as a transdisciplinary practitioner who takes an attitude of inquiry, seeing learning opportunities in every single thing I do, living life as inquiry.

I must warn you that this is an extensive chapter so that you are prepared. I thought of several ways of stopping it growing out of control. In fact, I was very close to shortening it into a more succinct version by moving some of its contents to an appendix. A more radical idea was to replace the chapter altogether with the accompanying website, not least because thecreativescintist.co revolves around it, so in a way that would have been the bravest thing to do. However, after much self-deliberation, I decided to keep it as it was. I believe this chapter tells a valuable story about the change my professional practice has gone through over the last 5 years, starting out being pretty tumultuous and becoming more focused as I progressed through my DProf. The awareness of my writing process I have developed as a result of the being immersed in the kind of chaos that precedes order is the main reason for my decision to keep it long and multifaceted. I hope you find value and beauty in its complexity.

3.2. Embracing radical creativity

I wrote the one of the latest iterations of this chapter in early March 2021. I was preparing to present at the first “Transdisciplinary Symposium” at Middlesex University that was taking place on 15th-16th March 2021. The event was described by Dr Kate Maguire – Associate Professor and Head of Doctor of Professional Studies (Transdisciplinary Practice), Middlesex University – as an opportunity to “explor[e] the rich texture and depth of the transdisciplinary imagination as it is practised by students and alumni of the [DProf] at Middlesex University”, [a group of diverse, imaginative, creative [individuals] who are full of energy, questioning, curious and committed to bringing about what matters in small and large contexts through self-examination, collaboration, a multi-perspective lens and the imperative of inclusion” (Maguire, 2021). On the event page, Maguire defined transdisciplinary practice as follows:

“So, what is it really? One could say it is many things, but it is not a discipline. It draws on many discourses and experiences of practice. Some would say it is a way of being that informs a way of doing. A way of revealing what has been hidden. The antithesis of an epistemology of ignorance. It is, in many ways, a different way of experiencing others, our world, our action in the world and finding the words to share that. It is inquiring at the intersections and translating across difference. It is coherent, imaginative, emergent and impactful (Maguire, 2021).”

From the first day of thesis writing, I felt the urge to tap into the innate radical creativity that has always guided me throughout my life. Having my fingers on the keyboard was like an almost irresistible invitation to, in Hemingway’s words, “write hard and clear about what

hurts” (Wright, 2021), embracing all the energy, values, beliefs and emotions that are enmeshed self-reflective professional practice. However, I still felt conditioned to fight this impulse, led by a deep-rooted positivist pull that was making me doubt myself. I imagined myself standing in front of my viva panel, introducing myself as a neuroscientist who’d written his thesis in the first person and whose thinking has been inspired by key ideas and big voices that cut across a wild number of disciplines, from microbiology to social feminist theory and, frankly, that made me panic. The question “is creativity compatible with rigour and credibility?” kept spinning around my brain as if that thought was trapped inside a washing machine on a spin cycle.

In order to get ready to present at the symposium, Dr Maguire introduced me to a couple of peers from my same doctoral programme who were at different stages in their own journey. Listening to their stories made me realise how much in my own head I had been. I had spent the last 4 and half years being encouraged to embrace creativity as a doctoral candidate. Why was it so difficult for me to do that when I am a naturally creative person?



Figure 8. At the Symposium

Looking back, I see those meetings and my presentation at the symposium as cathartic experiences that enabled me to face my fear that my creativity was incompatible with the validity of my work. I left the event ignited, aching to embrace transdisciplinary imagination so that I could connect my emotions, values, and beliefs with my scientific work. That same afternoon I reviewed a big chunk of my writing and I realised that I had been censoring myself when the words I was committing to paper were too emotionally charged. I was erasing pretty much all evidence of my experience of metaemotion, i.e., “emotions about emotions”? (Mendonça, 2013) which, according to cognitive scientist and philosopher of the mind Dina Mendonça, are meta-emotional layers of experience that constitute critical components of an “updated rationality that incorporates emotional input in decision-making” (Mendonça and Sàágua, 2019, p. 137). Emotions are situated as part of the context that “surrounds and includes us” (Gallagher, 2009, p. 47). That means that they are implicated in all situations, including professional practice and research settings. As a matter of fact, they influence our cognitive processes (Gläser-Zikuda et al., 2005, Pekrun, 2006) by affecting the actual neural circuits involved in decision making (Phelps et al., 2014). As a neuroscientist, I knew this only too well, so why was I having a hard time demonstrating my knowledge of the neurosciences in imaginative ways? To make things even more paradoxical, the key theme underlying the research projects that I discuss throughout this thesis is the relationship between the gut and the brain. Gut reactions or hunches are autonomic nervous system responses with a role that has even been described in clinical practice literature (Kozłowski et al., 2017, Stolper et al., 2009a, Stolper et al., 2009b). I am writing about transforming my practice by means of self-reflective practice. So why couldn’t I embrace my gut feelings as signs of my emotional self-awareness?

I ended up deleting several sections and 2 whole chapters as part of the review of my writing that I engaged with after the symposium. I should have been disheartened to see my word count reduced by fifteen thousand words, but I was actually thrilled with the outcome because, in doing so, I had incorporated the iterative writing method that I have used throughout my thesis, based on Barbara Turner-Vesselago's "freefall style" (Turner-Vesselago, 2016), which I'll discuss further in [chapter 4](#). Most importantly, I decided to listen to my gut and to not let preconceived ideas of rigour based on positivist approaches to science get in the way of my creative self. The tangible result you see in front of you my laying out this chapter, "a situated knowledge landscape" rather than as a traditional literature review. I knew this might come across as unorthodox, but that was a risk I was prepared to take. My intention was to tap into the deep reserves of knowledge that were present in the chapter, but to do so in a very practical way. I wanted to demonstrate my being a transdisciplinary practitioner in an emerging field, someone who had been truly immersed in the creation of real-world applications of "gut-brain axis" or gut microbiome and mental health science. The concept of a literature review reminded me of the split between "lab work" and "theoretical work" in my clinical neuroscience masters where even the assignments were marked as "lab-based" or "theoretical". My experience during my DProf had been completely different and I wanted this chapter to be a reflection of that very fact. I wanted to demonstrate that I had engaged with an extensive body of literature as translator of science and a knowledge broker, depending on the context where I was operating. I have – and continue to – engage with science following a practice-based learning approach where I create knowledge that's useful for my own professional practice and that of others whilst reviewing the ever-growing evidence base on the gut microbiome and its interface with the nervous system, both in health and disease.

Ultimately, the aim of this section is to demonstrate that I am not trying to “short-change” my thesis by not including a traditional literature review on the gut microbiome and mental health. Quite the opposite, I feel as if I have been speaking two languages, one that enables me to verbalise my experience of professional practice, and a second one that helps me describe my engagement with the subject disciplines I have focused on during my DProf. I have dived deep into the vast field that is action research in order to acquire the vocabulary that has helped me express my engagement with my practice, whilst being immersed in work-based learning activities that have generated several tangible outputs, such as peer-reviewed journal articles, book chapters, or professional research reports.

Below are some key examples of my immersive literature review experience. I refer to them at various different points throughout my thesis, but I do feel the need to highlight them here as evidence of my practical engagement with the science in the emerging field of the gut microbiome and brain / mental health, as discussed above:

- **My paper “Harnessing the Power of Microbiome Assessment Tools as Part of Neuroprotective Nutrition and Lifestyle Medicine Interventions”.** This is an extensive critical narrative review of 251 articles from a practitioner’s perspective, where I explored the physiological processes that influence both gastrointestinal, as well as brain health, focusing on how tools such as “the characterisation of commensal bacteria, the identification of potential opportunistic, pathogenic and parasitic organisms and the quantification of gut microbiome biomarkers and metabolites can help inform clinical decisions” where the goal is to slow down neurodegeneration and to promote neuroprotection (Toribio-Mateas, 2018a, p. 1). The paper was published in

a special issue on “the microbiota-gut-brain axis” in the peer-reviewed journal *Microorganisms* MDPI, which has an impact factor of 4.128 (2020) and a Q2 JCR rank in Microbiology. In April 2018 and it triggered a completely unexpected positive response by the academic and scientific community in this field becoming the number 1 most read / downloaded article in *Microorganisms* in 2018 and being featured in a banner on the MDPI home page. To date, that paper has attracted an Altmetric attention score of 163, meaning that it is in the top 5% of all research outputs scored by Altmetric (2021). The reason this discussion is relevant is as follows. I was going round in circles trying to complete the literature review for my DProf as if I was on a traditional PhD pathway. I was listening to some friends who were at similar stages of their doctoral (PhD) journey. They had narrow research questions, so for them it was easier to focus on trawling the literature for answers. But my scope was still too broad at that stage, and I didn’t want to commit to narrowing it. I did know, however that the gut microbiome and mental health was the top subject discipline I wanted to focus on, and that I wanted to bring the patient into the picture because I felt their experience mattered so much, yet most studies just saw them as subjects to study from a value neutral perspective. Driven by the will to focus on the patient as a person, rather than as a number in a clinical trial, and by my intense curiosity about the science documenting the communication between gut bacteria, the brain, and the rest of the nervous system, I wrote the paper as my literature review, taking the best part of a year to do so from conceptualisation to publication and dissemination in various forums, from podcasts to blogs and newspapers / magazine quotes.

- **My 27-page book chapter entitled “Neuroprotection, Aging, and the Gut–Brain Axis: Translating Traditional Wisdom from the Mediterranean Diet into Evidence-Based Clinical Applications” (Toribio-Mateas, 2018b) in the book “Nutrition and Integrative Medicine: A Primer for Clinicians” (Bakhru, 2018),** edited by Dr Aruna Bakhru MD, a Board Certified physician (Internal Medicine) and a Fellow of The American College of Physicians, published in August 2018. I reviewed around 200 papers focusing on the intersections of translational aspects of neuroscience, neurology, microbiology, nutrition, and lifestyle medicine.
- **My chapter “Diet and the microbiome in precision medicine” (Toribio-Mateas and Bester, 2020)** in the Elsevier Science / Academic Press textbook “Precision Medicine for Investigators, Practitioners and Providers” (Faintuch and Faintuch, 2020), edited by two world-leading gastroenterologists.
- **My chapters “Cognitive Health through Gut–Brain Communication” (Toribio-Mateas, 2020b) and “The Evidence Base in Personalized Nutrition” (Toribio-Mateas and Walker, 2020)** in the practitioner textbook “Case Studies in Personalized Nutrition” (Walker, 2020).
- **My recently published paper “Impact of Plant-Based Meat Alternatives on the Gut Microbiota of Consumers: A Real-World Study” (Toribio-Mateas et al., 2021),** which documents the effects of flexitarian consumer behaviour around food choices and the effects this has on the gut microbiome. This is my first randomised controlled trial, which I managed as principal investigator from

conceptualisation to publication in the journal Foods (MDPI). Foods has a Q1 CiteScore journal rank in the “Health Professions, miscellaneous” category and a Q2 JCR journal rank in Food Science and Technology. I worked on this research project from September 2020 to August 2021, reviewing a library of over 300 papers, 171 of which made it to the references in the published article.

- **The paper “Trialling a microbiome-targeted intervention in children with ADHD – the rationale and a non-randomised feasibility study” (in press)**, which I co-authored alongside a team of neuroscientists and psychologists from St Mary’s University and Goldsmiths University of London and is currently being peer reviewed for publication in BMC Pilot and Feasibility Studies.
- **A range of professional education materials** including my workshops on nutrition for optimal psychological resilience via the gut-brain axis for Lloyd’s Bank Optimal Leadership Resilience Programme, my clinical education roadshow workshops for Cytoplan, and my research project on “Eating for Optimal Cognitive Function” for the Advanced Workplace Institute.

All of these research outputs can be accessed from the Professional Landscape page on “The Creative Scientist” at <https://thecreativescientist.co/creations/landscape>. The site is password protected, so you will need to type **thesis2021** when prompted. Please note that the password is case sensitive. A copy of the child ADHD manuscript currently under review is available from the “Untold narratives” page of the website: <https://thecreativescientist.co/creations/untold>.

3.3. Key ideas / big voices

I decided to become a neuroscientist later in life. This means I had to learn to become a neuroscientist, and I also had to learn to realise that particular occupational identity.

According to educational scientist Selena Chan, becoming enculturated into the material, social and affective dimensions of one's practice, workplaces and society is like learning a trade where there is a lot of learning by doing as well as learning by interacting with peers in the same field (Chan, 2020). This is what she describes as "learning to become" (Chan, 2021, p. 17-20). The learning that emerges out of that enculturation contributes to "learning as becoming", i.e., learning as the realisation of my professional identity as a neuroscientist (Chan, 2021, p. 15), which is tightly linked to feeling part of a community of individuals who share interests and work practices that are situated "[in] the here and now, [as] experiences of belonging leading to the perceived interpretation of being one among equals across organisational boundaries" (Filstad et al., 2019, p.116). In the process of thinking about my literature review I realised that I was never going to learn to become or experience "learning as becoming" a neuroscientist from carrying out a theoretical exercise. This is why I chose to go with a "situated knowledge" landscape that illustrates the immersive living and learning I have experienced during my DProf journey more truthfully.

As I explained in the previous section, I am acutely aware of the fact that this may appear unconventional but – to borrow the words of Kate Maguire – I trust my choice to represent "the most convincing thread of coherence, made on the basis of personal and professional integrity demonstrated by reasoned argument, attention to detail[,] authenticity and rigour in every thought, word and action underpinned by [...] my self-awareness and respect" (Maguire, 2019, p. 113).

Coghlan et al (2019) differentiate between the core and the thesis projects as contributing pieces to demonstrating doctorateness. Aside from matters of authenticity, trustworthiness, and ethical stance, there's a part of me who wishes to rebel. It has always been there, and it dislikes fixed rules. Psychiatry literature defines this trait as "oppositional defiant disorder" (ODD) (Adamou et al., 2013), suggesting that it occurs in up to 60% of individuals with attention deficit and hyperactivity disorder (ADHD) (Sadek, 2019, p. 40). In my case, I don't feel the urge to disrupt just for the sake of it, which is one of the prominent signs in ODD. However, I do feel the urge to engage in positive disruption of systems such as professional practice and academia, where I would really love to be able to apply the insight I have developed during my DProf as "an imaginative process that precedes change through [my] ability to [think about] things differently" (McKeown, 2019, p. 115) so that I can really make a difference. From that point of view, I trust my professional and researcher integrity as much as I trust that of those academics who "have a responsibility of trustworthy care in practising their transcendent moral duty to help students make authentic, personal decisions that prepare them to take up a significant, worthy place in the world" (Gibbs et al., 2019, p. 8).

It is voices such as those of Professor Paul Gibbs that inspired me to embrace the rebel and the creative in me to continue to engage in positive disruption. But there is a myriad of key ideas and big voices that continue to inspire me. Some I have already mentioned in [chapter 1](#) and [chapter 2](#), which I see as testimony of my commitment to working with multiple epistemologies to create the version of action research I have used as an approach for improving my professional practice. The rest I cover in this section, and I have created a bubble diagram to help me present them in visually.

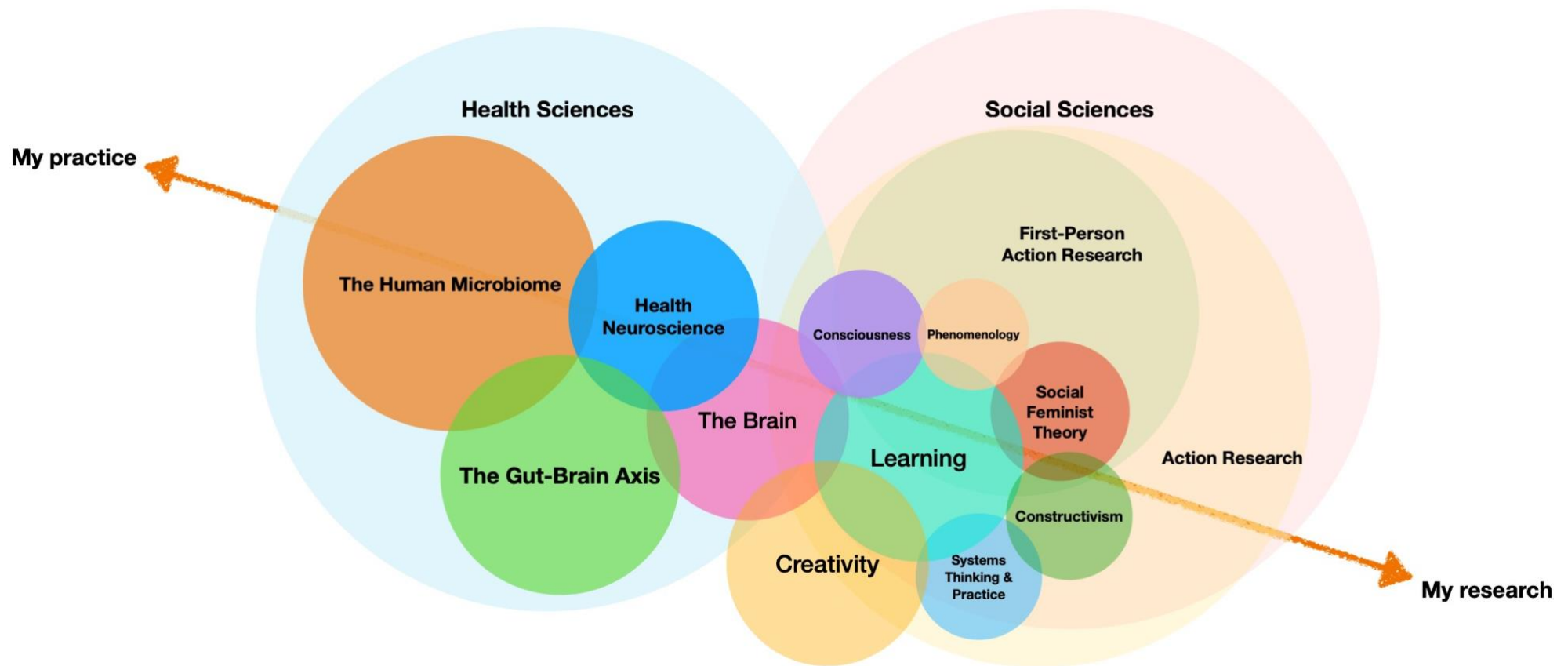


Figure 9. Themes that influence my influence my doctoral research

A bubble diagram of the themes that had the biggest influence in my doctoral research. Of particular importance are the intersections between the themes. The size of the bubbles represents the impact the themes have on my inquiry. The line across the themes represents my transdisciplinarity approach to research and practice.

The way I think of inquiry now is completely different to what it was 5 years ago. Throughout my DProf journey I have developed an interest in the intersection between the health and the social sciences. The approaches used to generate and assess knowledge in these two branches of science can sometimes clash, but I believe they can coexist happily. Indeed, transdisciplinary practice is the art of facilitating that happy coexistence. Amongst the inspiring big voices that I look up to in each of the areas I've highlighted above are those of the following individuals:

- **Tim Spector.** I admire Prof. Spector for driving the science on the role of the gut microbiome in health and disease, and for his ability to do that in a translatable way. He has co-authored gems such as “Effect of Diet on the Gut Microbiota: Rethinking Intervention Duration” (Leeming et al., 2019), “The complexities of the diet-microbiome relationship: advances and perspectives” (Leeming et al., 2021), and “Food: a new form of personalised (gut microbiome) medicine for chronic diseases?” (Pallister and Spector, 2016), all fantastic resources for me and my colleagues when designing interventional studies targeting the microbiome. He's amongst the world's top 1% most cited authors, so these are just a drop in an ocean of respect I have for him as a driving force in the area of human microbiome science that's applied and sensitive to real world settings.
- **Ted Dinan and John Cryan.** Professor Ted Dinan is a psychiatrist at University College Cork. Together with John Cryan, Professor of Neurobiology also at UCC, they are my top two most influential scientists documenting the ongoing communication between the gut microbiota, the gut, and the brain. They have published over 400 papers together, some of which I have read tens of times, including “The Microbiota-Gut-Brain Axis” (Cryan et al., 2019), “The Gut Microbiome in Neurological Disorders” (Cryan et al.,

2020), “Probiotics and the Microbiota-Gut-Brain Axis: Focus on Psychiatry” (Mörkl et al., 2020), “Brain-Gut-Microbiota Axis and Mental Health” (Dinan and Cryan, 2017a), “Feeding the microbiota-gut-brain axis: diet, microbiome, and neuropsychiatry” (Sandhu et al., 2017) and “Gut Microbes and the Brain: Paradigm Shift in Neuroscience” (Mayer et al., 2014a).

What I love most about Spector, Cryan and Dinan is that their style reflects their personalities. They are incredibly bright scientists who can dive deep into pretty dry material about genetics and metabolic pathways, but they come across as humans who are humble and aren’t on a pedestal looking down at the rest of the world on the basis of the privilege they enjoy by means of their professional status. I’ve had the chance to work closely with Spector, briefly with Dinan, and have just met Cryan once at a conference. They’re all jovial, gentle individuals, and when they present to an audience or are interviewed, this comes across quite clearly. They are able to translate the most complex concepts into plain English, and their more accessible works like mainstream books and blog articles are always an absolute pleasure to read.

- **Antonio Damasio.** My favourite neuroscientist. Why? Because he is the head of the Brain and Creativity Institute at University of Southern California, where he looks into aspects of the brain such as the role of creativity and imagination in decision-making (Damasio et al., 2013). Throughout his prolific career dating back to the 1960s in his native Portugal, Damasio has documented the intersection between the brain, creativity and consciousness in absolutely brilliant books like “Self Comes to Mind: Constructing the Conscious Brain” (Damasio, 2012), focusing on cortical and subcortical brain activity

during the feeling of self-generated emotions (Damasio et al., 2000), an area that fascinates me because using writing as inquiry can sometimes feel like using writing as a therapeutic tool. One of this key research areas is the activation of different brain areas during autobiographical processes such as reflection (Araujo et al., 2013) and the biology of consciousness (Damasio, 1998), which he describes in the most eloquent manner, using a combination of cognitive and neurobiological methods to approach these first-person phenomena that are so difficult to study. From that point of view, Damasio sits at the junction between the harder health sciences and the softer social sciences, and I look up to him as an absolute inspiration.

- **Kirk Erickson.** Professor of psychology at the University of Pittsburgh. His paper “Health Neuroscience: Defining a New Field” (Erickson et al., 2014) lays out a fascinating paradigm for a field of neuroscience that includes the relationship between the gut microbiome, the brain, the nervous system, and human emotions as well as physical health. Other captivating works that continue to inspire me include the “Relationship between Dispositional Mindfulness, Psychological Health, and Diet Quality among Healthy Midlife Adults” (Donofry et al., 2020), and “Greater intake of vitamins B6 and B12 spares grey matter in healthy elderly: a voxel-based morphometry study” (Erickson et al., 2008).

- **Francisco Varela.** A transdisciplinary practitioner whose research trajectory cuts across biology, philosophy, cybernetics, and neuroscience. His books “The view from within: first-person approaches to the study of consciousness” (Varela and Shear, 2002) and “The tree of knowledge: the biological roots of human understanding” (Maturana and Varela, 1998), and “Ethical know-how: action, wisdom, and cognition” (Varela, 1999) are fundamental for anyone interested in the overlap between neuroscience and phenomenology. In fact, his papers “Neurophenomenology: A methodological remedy for the hard problem” (Varela, 1996) and “First-person methodologies: What, why, how?” (Varela and Shear, 1999b), both of which were published in the *Journal of Consciousness Studies*, cover many of the foundational ideas that Torbert and Reason developed from an action research standpoint, particularly the entanglement of first, second and third person realms to inquiry (Reason and Torbert, 2001, Torbert, 2001, Torbert and Taylor, 2008). “Life after Kant: Natural purposes and the autopoietic foundations of biological individuality” (Weber and Varela, 2002) is also a highly influential paper for anyone interested in systems thinking and practice, as it describes the self-organising characteristics of complex adaptive systems that I’ve referred to a few times throughout this thesis.
- **Deanna Minich.** A scientist who is also an artist and who I admire deeply. She finds inspiration in her painting that she then transfers to her research questions. Works that have influenced me, apart from her vibrant personality and incredible professionalism, include “A Review of the Science of Colorful, Plant-Based Food and Practical Strategies for “Eating the Rainbow” (Minich, 2019) and “Personalized lifestyle medicine: relevance for nutrition and lifestyle recommendations” (Minich and Bland, 2013).

- **Trisha Greenhalgh.** Professor of primary health care at Oxford University, where she and heads several research initiatives. Most relevantly for me the “translational health sciences” programme that focuses on the social science of innovation, taking a transdisciplinary approach to translating healthcare science into real-world applications. The most important reason why I got attracted to Prof. Greenhalgh’s work is the fact that she appreciates the role of complexity science in healthcare, which she sees as complex system with fuzzy boundaries. She has published several papers on that subject, including a whole special edition on complexity science in the British Medical Journal back in 2001, just when I was studying this very subject at the Open University, so my obsession with her work started a long while ago. Her articles “The challenge of complexity in health care” (Plsek and Greenhalgh, 2001a) and “Coping with complexity: educating for capability” (Fraser and Greenhalgh, 2001) should be included as reading materials for every healthcare practitioner, as well as for researchers in the health sciences. The following extract from the latter paper explains why I think so:

“In today's complex world, we must educate not merely for competence, but for capability (the ability to adapt to change, generate new knowledge, and continuously improve performance).

“Capability is enhanced through feedback on performance, the challenge of unfamiliar contexts, and the use of non-linear methods such as storytelling and small group, problem-based learning.” (Fraser and Greenhalgh, 2001)

- **Amanda Kirby.** Professor Kirby describes herself as an unusual professional who wears many different hats. She's a medic, an academic, an entrepreneur, and a parent / grandparent of a neurodivergent family. She's Chair in Developmental Disorders at the University of South Wales and has published extensively on ADHD and other neurodevelopmental disorders like dyspraxia and dyslexia (Mcardle, 2018a, Rutherford and Pickup, 2015, Seamon, 2015). Her work inspired me to include my lived experience as a neurodivergent individual in this thesis. I believe that the more these neurotypical people are used to our way of seeing the world, the better we can all get to know each other. I am grateful to Prof. Kirby for the dissemination work she does to champion neurodiversity, changing the narrative about conditions such as ADHD, and helping everyone have better conversation. I particularly love her ability to translate these concepts into engaging posts on social media, as seen below.

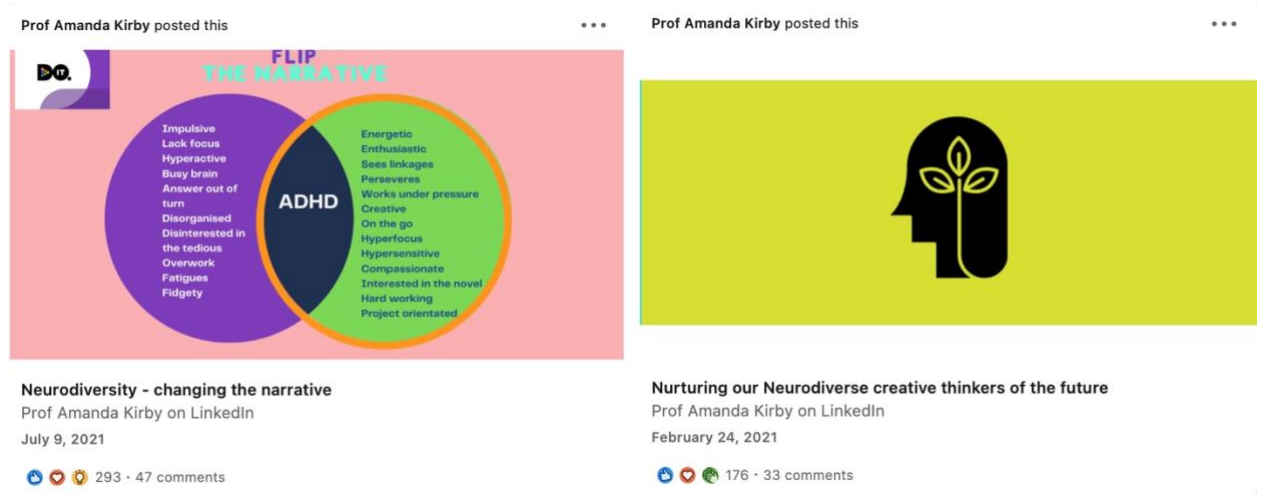


Figure 10. Neurodiversity – changing the narrative

A screenshot of a couple of LinkedIn posts by Prof. Kirby, highlighting the importance of changing the narrative about ADHD, and focusing on understanding different ways of thinking.

- **Neil Bindemann.** An immunologist and neuroscientist who I have reconnected with recently and who is the driving force behind a couple of the work ventures I refer to later in this chapter: NeuroDigest and the Primary Care & Community Neurology Society.

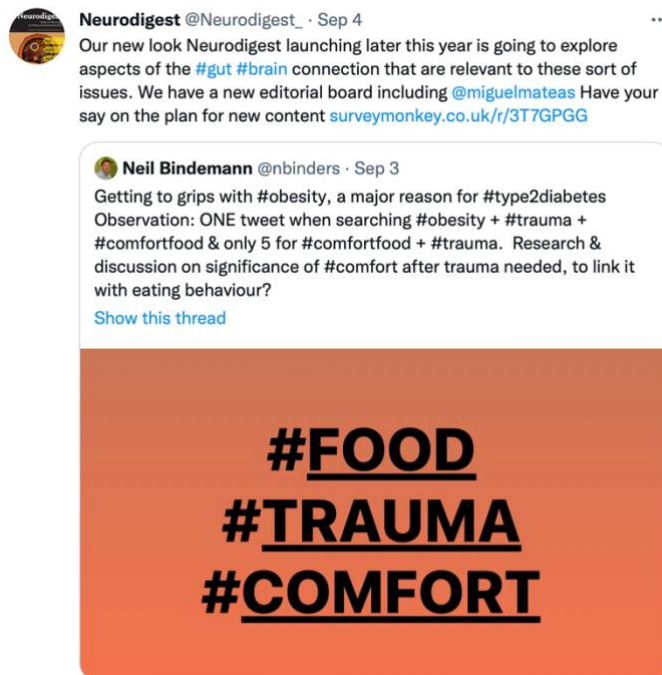


Figure 11. A tweet by NeuroDigest

Featuring an invitation for subscribers to have their say about an upcoming editorial theme.

Neil was really ill with a brain tumour about in 2015 and experimented with his nutrition and lifestyle, which helped his recovery. As a result of that experience, he embraced the value of first-person

narratives and inclusion of views by everyone involved in any community. He heads the secretariat of the Sleep Society, the Society for Research in Rehabilitation. He is also the founder of “The Lifestyle Health Foundation”, “a social enterprise bringing a community of people & organisations together who share the vision and mission to learn about lifestyle health and its importance, especially in the early years of a child’s life in preventing many mental and physical health problems” (Bindemann, 2021) that I support as a “Lifestyle Health Ambassador Leader”. Neil is not a published author or a famous scientist, but his drive to engage with people who have a story to share, and on the therapeutic and community-forming value of those personal narratives is absolutely inspiring.

- **The Social Sciences bubble.** [Chapters 1](#) and [2](#) feature the key thinkers that have stimulated my appetite for [the key ideas I summarised in figure 9](#). On that basis, I my for love Haraway, Barad, Ellsworth, Judi Marshall, Reason, Coghlan, Polanyi et al. However, I would like to pay a special mention to Laurel Richardson, Professor Emeritus of Sociology at the Ohio State University. Her work on “Writing as Method” (Richardson and Adams St. Pierre, 2008, St. Pierre) and her intense appreciation of autoethnography as a research method, along with her substantiation of the value of personal narratives (Richardson, 1990, Richardson, 2000) have had an incredibly deep influence on me. And the same goes for Gillie Bolton’s work on reflective practice and professional development (Bolton, 1999a, Bolton, 1999b, Bolton, 2005, Bolton, 2006, Bolton, 2009) with an emphasis on writing as a tool for growth with immense therapeutic value. Taken together, Richardson’s and Bolton’s influence, with a touch of everyone else in this bubble, explain my writing style.

Another key group of influencing voices are based at Middlesex University and include Carol Costley, Professor of Work and Learning at Middlesex University (Costley, 2013, Costley, 2015, Costley and Armsby, 2007, Costley et al., 2010, Costley and Fulton, 2019, Costley and Pizzolato, 2017), Kate Maguire, Associate Professor (Practice) (Maguire, 2015a, Maguire, 2015b, Maguire, 2015d, Maguire, 2018, Maguire, 2019, Maguire, 2021), Paul Gibbs, Professor of Education (Gibbs, 2011, Gibbs, 2014, Gibbs, 2015, Gibbs, 2021, Gibbs and Maguire, 2016), Brian Sutton, Professor of Learning Performance (Loo and Sutton, 2020b), and Dr David Adams (Adams, 2014). Each of these academics possesses a unique voice, but they are all at the forefront of transdisciplinary inquiry and their work, lectures, and support throughout my DProf journey has had a tangible impact in changing the way I see the world and the way I go about my research and practice.

3.4. Situated knowledges

This section's title is inspired by Donna Haraway's article "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective". In her paper, Haraway debates that the creation of scientific knowledge must acknowledge the concrete or "real" as well as the semiotic. She argues for "politics and epistemologies of location, positioning and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims" (Haraway, 1988b). This makes a lot of sense to me as an applied scientist whose research is work-based, but not confined to a lab. I operate in the real world, and this requires me to embrace "the sciences and politics of interpretation and translation" because knowledge contained by boundaries "remains generative" and "productive of meanings" that are always only partly understood (Haraway, 1988b). As a transdisciplinary practitioner, I see inquiry as much more than "just research" in the experimental sense of the word that is often used in the health sciences. Throughout my DProf, I have realised that inquiry isn't just experimental research, as in some of the projects that I will discuss [in chapter 5: "Stories of inquiry"](#). Inquiry is an attitude that enables me to learn about myself as I learn about my practice. As a result, adopting this kind of attitude has meant spotting opportunities for research beyond what I had imagined. Every day, my inquiry encompasses the application of knowledge pertaining to a range of discrete subject disciplines to a context that is localised and in constant state of flux. The possible permutations of subject disciplines and localised professional contexts are infinite, so there are no guidebooks that provide a set of rules to follow, aside from obvious codes of conduct. Scholarly professional inquiry has freed me from the need of being attached to an academic institution for every single one of my projects to materialise whilst committing to quality standards equivalent to those of an academic researcher.

It has also enabled me to be more creative in terms of my hypotheses and how I've gone about testing them. Some might think that this is easier than a traditional PhD, whereas my eyes have been opened to how much more difficult it is to transcend boundaries and disciplines and to sit above and beyond the limits imposed by classical research methods, whilst being absolutely committed to the scientific rigour of my work and having to deal with the daily challenges of a demanding professional landscape.

For example, with regards to my own practice, in my R&D work I am bound to professional standards by the Royal Society of Biology, which encompass those by the British Neuroscience Association, and the Microbiology Society, the Society for Applied Microbiology. However, nowhere in these documents can I find guidance on what to do in a typical day which, typically, means my performing a range of activities that span across nutrition, microbiology, clinical education, marketing / business development and neuroscience. Maguire would describe this situation as being “in a constant and intensified mode of *“trans-lating”* across different realms of experience, domains of practice, epistemological paradigms, objects of knowledge, learning and relational styles, values and purposes”, a defining characteristic of doctoral level professional studies and work-based learning (Maguire, 2015c, p. 165). I am required to be creative in my generation of knowledge because there isn't a “Being Miguel for Dummies” book I can refer to, and the outcome of my work activities has a tangible impact on the professional ecosystem I am embedded in. But the beauty of transdisciplinarity is that one can borrow from a myriad of backgrounds across several disciplines, assembling appropriate pieces of evidence to create a valid sense-making framework.

Some domains provide abundant sources of literature on professional practice matters that help me illustrate the point I make about borrowing and assembling. One of them is social work, a field where Professor Pamela Trevithick sees theory, facts, and “practice/practical/personal knowledge” as being interwoven (Trevithick, 2007). Monica Kjørstad, a social scientist at University of Oslo, refers to this interweaving as an ongoing “interplay between practice-based and research-based knowledge” (Kjørstad, 2008). Helen Brodin - a Swedish sociologist whose research on the intersections of gender, ethnicity and professional practice (Brodin and Peterson, 2019a, Brodin and Peterson, 2019b) I find absolutely fascinating - explains how social workers must learn to “synthesise theoretical knowledge, know-how, prudence and practical wisdom” in order to become wise practitioners (Brodin, 2011). She describes professional practice knowledge as “socially situated knowledge constituted by a combination of:

1. declarative (*know that*),
2. procedural (*know-how*) and
3. conditional knowledge (*knowing when and why*)” (Brodin, 2011)

I believe that the kind of integrative knowledge framework discussed by Brodin, Trevithick, and Kjørstad is absolutely appropriate for practitioners beyond the context of social work. In fact, I can see it clearly applying to me. Furthermore, I believe that these interconnected streams of knowledge converge with our own personal mastery which, according to Peter Senge, is the “the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality more objectively” (Senge, 2006, p. 10). Senge, who is a world-leading figure in the transdisciplinary areas of complex

systems and organisational learning, summarised this conundrum in his book “The Fifth Discipline”, where he wrote about how in systems thinking “the component parts are so interdependent that events “distant in time and space” have hidden influences on one another so that one can only understand what is happening by contemplating it as a whole” (Goldman Schuyler, 2020).

Zooming out to get a global view of the set of circumstances I am immersed in can be quite difficult, but I still need to do it. It is often the only way for me to decide how to deal with problems as they emerge. Then I find myself needing to find meaning in that emergence, engaging in a hermeneutical process that enables me to “develop a refined capacity to intuitively grasp salient features of ambiguous situations”, creating “a landscape of possible paths of response, while driven by the pursuit of the notion of the common good” (Shotter and Tsoukas, 2014). Therefore, the purpose of this professional knowledge landscape chapter is to help me articulate the context contributing to the paths of response that have materialised into some of the project activities that I discuss in detail in [chapter 5](#).

3.5. Indwelling

The professional landscape I inhabit has experienced a radical transformation throughout the time I've been registered as a doctoral candidate at Middlesex University. Alongside it, my professional identity has also changed dramatically. To illustrate these points, I am bringing back the professional landscape timeline I introduced in [chapter 1](#).

When I joined the DProf programme in late September 2016, I had been self-employed for over 6 years. I was running 2 businesses. One was a consultancy business that allowed me to continue to do contract / freelance work in medical informatics, the branch of information systems that encompasses “the development of methods and tools of information processing for:

“(1) diagnostics ('the visible body'); (2) therapy ('medical intervention with as little strain on the patient as possible'); (3) therapy simulation; (4) early-recognition and prevention; (5) compensating physical handicaps; (6) health consulting ('the informed patient'); (7) health reporting; (8) health care information systems; (9) medical documentation and (10) comprehensive documentation of medical knowledge and knowledge-based decision support.” (Takeda, 2010) cf. (Lorenzi, 2002)

I had been immersed in this professional field since the early 2000s, working in roles spanning product development to training / education.

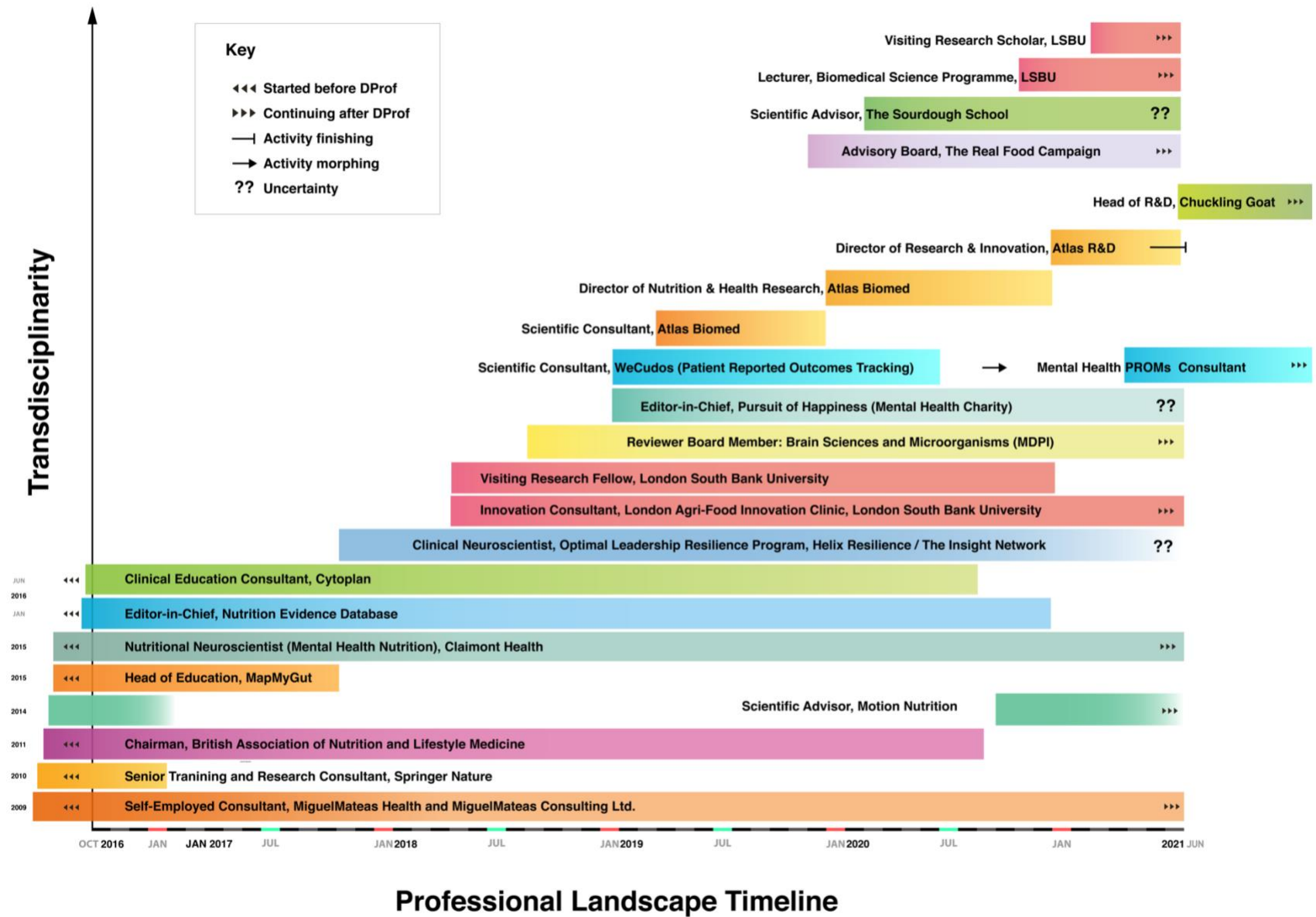


Figure 12. Professional landscape timeline

A timeline diagram illustrating the transdisciplinary nature of my professional activities throughout my DProf.

I spent the last 7 years of my full time employment working for Ovid Technologies (Ovid for short), a health information systems and technology company specialising in “premier medical, nursing, and allied health content; clinical decision support tools; drug information and patient surveillance; structured documentation and coding; healthcare terminology, data management and systems interoperability solutions; precision medical research tools; and continuing medical education solutions” (2021). Ovid is the medical research branch of Wolters Kluwer Health, “a global leading provider of trusted clinical technology and evidence-based solutions that engage clinicians, patients, researchers, students, and the next generation of healthcare providers” (2021). In 2010 I decided to leave Ovid to start my own company and I was lucky enough to land a contract with Springer Nature as Education and Research Consultant. My role involved providing support to researchers in academic institutions, hospitals, and corporate R&D departments. I designed and delivered training on scientific, technical, and medical (STEM) databases including SpringerLink, Springer for R&D, Springer Images, Springer Protocols, Springer Reference, and Springer Materials research platforms. My focus from 2014 was on Adis databases for pharmacology data, from drug safety and pharmacovigilance to clinical trial design and methodology. As a sample of my work, I was involved in a project to support the setting up of a consortium of scientific libraries in Belarus, I delivered workshops to young researchers looking to increase the quality of their scientific publications in Saudi Arabia and trained Medical Doctors on the importance of image retrieving techniques as part of a cancer research project in Oman. And from 2014 to 2016 I supported the development local product adaptations for Spain and Spanish-speaking Latin America.

By the time I started my DProf I had been working for Springer Nature and had also been practising as a nutritionist for over 6 years. I had just completed my master's in clinical neuroscience, and I was ready for a change at professional level. I wasn't as interested in continuing with my own nutrition clinics, which I had started to discontinue in order to accommodate some contract work with Claimont Health (2018). I enjoyed a very good working relationship with Claimont's CEO, Consultant Psychiatrist Dr Vince Gradillas, and I prioritised working with him as part a multidisciplinary team including psychiatry, clinical psychology, nutrition, sleep physiology, sports therapy, which provided me with a rich learning environment that I thrived in.

The reason why I've gone back into my professional past in such detail is to highlight the notion of *indwelling* that is central to Polanyi's insight on personal knowledge (Polanyi, 2015). I couldn't have learned all that I did throughout my 20 years in information systems by simply observing from the outside. The years that I spent embedded in the context of health information systems gave me the opportunity to immerse myself in complex subjects "through the account or story in the knowledge" (Cho et al., 2016), just as you do when you learn a language in a foreign country. You try even if you fail and learn from each failure to become better at it, like a perpetually iterative action research cycle. My interaction and communication with a varied range of stakeholders – from neurosurgeons to medical librarians, programmers and marketing professionals – enabled me to learn "as I worked", what Lave and Wenger call "situated learning" (Lave and Wenger, 1991), a constructivist concept that highlights the importance of participation in the creation and dissemination of knowledge. I believe I was successful in my training roles because I'm a storyteller. And, as Davenport and Prusak put it, "a good story is often the best way to convey meaningful

knowledge”, alleging to the power of narratives in exposing and capturing tacit knowledge (Davenport and Prusak, 1998), which is exactly what I was doing. I wasn’t an expert in all of the subjects I was discussing, but I knew how to find a good golden thread to convey my messages in a way that was uniquely relevant to my audience. I’d like to think of my ability to make a message my own as the “personalisation approach” to situated learning that Sense sees as “the agency through which tacit knowledge is exposed and shared” (Achalandabaso et al., 2014). And I’d also like to think that I’ve carried some of that personalisation approach through with me as I’ve gone on to explore the new challenges and opportunities that have been provided by my professional landscape.

3.6. Reflexivity

For this section I have created a journal of the key activities I have been involved in since registering for my DProf in September 2016. The exercise of documenting what I was doing at different points in time throughout my doctorate has helped me learn about the reasons why I engaged in those activities, and indeed the reasons why I stopped doing what I was doing and moved on to do something else. On that basis, I would like to think of this exercise as my own version of a learning history, a narrative method rooted in ethnography, history and journalism that “collects and evaluates experiential knowledge of individuals and teams about critical events in the past” in order to identify and present issues past mistakes or to come up with new solutions to existing problems by looking at professional processes from various perspectives (Thier, 2020). A learning history typically involves capturing “memories in the making” with first-, second- and third-person dynamics where, like any action researcher, the learning historian is required to use “first-person practices to interrogate the assumptions and positions

that guide her choices and inform her approach” (Gearty and Coghlan, 2018). In a previous version of this thesis, I had ended up writing a long chapter that - in my director of studies’ words - was “full of weeds”. Adopting a year-by-year journal style facilitated the task of conveying the multiplicity of professional activities I have engaged in throughout my DProf, but the succinctness of this format didn’t make the exercise any less political or reflexive.

By the time I got to revising this chapter, my professional landscape had changed, as living proof that professional practice is in a constant state of flux. The most recent developments are illustrated in Figure X, and they are also spelled out in the following journal of my professional activities from 2016 to 2021. I found myself questioning my choices with regards to the creation of the story I was telling, reflecting on my own agenda for staying in roles or leaving them, and “interrogating power asymmetries inherent in the process” (Gearty and Coghlan, 2018). Fortunately, I am a bit of a hoarder when it comes to digital data. I never delete any emails or calendar appointments, and I make notes in my calendar app to remind me of matters I must bring up at meetings, as well as of anything interesting that was discussed. I thought this would be a quick and easy task but going through that material ended up taking me about 10 days during which I was able to engage with my own aspirations, values, and commitments, watching them evolve as I travelled with them along the timeline I was exploring. Reflexivity is a process through which “we create changes over time, through reflection and action in relation to our similarities and differences” (Teh and Lek, 2018). I know I have changed as a result of my DProf journey but situating myself in relationship to those I have worked with for the last few years made me realise of how much my worldviews have been transformed by the experiences I’ve lived since September 2016.

2016

Been working as Head of Education at microbiome startup MapMyGut with Professor Tim Spector at King's College London from September 2015.

Been working as Nutritional Neuroscientist with Consultant Psychiatrist Dr Vince Gradillas at Claimont Health, a mental health private medical care company from November 2015.

January

I become Editor-in-Chief of the Nutrition Evidence Database.

June

I finish my MSc in Clinical Neuroscience and join Cytoplan as Clinical Education Consultant.

September

I start my professional doctorate journey!

October

I get the Middlesex University Santander Work-Based Learning doctoral research award for my DProf project concept.

2017

February

I leave my role of Research and Education Consultant at Springer Nature.

I help organise and I am one of the speakers at the "Reversing the Clock on Biological Ageing" (a Cytoplan Event) conference with Professor Giovanni Scapagnini (Neurobiology) and Professor Gordan Lauc (Glycobiology).

May

I publish a paper with Professor Tim Spector about n=1 clinical trials, personalised healthcare and giving patients a voice.

April to October

I deliver 8 practitioner education workshops on "The Gut-Brain Connection" in 8 cities around the UK as part of the Cytoplan Practitioner Roadshow.

October

I formulate 2 award-winning neuroscience-based food supplements for brain health for nutrition startup Motion Nutrition.

And I leave my role at MapMyGut!

November

I start working as Nutritional Neuroscience Lead on the Lloyd's Bank Optimal Leadership Resilience Programme (OLRP) for senior executives, running the "Delivering Clinical Neuroscience In The Workplace" Nutrition Programme.

2018

April

I publish my paper on the gut-brain axis in Microorganisms MDPI. It's been read over 21K times, downloaded 16.5K times and cited 25 times to date (April 2021)

May

I join the London-Agri Food Innovation Clinic (LAFIC) as Innovation Consultant, working on small-scale clinical trials to assess the effect of fermented foods on cognitive performance. I am invited to join the School of Applied Sciences at London South Bank University as Visiting Research Fellow.

April to October

I deliver 8 practitioner education workshops on "Neuroimmune Health" in 8 cities around the UK as part of the Cytoplan Practitioner Roadshow.

October

My "Gut-Brain Connection" podcast with Dr Rangan Chatterjee is number 1 on the iTunes chart for a whole week!

February to November

I deliver 8 workshops to a total of 1,200+ Lloyd's OLRP delegates and conduct 75 one-to-one coaching sessions.

December

I am mentioned in Dr Chatterjee's Amazon bestseller book "The Stress Solution"

I am selected for a poster presentation at the Conference on "The Human Microbiome and Health" at the Wellcome Trust Campus in Hinxton.

Figure 13. Professional activities 2016-2018

Journal of key professional activities from 2016 to 2018.

2019

January

My paper Harnessing the Power of Microbiome Assessment Tools as Part of Neuroprotective Nutrition and Lifestyle Medicine Interventions makes it to number 1 most read article in the journal Microorganisms and is featured on the front page of the MDPI website.

I start contributing as a regular reviewer to the MDPI journals Brain Sciences, Microorganisms, Nutrients, and International Journal of Environmental Research and Public Health, completing 28 reviews to date (April 2021).

I start volunteering as Editor-in-Chief of the Pursuit of Happiness (a US-based mental health charity) knowledge database.

January to December

I join WeCudos as a Scientific Consultant. WeCudos is a clinical symptom tracking online platform based on patient-reported outcomes measures (PROMs).

I work on the co-design and implementation of PROMs of value to nutrition and lifestyle medicine practitioners, and I design 2 clinical audits with members of the British Association of Nutrition and Lifestyle Medicine (BANT).

March

I start working as Scientific Consultant for Atlas Biomed.

2019

June

I'm featured on ITV discussing hidden ingredients in supermarket foods and their effect on mental health.

I'm one of the keynote speakers at the "Love vs Trauma Symposium" at the Barbican Centre, talking about "Using the gut-brain connection to build resilience from the gut up" to 400 psychologists, trauma therapists, and psychiatrists.

July

I am invited to write a chapter on "Diet and the microbiome in precision medicine" by one of the world leading gastroenterologists, Joel Faintuch, for this book "Precision Medicine for Investigators, Practitioners and Providers" (Elsevier)

July to December

I am employed by the Advanced Workplace Institute to conduct a scientific review of the effects of nutrition on cognitive function in the workplace. I write an extensive report and provide a "plain English" presentation to the Institute's members (including companies such as LinkedIn, Ernst and Young, Balfour Beatty and Unilever) to summarise the findings and how to implement them.

October

I am one of the keynote speakers at the Nutritional Psychiatry Conference "Mental Health & Rethinking the Role of Food, Nutrients & Microbes".

December

I contribute to Dr Chatterjee's Amazon bestseller book "Feel Better in 5" with a section on the gut-brain connection and a smoothie recipe.

2020

January

I become Director of Nutrition and Health Research at Atlas Biomed.

I join the Scientific Advisory Boards of the Real Food Campaign and The Sourdough School.

I'm keynote speaker at the conference of the International Association for Clinical Psychoneuroimmunology in Madrid, discussing the role of the gut brain axis in health and disease.

February

My chapters "Cognitive Health through Gut-Brain Communication" and "The Evidence Base in Personalized Nutrition" are published in the textbook "Personalized Nutrition and Lifestyle Medicine for Healthcare Practitioners".

March

I start leading the "microbiome-gut-brain nutrition" piece for a mental health research study involving all 16 members of the Board of NatWest Bank and part of an organisation wide resilience programme.

I design an "inflammation and immunity" report for the Atlas microbiome test that provides a list of bacteria linked to inflammation / anti-inflammation, and a score for the user.

May

The Lloyd's OLRP programme is extended until 2022. At this point I've run 18 of my "Delivering Clinical Neuroscience in the Workplace" workshops, involving over 2,000+ Lloyd's employees.

A research study proposal to correlate microbiome patterns with resilience, stress and happiness of Atlas Biomed customers gets ethical approval by London South Bank University.

Figure 14. Professional activities 2019 to 2020

Journal of key professional activities from 2019 to May 2020.

2020

March to July

I design and deliver 2 practitioner education courses for Cytoplan: “Building Healthy Resilience” (a 6-week Mental Health and Lifestyle Medicine course with 20 hours of approved CPD) and “Building Healthy Immunity” (a 3-week Neuroscience and Nutrition course with 8 hours of approved CPD).

I design and deliver 3 sessions on nutrition, mental health and and gut-brain communication for “Webinars for GPs”, a company led by GP Dr Simon Wade, specialising in extra-curricular education for medical doctors in general practice.

August

Professor Brian Sutton’s book “Informal Learning, Practitioner Inquiry and Occupational Education” is published by Routledge. It features a case study provided by myself on “Becoming an Opinion Leader”.

I leave my role of Chair at BANT and my role of Editor-in-Chief at the Nutrition Evidence Database. Also, my contract with Cytoplan comes to an end.

I’ve been working on a study on the effects of sourdough and polyphenols on physical health and mental wellbeing with Vanessa Kimbell at The Sourdough School for a while now. The results are filmed and I discuss them with participants about on video. Also featured is the school’s GP and a fellow neuroscientist.

September

Vanessa Kimbell’s Amazon bestseller book “The Sourdough School: Sweet Baking: Nourishing the gut & the mind” is published. I wrote the Afterword for it. The Foreword was written by Prof. Tim Spector.

September - December

I film a programme on the fermented foods, the microbiome and mental health for Channel 4, and another one on processed foods, the microbiome and mental health for Channel 5.

2020

September- October

I put forward Motion Nutrition (the company I formulated brain health products for in 2017) as a candidate to a LAFIC-funded study on the effects of “Unplug” (a food supplement for relaxation and sleep) as reported by the company’s database of 35,000 users. The study is approved by LSBU with me as principal investigator.

October

I am approached by Meatless Farm (a world leading plant-based food company) to do a microbiome study with them. I introduce them to Atlas Biomed and London South Bank University and form a collaborative research group.

I speak at 2 events this month: the London Food Tech Week and Food Matters Live. At both events I discuss the value of direct-to-consumer microbiome testing and opportunities for new product development based on real world research.

November

I write about food, personalised health and direct-to-consumer genomics for “Food Science Hi Tech”, a professional monthly publication.

I present the results of the WeCudos x BANT clinical audits at the BANT Annual Conference.

Meatless Farm study ethics application is approved as “exemplary” and recruitment starts, filling all participant slots within 1 week.

I collaborate in the writing of a review on the effects of different dietary fibres on health and disease.

2021

January

I become Director of Research and Innovation at Atlas Biomed working intensely on R&D and new product development.

Ruby Wax writes about me in her latest book and how following my advice on microbiome and mental health was an interesting experience. We worked together for a few months in 2020 for this piece.

Meatless Farm study starts.

I represent Atlas Biomed at the Illumina-Eurofins Conference on “Preventative Genomics: Future Impact on Healthcare”, talking about D2C genomics and real world data.

I collaborate with a team of researchers in a paper on fibre types, microbiome and health benefits that is submitted to the journal Public Health Nutrition.

February

Meatless Farm study finishes and data analysis commences.

I present at the Probiota event on direct to consumer microbiome testing.

Figure 15. Professional activities 2020-2021

Journal of key professional activities from March 2020 to February 2021.

2021

February

I collaborate with a group of clinical psychologists in a pilot study on the effects of kefir on the severity of symptoms in children with ADHD.

I sign R&D contracts with Probio7 and Verm-X for microbiome studies as collaboration between Atlas Biomed and LSBU.

March

Internal negotiations with Atlas Biomed's legal department to get approval for UK-based, collaborative R&D studies.

ADHD study manuscript is rejected by Microorganisms MDPI and the team starts to rewrite it to resubmit to BMC Feasibility and Pilot Studies.

Fibres paper gets reviewer comments and needs to be amended before resubmission to Public Health Nutrition in May.

I speak at the "Transdisciplinary Perspectives on Practitioner Research symposium at Middlesex University

I am invited to join a steering group to help transform the Primary Care & Community Neurology Society into the updated Person-Centred Neurosciences Society.

2021

Just a few of the activities taking place from April

The Verm-X and Probio7 study proposals get ethical approval by LSBU. These are the first 2 studies I submit for ethical approval that feature qualitative methods including semi-structured interviews and the use of a patient-reported outcome known as MYCAW that generates mixed qualitative / quantitative data.

The professional journal Agro-Food Hi-Tech publishes my article on "Voice of Customer vs Innovation in Direct to Consumer Genomics".

I launch the first ever consumer research programme at Atlas Biomed. The first step is an extensive (10-minute) consumer survey that gets 300 responses within the first week. The next stage involves 2 research projects combining the use of Atlas microbiome tests and focus groups.

I start working on a new "Corporate Wellbeing" initiative at Atlas Biomed, aiming to provide a employee health package for companies that includes microbiome testing and mental health education.

I collaborate with a colleague (Leigh-Ann Stewart, who is completing her MSc in Transdisciplinary Practice at Middlesex University) to create an internal R&D project at Atlas Biomed to find out about the motivations by our users to retest.

I am invited to interview as Science & Technology Manager (Microbiome and Mental Wellbeing) at Unilever R&D. I decide the 9 to 5 is not for me, so I do the first interview, but do not take it further.

I am offered a role on the Editorial Board of NeuroDigest, a growing UK-based magazine, created with the aim of providing a central resource to keep health professionals up to date with news and reviews from across the neurology community. I also join the steering committee of the Primary Care & Community Neurology Society.

Plans to transform The Sourdough School into a research centre on the health benefits of sourdough start to materialise. I have conversations with the founder Vanessa Kimbell about becoming Research Director of the school.

The Waterloo Foundation charity approves funding for a randomised controlled trial on 70 children that follows the principles explored in the ADHD and kefir feasibility study. I am invited to join the RCT team.

I'm invited to get trained and on how to use the Therapy Outcome Measure (TOM), a patient-reported outcome measure used widely in the NHS, with views to becoming a trainer on it myself, helping healthcare practitioners understand the value of measuring the effect of their interventions.

The global publisher Wiley invites me as a speaker to do a series of webinars (some in English, some in Spanish) on the benefits of using scientific information resources in R&D roles.

I am one of the microbiome and mental health experts at "The Ingredients Show" in Birmingham (July 2021). Sadly this is cancelled on 15th June due to extended COVID-19 restrictions.

I'm invited as a speaker at the "Translational Microbiome Conference" in Washington DC in October 2021. I'm also invited to talk about the gut microbiome and mental health at the Sports & Active Nutrition Digital Summit in October 2021. This is an online event by NutraIngredients.

June-August

I leave Atlas Biomed and become Head of Research and Development for Chuckling Goat, manufacturers of kefir products, working on a joint project with Cambridge University to launch a new direct-to-consumer microbiome test and probiotic products. I also start developing a "Happy Kefir" with added nutrients that enable Chuckling Goat to have some health claims supporting the use of kefir for the maintenance of mental health. And I start putting together a "Teenage Mental Health" microbiome and mental health education kit that would help 13 to 18 year olds understand the role of gut bacteria in anxiety / depression.

"My Fibres paper" is published in the journal Public Health Nutrition, and I submit "My Meatless RCT" to the peer reviewed journal Nutrients. This is my first clinical trial as Principal Investigator. The paper is rejected by Nutrients but is accepted by the journal Foods in August.

I start working on a new patient-reported outcomes consultancy business with Dr Adam Read of WeCudos.

Figure 16. Professional activities 2021

Journal of key professional activities from February 2021 and into the rest of the year, as of June 2021.

It was like turning the researcher lens back onto myself (Berger, 2015) to recognise and take responsibility for my own situatedness within the process of inquiry I have been living in, reflecting on the effect that each of my professional activities may have had on the people involved and the networks they were part of. It also gave me the opportunity to revisit the kind of questions I was aiming to answer through my inquiry, and how my data collection methods and my attitudes towards methodology have changed over time.

This wasn't my first attempt at being reflexive. The "curious practitioner" taught module delivered by Prof. Sutton, Dr David Adams and other members of the Transdisciplinary Doctorates programme at Middlesex University early in 2017 emphasised the importance of engaging in reflexive practice early in developing the research proposal because "to be reflexive takes time and one gets better at it with each successive encounter" (Dodgson, 2019).

"Researchers need to increasingly focus on self-knowledge and sensitivity; better understand the role of the self in the creation of knowledge; carefully self-monitor the impact of their biases, beliefs, and personal experiences on their research; and maintain the balance between the personal and the universal" (Berger, 2015).

Margaret Gearty, a Professor of Learning History at the Ashridge Doctorate in Organisational Change proposes that the practice of reflexivity is "vital in helping the researcher to question his or her choices and to explore his or her own perspectives and prejudices" (Gearty et al., 2015, p. 15). Creating the professional activity journal 2016-2021 that you can find in figures 11 to 14 above provided a clear confirmation as to why I have always had trouble defining myself as a professional. And I believe that the principal reason is my being the type of individual that

Paul Williams describes as a “boundary spanner”. Williams is a seminal contributor to the subjects of organisational learning, leadership, and knowledge management at Cardiff Metropolitan University. In his enlightening article “The life and times of the boundary spanner” (Williams, 2011) he wrote about boundary spanning professionals living a life charged with “paradox, ambiguity and tension stemming from a number of sources” that accurately map onto the defining characteristics of my own, chiefly:

- **Having multiple accountabilities.** The story of my everyday life is needing to liaise with and report to a number of different people about a number of different projects, facing the fact that “organisational and professional allegiances, governance rationales and performance management frameworks often do not marry easily” (Williams, 2011). This requires a huge amount of flexibility and the ability of letting go of issues that arise in each of the projects that I am involved in, most notably because of the extent to which my projects are entangled with one another. This has led me to situations when I’ve become overwhelmed by problems.

A recent illustration of this point is provided by the NatWest project I have been involved in for the last year. My contract isn’t with NatWest directly but with a company called The Insight Network, “an established network of therapists in the UK who offer evidence-based therapies in an out-patient setting to help resolve a range of common issues we face in our day-to-day lives, such as stress, depression, anxiety and eating disorders” (Network, 2021). The Insight Network (TIN) specialises in employee wellbeing, and specifically in employee mental health. The company has different internal divisions, and this particular project is being managed by a sister company called Helix Resilience, recently rebranded as

Happence (Happence, 2021). My role involves meeting with every board member, a total of 16 people including the CEO, CFO, etc., in semi-structured sessions where I guide them through behavioural neuroscience assessments to measure their stress, resilience and happiness levels. I also guided them on how to complete microbiome tests. My session notes, along with the measures data I collect from them are then shared with someone who works for Happence, but also with someone who works for TIN. The protocols for Happence and are similar to those at TIN, but they're not identical. Nor is the organisational culture, or the personality of those people involved. I also need to share data with bioinformatician colleagues at Atlas Biomed who are based in Moscow and who are helping with the deep analysis and correlations between changes in the microbiome of the participants, their dietary habits, and the results from their behavioural neuroscience tests. When I meet with members of the board I am "Miguel from TIN", but when I'm talking to colleagues from TIN, I might seem "more Happence" to them, and that makes a difference because they know Happence deals with board-level executives, so they may have a perception of me based on my ability to do that. In addition, when I am talking to the biostatisticians in Moscow, I am one of their colleagues from Atlas. This is just one of the many examples of the kind of projects I am immersed in, where organisations, people and accountability lines are completely intertwined. Sometimes this is beneficial, but sometimes blurred lines make things more complicated. Learning to navigate this context, remaining professional and scholarly in my inquiry is a skill in itself.

- **Managing without power and in different organisations.** I understand that I possess some elements of power through my personal agency and professional status, as well as from my expertise and knowledge in certain areas. For example, in my community of practice I am well known for my public speaking / lecturing and my publishing on the connection between nutrition, the gut and the brain / mental health. I am also well known for my longstanding role of Chair in a large professional association. However, this doesn't automatically mean I have power to manage or influence situations across the board. I cannot (and do not!) pick up the phone with a "do you know who I am?" kind of attitude at all. It is not who I am. Besides, I have grown an acute awareness of the power dynamics and the different hierarchies and lines of command in the networks I am embedded in. That helps me adapt my attitude according to every situation.
- **Having to constantly assess the fine lines between personal and professional interests.** Examples include my involvement with The Sourdough School as a Scientific Advisor, where I am committed to achieving successful collaborations with academia in order to enable the publication of research conducted at the School with the gravitas and the credibility afforded by the ethical approval provided by a university. I am doing work *mostly* on a pro bono basis because I have a friendly relationship with the founder, Vanessa Kimbell, who is a current DProf candidate at Middlesex. In addition, I have been part of the team in some of the School's research activities, which adds yet another dimension to take into consideration.

- The opposing forces of self-interest and collaboration.** This is very closely related to the previous point, but it is more about achieving balance between individual and organisational self-interest. The primary example for me in this category is my leaving the role of Chair at the British Association for Nutrition and Lifestyle Medicine (BANT), a large professional association with 3,200+ members, after 9 years, at a point when I didn't feel I could take the organisation any further down the path I had envisaged in order to achieve my vision as a leader. There would have been clear benefits for me if I had decided to stay, including the status and access to opportunities that are exclusive for those in positions of power and which I've always been extremely careful not to be seen as profiting from. But things like invitations to publish or to be a speaker at conferences were forthcoming and would have allowed me to further my own interests in disseminating knowledge, raising my own profile as well as that of the profession. However, for a year before I finally left in August 2020, I felt my time to go was approaching fast and I was more interested in enabling others with whom I had co-operated for years take the lead and realise their own vision of the organisation. I started sharing those opportunities that I mentioned before with colleagues, enabling them to raise their own voice and establishing themselves in a position of authority that would enable them to lead BANT once I stepped down.
- Complexity.** All of these decisions are complex and highly political because they must take into consideration "a jigsaw of interdependencies between people and organizations" (Williams, 2011) with boundaries that are often blurred. As an example, the crucial key performance indicators determining the success of my current role as Director of Research and Innovation at biotech company Atlas Biomed are dependent on my relationship with London South Bank University (LSBU) as visiting researcher. At the same time, my

professional relationship with LSBU is entangled with my personal relationship with one particular person at the School of Applied Sciences, without whom I would struggle to achieve the outcomes that Atlas expects me to achieve every quarter.

These are just some of the examples that help me illustrate my being a boundary spanner, some of which I will discuss in detail [in chapter 5](#).

It is worth noting that I only became acquainted with the concept of the boundary spanning in 2020. Then, early in 2021, in a conversation with Professor Brian Sutton reviewing one of the drafts I had sent him, he mentioned the term again. In fact, his exact words during a Zoom call were “*you are a living boundary spanner*”, and his compliment ignited my interest in this area. Prior to that meeting I didn’t have the ability to conceptualise, let alone verbalise my being ability to span boundaries, so I was surprised to read that it is possible for someone to nominate themselves as one. Indeed, according to Bourdieu's practice theory, professionals with dominant roles in a field use the reputation or honourability of their own positions to appoint themselves to “various positions endowed with symbolic capital” (Bourdieu, 1998, p. 51), the fourth general capital type along with cultural, economic and social capital described by the French sociologist (Lebaron, 2014). The boundary spanner position can be seen as reputable, and thus self-nomination as well as the nomination of others as boundary spanners is reported to happen across organisations. A clear example is top managers, who are expected to engage in boundary spanning activities (Van Meerkerk and Edelenbos, 2014). However, educational theorist Etienne Wenger – known for his work on communities of practice and collaborative learning – criticises this approach on the basis that a certain extent of overlap between professional practice and personal interests is required for boundary spanning to be

successful, proposing that nomination by a third party is likely to have “unexpected consequences” (Wenger, 1998, p. 80). Moreover, organisational change researchers Levina and Vaast, differentiate between a nominated boundary spanner and a “boundary spanner-in-practice”, which they define as a professional who develops an interest in negotiating relationships between disciplines, but who also has the ability and the inclination to participate in such relationships. Levina and Vaast state that “the first two conditions relate to developing an ability to span boundaries, while the third relates to having an inclination to do so” (Levina and Vaast, 2005).

3.7. Brokering and translating knowledge

Doing a professional doctorate is a completely different process to a taught degree in that subject-specific learning is self-directed, i.e., formulating and pursuing learning goals as well as completing and evaluating my own learning was all my own responsibility as a learner (Knowles, 1975). I had only just completed my master’s degree in clinical neuroscience a couple of months before registering for my DProf in September 2016, so the detailed explicit knowledge that I had acquired during the previous two academic years was very fresh in my mind. Completing my master’s had enabled me to start applying that knowledge as part of the multidisciplinary mental health team at Claimont Health, which I had joined in late 2015. That provided the perfect context for me to develop practical expertise in that field. Additionally, just a few months earlier I co-founded MapMyGut (Harrison-Dunn, 2017), a commercial spinoff of the Department of Genetic Epidemiology at King’s College London (KCL) led by Professor Tim Spector. MapMyGut was partly funded by the same grant that enabled

the British Gut Project, “a unique open collaboration between the Department of Twin Research at KCL and The American Gut Project (McDonald et al., 2018) to try to understand the bacterial diversity of the British Gut” (Campbell, 2014).

In my 3-day-a-week role as Head of Education at MapMyGut I was fully immersed in a professional ecosystem offering plenty of learning opportunities. I was invited to be part of the founding team because of my previous experience in gut microbiome testing as a nutrition practitioner. Gut health had become one of my specialisms, and since setting up my private clinical practice I had been gone through hundreds of individual test results from which I had developed learning that is not found in textbooks. I had a good method for interpreting complex data and to translate it into meaningful, realistic, and evidence-informed recommendations for my clients. Being valued for my tacit knowledge was immensely gratifying, as was working with the team at KCL, who were all laboratory-based scientists, except for Prof. Spector who is also a medical doctor; the rest were either geneticists, microbiologists or bioinformaticians who didn't have much exposure to the real world. Fortunately for me, this meant that they really appreciated my knowledge translation skills. In fact, translating the findings of their research into the human microbiome of thousands of identical twins into educational materials that healthcare practitioners could use in their own clinics when using the MapMyGut microbiome test was the most important element of my job description.

Apart from translating the science, I was also “moving ideas from where they are known to where they are not”, a process defined by Andrew Hargadon as “knowledge brokering” (Hargadon, 2002). The Palgrave Encyclopaedia of Strategic Management refers to knowledge brokering as “the root cause of innovation in a variety of literatures,

ranging from cognitive research on analogical reasoning to sociological studies on the innovativeness of groups, organisations and communities. As they facilitate the transfer of knowledge across domains, social networks have been identified as a prime source of knowledge brokering” (Carnabuci, 2018). Indeed, as Head of Education at MapMyGut I was brokering human microbiology knowledge into a community of practice that was accessible to me. Members of that community were starting to become interested in this discipline but lacked the ability to engage in practical application of that knowledge. Therefore, I was engaging with my existing professional networks and expanding them through knowledge dissemination by means of public speaking and publishing. I am particularly proud of an article that I co-created with Professor Spector about the role of direct-to-consumer microbiome testing (Toribio-Mateas and Spector, 2017).

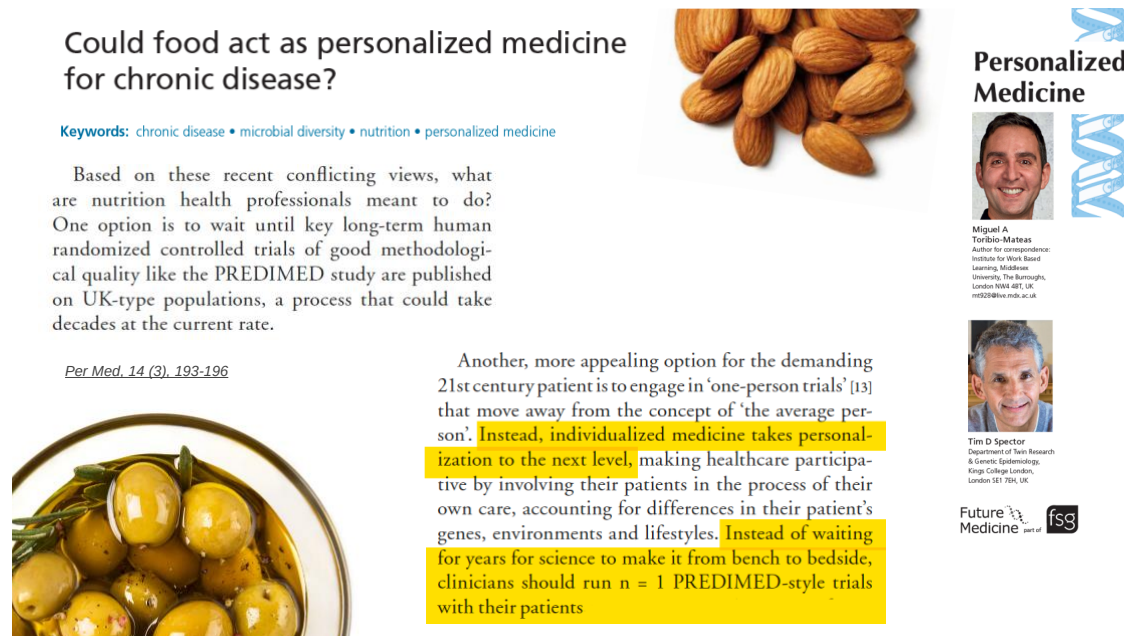


Figure 17. Knowledge brokering and translation

A screenshot of the article “Could food act as personalized medicine for chronic disease?” that I co-published with Professor Tim Spector.

I am tapping into this area of my professional background because I see knowledge translation, brokerage, and dissemination as essential pieces in the process of bridging the gap between research and practice, which must feature “Of-Knowledge” as well as “About-Knowledge”. These concepts, coined by Professor Nicky Priaulx of the Cardiff University LawLab Research Centre refer to an often blurred but distinguishing line between the detailed understanding of a field (“Of-Knowledge”) and the connective knowledge about fields that enables cross-disciplinary collaboration (“About-Knowledge”) (Priaulx and Weinel, 2018). In fact, as a scientist interested in both advancing scientific knowledge and in applying the understanding of natural phenomena to practice, I would be only too happy to be referred to as a “knowledge translator” (Rake et al., 2021).

“The idea of knowledge translation was introduced by the Canadian Institutes for Health Research (CIHR) in 2000 to cover a wide variety of activities including knowledge dissemination, communication, technology transfer, ethical considerations, knowledge management, knowledge utilisation, two-way exchange process between researchers and knowledge users, technology assessment, synthesis of findings and development of agreed guidelines for practice” (Rushmer et al., 2019)

However, as a creator of knowledge in transdisciplinary settings, I much prefer Faye Miller’s notion of “transdisciplinary producer”, which Miller defines as a professional who generates “transdisciplinary resonance” from the deep and profound internal experiences of reflecting and intuiting to know resources from himself/herself and

others in transdisciplinary informal learning relationships, projects and spaces, experiencing an affinity with participants, collaborators and audience that bridges gaps between them (Miller, 2020c). I am really enthused by this concept in Miller's recent book "Producing Shared Understanding for Digital and Social Innovation", which she wrote in 2019 as part-academic, part-journalist, part-career development consultant with a background spanning higher education, public policy, and documentary production. It is with that transdisciplinary producer mindset that I went on to complete a narrative review of 256 articles spanning the subjects of clinical neuroscience, microbiology, clinical education, nutrition, and patient-reported outcomes research.

The review took me nearly 8 months to complete, and I submitted it for peer review to the journal *Microorganisms* in February 2018. The paper, entitled "Harnessing the Power of Microbiome Assessment Tools as Part of Neuroprotective Nutrition and Lifestyle Medicine Interventions" (Toribio-Mateas, 2018a) was published a couple of months later, reaching 15,000 downloads within three months of the initial publication date.

3.8. An immersive literature review

The reason why I am making such a prominent feature of “my Harnessing paper” – my endearing nickname for this big piece of work – is the fact that, as a practice-based doctoral candidate, I consider it as a key part of my literature review. This is particularly true when people ask me questions such as “*was it part of your PhD?*” or “*did you get funding for it?*”. The answer to both is the same: “*no*”. My doctoral programme didn’t require me to publish X number of papers on my chosen subject, as I know some do. And I didn’t apply for a grant to cover the hundreds of hours of my time I spent reading, reviewing, and critiquing literature, writing the manuscript, submitting it for peer review, answering to comments by reviewers, etc. I didn’t just observe objective facts as a researcher looking in from the outside either. Instead, I was embedded in a professional context where learning about the subject disciplines I wrote about became an immersive experience where all potential sources of knowledge were entangled, from formal to informal. On that basis, articulating my learning experience during 2017-2018 requires me to depart from traditional academic formats, and to look at my doctoral research work from other standpoints. For example, being a creative person by nature, I am drawn to looking at my work as art, which, as a discipline, can help “create new diffractive lenses, new lines of flight” to develop any discipline from within (Bayley, 2018b, p. 53), “linking, mediating and interrelating qualities in ongoing ways, connecting the trans (implying exceeding, moving towards, changing; going across, over or beyond) to the performative (saying as doing, or that which performs something while articulating it)” (Jones, 2016).

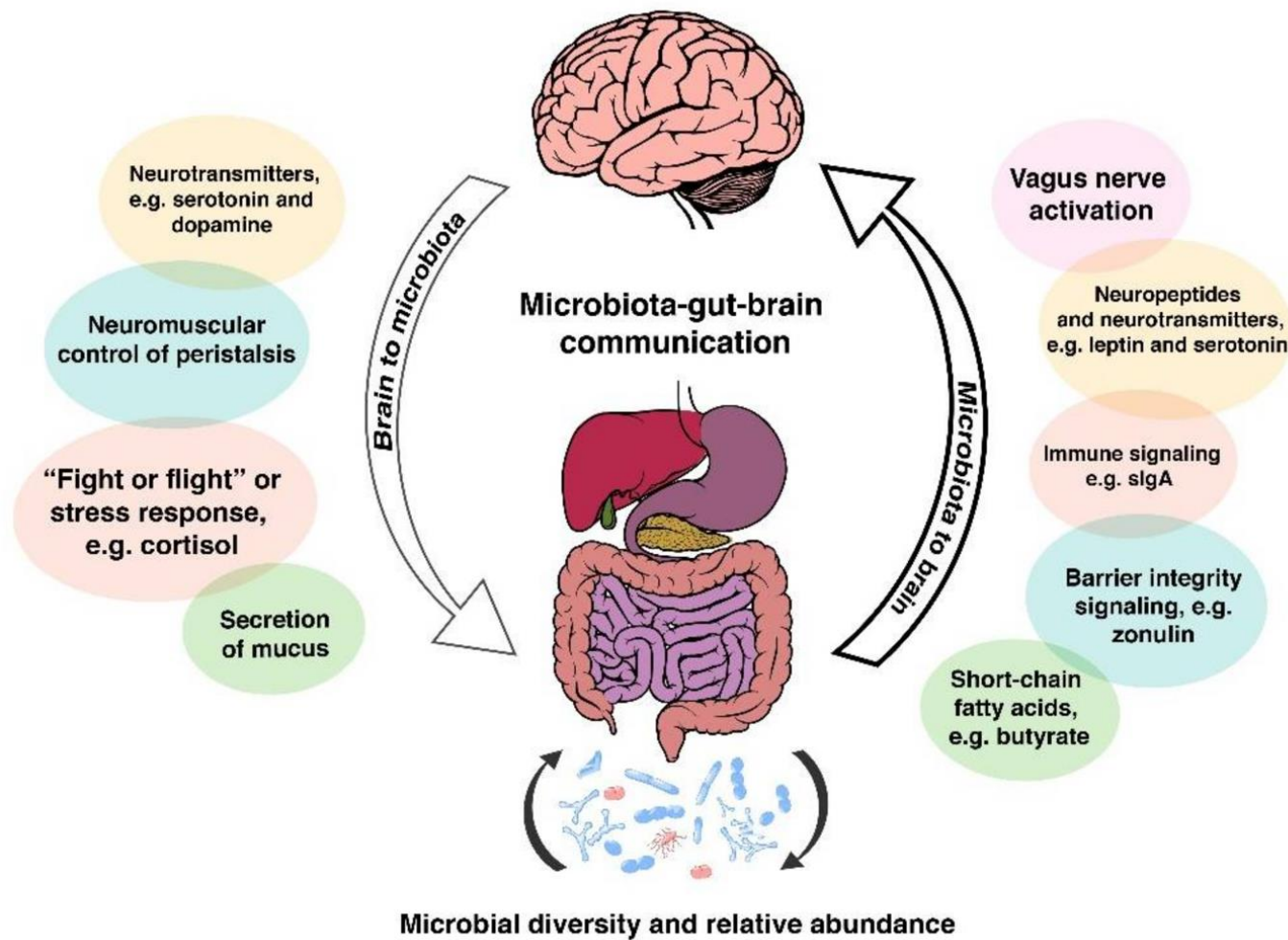


Figure 18. Microbiota-gut-brain communication

In this simplified diagrammatic illustration of the bidirectional communication pathways between the gut microbiota and the brain I created for my paper, I feature a range of molecules originating in the gut that are involved in the upstream part of the communication system. Also featured is the “fight or flight” response, driven by the activation of the sympathetic nervous system, and how exposure of to that response plays an important role in the dysregulation of the intestinal ecosystem (Toribio-Mateas, 2018a).

In the words of Professor Carol Taylor, Head of Learning, Pedagogy and Diversity Research at University of Bath:

“we begin with immanence, relation, nonseparability, values, partisanship, responsibility for each and every choice or cut, immersion, emergence.”

“what emerges as “research” cannot be “about” something or somebody, nor can it be an individualised cognitive act of knowledge production. Rather, posthumanist research is an enactment of knowing-in-being that emerges in the event of doing research itself. In opening new means to integrate thinking and doing, it offers an invitation to come as you are and to experiment, invent and create both with what is (already) at hand, by bringing that which might (or might not) be useful, because you don’t yet know, into the orbit of research”

(Taylor, 2016, p. 18).

I am not claiming for my research practice to be posthuman, but I believe Taylor’s words illustrate beautifully my situatedness while I was writing a mammoth of a paper with 32 pages and 4 full colour illustrations, all created by myself.

I was still Chair of BANT whilst I was reviewing the literature that I included in my paper. This meant I was in touch with practitioners daily and thus I was acutely aware of the extent to which they craved practical application of science. Through my Head of Education role at MapMyGut I had the opportunity to do that for them, creating learning opportunities via events at KCL where Professor Tim Spector and I would share practical insights on the use of microbiome tests.

In addition, I was also consulting for Cytoplan (Cytoplan, 2021a), [a British nutraceuticals company that I mentioned in chapter 2](#), leading a clinical education programme for healthcare practitioners which I delivered via a set of workshops that took place in 8 different locations in the UK throughout the year. I thought of this as “a tour” and I wanted Cytoplan to promote it as such in their marketing, but the idea of portraying me as a rock star didn’t go down well so I ended up calling it “a practitioner roadshow”. Each of the workshops collected feedback from participants the spine of content that I had prepared for the first one ended up looking quite a lot different by the time I got to present at the “grand finale”, a conference-style event in London in November that consolidated participant responses, allowing me to share their insights with delegates on the day. Making the most of the overlap between my interests and my work at MapMyGut, I thought that “The Gut-Brain Connection” would be the best fit for the inaugural roadshow, and I wasn’t wrong. Each of the regional workshops sold out, and over 300 practitioners – from nutritionists to physiotherapists and medical doctors – attended the final event at the County Hall Conference Centre in London in November 2017.

Just a month later, I started working as part of the team running the Lloyd’s Bank Optimal Leadership Resilience Programme (OLRP) for senior executives, an employee mental health programme commissioned by Lloyd’s CEO António Horta-Osório, whose personal experience of restoring Lloyds Bank’s fortunes “almost shattered his mental health”, making him go “a mission to end the stigma of workplace stress” (Carpenter, 2017).

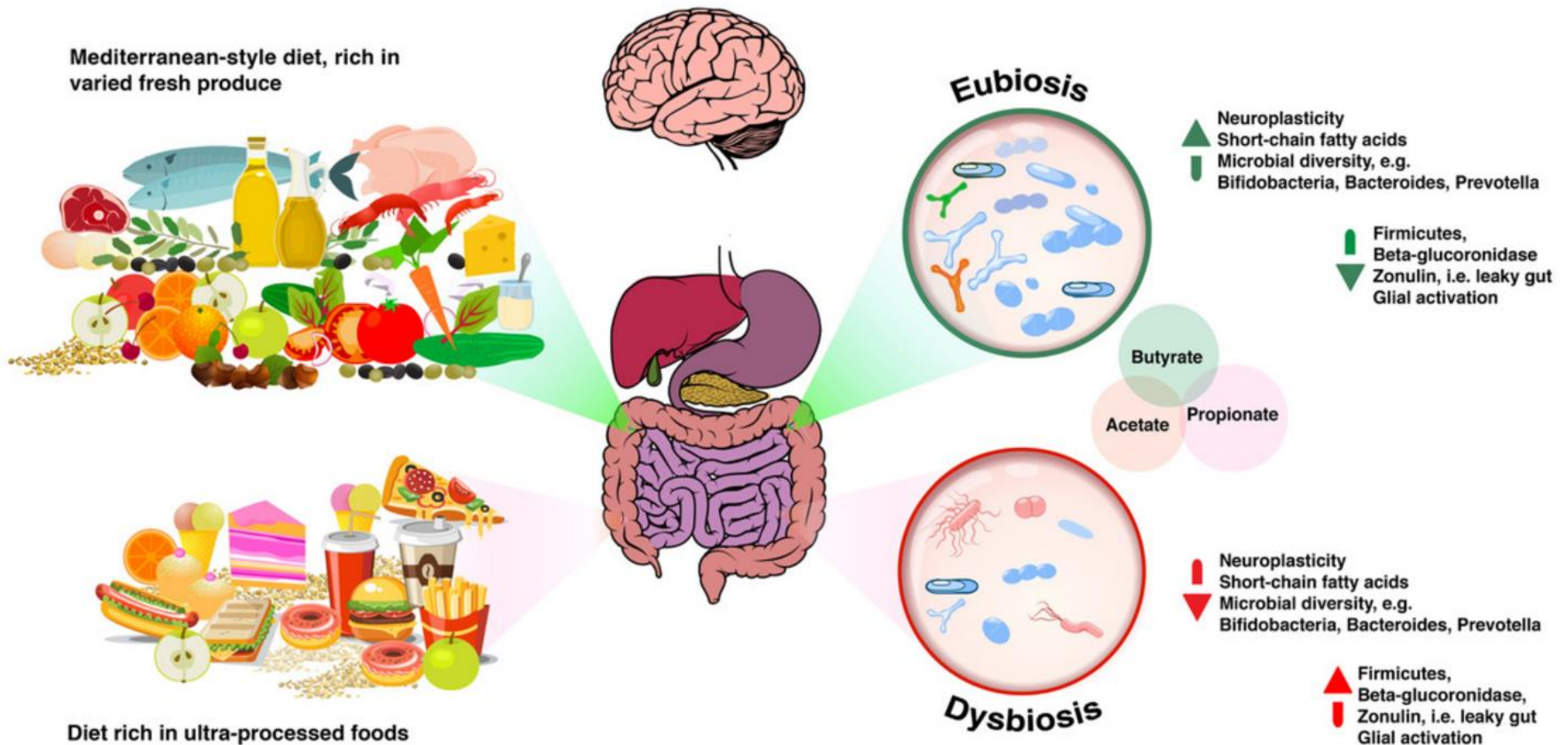


Figure 19. Diet, nutrition, the gut, and the brain

Another of the illustrations I created for my paper, describing the processes that affect the composition of the gut microbiota as well as the integrity of the intestinal barrier and how these are correlated with the levels of free radicals that have the potential to damage brain/nerve tissue, thereby increasing the chances of neurodegeneration, as well as anxiety, depression, and other psychiatric disorders (Toribio-Mateas, 2018a).

I was contracted out as project lead for the “Delivering Clinical Neuroscience in The Workplace” programme, which focused on how diet and nutrition affect mental wellbeing (Firth et al., 2020), and particularly psychological resilience, i.e. “the ability to adapt successfully in the face of stress and adversity” (Wu et al., 2013).

3.9. Learnscaping

Hopefully, the constellation of events that I have shared above assists me in conveying the fact that I hadn’t allocated time or headspace to a literature review in the classic sense of the concept. This was difficult to explain to some of my peers who are on a PhD route to their doctorate and who had a full year dedicated entirely to working on that task. As a matter of fact, I tried to explain that a professional doctorate was different to someone who interviewed me for a role at Unilever I was headhunted for. I said that I was doing my research as “I worked and lived it”, only to get a completely perplexed look. I am now used to the fact that the kind of work-based learning that I have been experiencing through the development of my transdisciplinary practice can confuse people because it “troubles traditional conceptions of ontology”, “destabilising boundaries and territories upon which disciplinary identities are built” (Bayley, 2018b, p. 55). However, living and breathing my inquiry has contributed to the emergence of a new type of knowledge that is connected and creative in ways I would have never anticipated and, quite frankly, I absolutely love the natural affinity I have with this way of learning. What I didn’t know at the time was that I was actually creating informal learning opportunities for myself, i.e. I was “learnscaping”, a term coined by Jay Cross, “an American futurist who popularised the term “e-learning” and championed the cause of informal learning in business settings” (Wikipedia, 2021).

Writing about changing learning cultures in higher education, Cross argued that “informal learning is about situated action, collaboration, coaching, and reflection, not study and reading” and that “developing a platform to support informal learning is analogous to landscaping a garden”. Because “the design of informal learning ecosystems is analogous to landscape design”, he called the environment of informal learning a “*learnscape*” (Cross, 2010, p. 47). He also provided what has become my favourite plain English definition of informal learning:

“A major component of informal learning is natural learning, the notion of treating people as organisms in nature. Students are free-range learners. Our role is to protect their environment, provide nutrients for growth, and let nature take its course. Self-service learners are connected to one another, to ongoing flows of information, learning, and work, to their teams and organisations, to their collaborators, not to mention their families and friends”

(Cross, 2010, p. 47).

The multiple professional experiences I was immersed in had provided me with opportunities to get a feel for disciplines including neuroscience, microbiology, and clinical nutrition that I hadn’t been taught at university. According to Schön, I was contributing to those fields whilst thinking about what I was doing and, in the process, evolving the way I was doing it (Schön, 2017, p. 56). As I developed my practical application of what I knew, I also embodied a diffractive attitude to learning that allowed me to tap into sources of knowledge that lay at the intersection of a diverse range of disciplines, and I started doing this without fear of being criticised for lack of

authority. In fact, I started to trust my ability to span boundaries and to broker knowledge across them because that's what my forte was, i.e., that *was* the source of my authority.

I like to think that a combination courage, reflection and determination, combined with an intense desire to share my knowledge with others allowed me to get in the state of flow (Csikszentmihalyi, 1975) that enabled me to produce “my Harnessing paper”, even though I still struggle to believe it was me who did it. I reviewed large amounts of evidence from both human and animal studies to illustrate the impact of dietary interventions on the idiosyncrasies of the gut microbiota, the tens of trillions of microorganisms (Backhed et al., 2005, Backhed et al., 2015) that inhabit our gastrointestinal system in quantities and diversity increasing from stomach to small intestine to colon (Brown et al., 2013, Sekirov et al., 2010). My aims were clear. I wanted to describe the role of the gut flora in health and disease as a process that is as crucial as is complex, and I wanted to do it in a way that had maximum appeal to a range of practitioners in different fields. I explained how under natural conditions, intestinal bacteria share their habitat with a dynamic community of viruses, protozoa, helminths and fungi (Chabe et al., 2017, Jenkins et al., 2017, Marzano et al., 2017), many of which exhibit parasitic behaviour (Leung et al., 2018), and how this was not only normal but expected because every unique community of microorganisms interacts with their human host through immune, neuroendocrine and neural pathways thereby casting local as well as systemic effects on the host's health as well as their disease risks. In fact, alterations in normal commensal gut microbiota can result in an increase in opportunistic pathogenic microbes that deranges the equilibrium of both microbes and host.

This microbial imbalance is known as dysbiosis and it has been widely reported as a key contributor to the multiple system dysregulation observed in the pathogenesis of cardiovascular (Battson et al., 2017a, Battson et al., 2017b, Heianza et al., 2017), metabolic (Haro et al., 2017, Kassaian et al., 2017, Mitchell et al., 2015, Reimer et al., 2017), neuroimmune (Le Berre et al., 2017, Miyake et al., 2015, Montassier et al., 2018, Nagy-Szakal et al., 2017) and neurodegenerative (Anacker et al., 2013, Chen et al., 2016, Devos et al., 2013, Tetz et al., 2018) conditions. I then proposed which methods practitioners could use “to examine key physiological processes that influence both gastrointestinal, as well as brain health” and discussed “how tools such as the characterisation of commensal bacteria, the identification of potential opportunistic, pathogenic and parasitic organisms and the quantification of gut microbiome biomarkers and metabolites can help inform clinical decisions of nutrition and lifestyle medicine practitioners” (Toribio-Mateas, 2018a). I also provided a means for practitioners to assess symptom severity in brain/neuro-related conditions by showcasing an innovative way to use the Measure Your Medical Outcome Profile (MYMOP) patient-reported outcome measure (Paterson, 1996, Paterson, 2004).

I had conceptualised my review with practitioners in mind. In fact, I spoke to hundreds of them over the many months it took me to select the literature to review and to carry out the narrative analysis. Therefore, I was actively involved in the creation of knowledge in the context of the organisations I was embedded in at the time: BANT, MapMyGut, Cytoplan, Claimont Health, The Insight Network (for Lloyd’s Bank) and my own private clinical practice. Being immersed in these organisations was a great source of inspiration for my paper. On that basis, I see “my Harnessing paper” as the outcome

of a series of action research cycles of action and reflection that helped me capture the impact of my professional activities on my community of practice whilst simultaneously giving back to members of my community and beyond, to members of other communities who may also have a shared interest in the matters I covered in my research.

Reflecting on it now, I can see that clearly in some of the paragraphs I wrote. For instance, we expect healthcare practitioners to be able to solve a range of health problems, from simple to complex. However, “uncertainty is a common and perhaps innate feature of clinical practice”, and phronesis is really what differentiates novice from expert practitioners (Tyreman, 2000). I wanted to make sure that these valuable insights shone bright in amongst all my gut- and brain-related writing. In doing that I wanted to invite those practitioners I was in touch with through my professional networks to join me in my own *learnscape*. As a matter of fact, I wanted them to know that they were an essential part of it, which is why I invited them to engage in some of the same activities I had been immersed in myself for the previous year:

“Practitioners are advised to use their clinical judgement and weigh the likely benefits against any potential disadvantages, whilst always taking into consideration their patient’s values and preferences, as well as the best available scientific research to support their clinical decisions. While we wait for good quality RCTs to be published, food-based interventions are likely to be extremely safe for most (e.g., “eat a wider variety of vegetables instead of always eating the same 2 or 3 every day of the week”), so practitioners could be

a little adventurous in the clinical application of emerging findings. Ongoing assessment of and patient outcomes derived by these interventions is needed in order to minimise risk whilst potentially maximising health benefit”
(Toribio-Mateas, 2018a).

I wanted my paper to be an example of a “participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview” (Reason and Bradbury, 2001, p. 1), and for my inquiry to be seen as carried out “in the pursuit of practical solutions to issues of pressing concern” to those practitioners I was talking to every day. I wanted to contribute to their flourishing, both as individual persons and as members of my extended professional community (Bagger-Sjöbäck et al., 2015, p. 1), and working on my paper provided me with an opportunity for revitalising my purpose as a scientist who is genuinely interested in co-operative inquiry. I wanted practitioners to become one with the process, to engage in ongoing collaboration for the greater good of the profession, which is precisely what my call to action was in my concluding thoughts:

“Last, but not least, this paper identifies an urgent need for more nutrition and lifestyle medicine practitioners to adopt the role of practice-based researchers who can help articulate real-world evidence emerging from real cases they deal with in their own clinical practice. Indeed, the author urges the growing number of practitioners using stool tests to assess their patients’ health to take the role of researchers in their own practices and to document the findings of

their “experiments” as real-world evidence that otherwise remains locked away in their patient records and could inform the clinical decisions of peers managing the same type of issues. This could be as simple as collecting self-reported patient-generated outcomes as measures of effectiveness. Sharing the results of their $n = 1$ interventions with other practitioners using similar assessment tools is likely to enable practice-based learning and ongoing refinement of clinical applications of scientific findings. However, both clinicians and patients need to be mindful of the complexity of the microbial ecosystem and the fact that host-microbe interaction is equally complex. The tools discussed in this paper provide useful answers to clinical questions, but cannot be seen as “one-fits-all” solutions in addressing patients’ health” (Toribio-Mateas, 2018a).

3.10. Lines of flight

Some of the compliments I got on “my Harnessing paper” from people who didn’t know me personally made me realise how much of the process they had missed. They saw the final glossy product, whereas I was completely engrossed in its evolution from the initial idea and through its iterations. Moreover, having the paper accepted for publication was the culmination of a process of self-discovery, self-challenge and self-acceptance that had started about a year earlier and that coincided with receiving an email by Dr Aruna Bakhru MD, a Fellow of the American College of Physicians and respected medical editor. Dr Bakhru had seen a video of me speaking at the Silicon Valley Health Institute in 2014 and was inviting me to contribute with a chapter in the textbook “Nutrition and

Integrative Medicine: A Primer for Clinicians” that she was putting together. This was 2017 and I was “neck-deep” in trying to balance self-directed learning in the subject disciplines I wanted to demonstrate professional competency in through my DProf, whilst getting to grips with the epistemic ontology of work-based learning. In addition, I must admit to being really worried about what Dr Bakhru and the book publisher’s peer-review committee would think of my nutritional neuroscience knowledge. I was also nervous because this was an excellent opportunity to share my insights on nutrition for neurodegeneration with the tens of thousands of people that would read the book. That preoccupation made me go into a long process of reading and research, which meant it took me a while to finish my 27-page chapter, entitled “Neuroprotection, Aging, and the Gut–Brain Axis: Translating Traditional Wisdom from the Mediterranean Diet into Evidence-Based Clinical Applications” (Toribio-Mateas, 2018b), for which I also created some illustrations, one of which is displayed below.

I remember writing that chapter was a really stressful experience, but also as a process that gave me the confidence I needed to develop my aptitude to researching the gut-brain connection and to write “my Harnessing paper”. Actually, that chapter was the seed that then developed into that paper, contributing to it in multiple ways. It allowed me to grow an increased awareness of the kind of arguments I wanted to focus on and those that I wanted to avoid. I was naturally drawn to sources from a range of disciplines, applying a diffractive lens to my literature searches. But I sometimes got stuck in laying out an argument where my knowledge of specific technical aspects of a particular field wasn’t deep enough. This happened a few times with some intricacies on the pathogenesis of neurodegenerative conditions. As I was writing, I feared that those

reading my work would question my authority as an author and I didn't enjoy that feeling because it made me feel vulnerable. It made me feel exposed, so much so that I got paralysed a couple of times and I thought I couldn't continue. I told Dr Bakhru, who was extremely kind and patient, and who encouraged me to carry on when all I could think about was *“why would anyone be interested in what I had to say. I am not a neuroscience professor. I don't even have a PhD”. Why would anyone take me seriously?”*

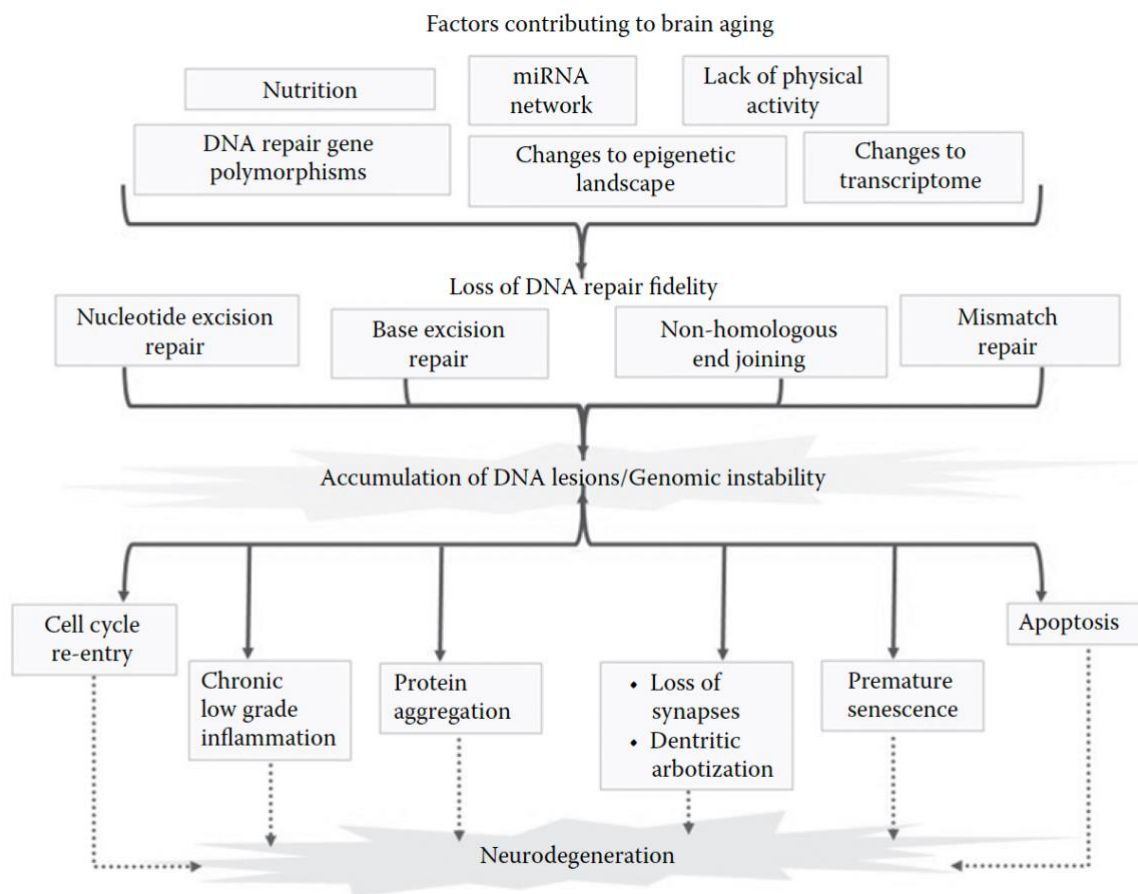


Figure 20. Factors contributing to brain ageing.

One of the figures I created for my book chapter “Neuroprotection, Aging, and the Gut–Brain Axis” (Toribio-Mateas, 2018b).

Reflecting on my stress levels at that time, I can now theorise how I felt based on the balance between the immersion and the estrangement typically experienced by cross-disciplinary professionals. As Priaulx and Weinel put it, our “estrangement from others is a consequence of the kind of intense immersion within a specialisation that is necessary for the acquisition of disciplinary expertise” (Priaulx and Weinel, 2018).

However, the more intense our immersion in a specialist field, the more likely we are to become estranged from others who are deeply immersed in other disciplines, and this growing discord was definitely contributing to some of the issues I was seeing in my own development as a researcher. An article about interdisciplinarity in the journal “Futures” written by Norwegian environmental scientists Aril Buanes and Svein Jentoft helped me understand my fears:

“Disciplines develop a distinct knowledge base, a literature which expresses a particular way of conducting research and reporting on findings.

“Crossing disciplinary boundaries involves breaking rules, as well as questioning paradigms and norms, which are often considered to be inappropriate. It is therefore to be expected that those who do so will be met by some form of sanction. There is a risk, for example that your proposal or article will be rejected” (Buanes and Jentoft, 2009).

I remember reading that article and thinking that was me crossing disciplinary boundaries and breaking rules, and I was alternating between doing that quite nonchalantly and experiencing minor panic attacks! I figured that if I was to be sitting

between, above and beyond disciplines, I needed to trust my creativity without fearing the consequences. I guess I just needed to “get over it” and “get on with it”. I needed to feel confident enough to dance to my own tune. Then I came across Deleuze and Guattari’s concept of deterritorialisation, a process that “brings about the creation of a new earth, when it connects lines of flight, raises them to the power of an abstract vital line, or draws a plane of consistency” (Deleuze and Guattari, 1987a, p. 561). Just like many of the Deleuze-Guattarian concepts, this sounds a little too abstract unless it is used as a lens through which to interpret a particular situation. Annouchka Bayley, a researcher focusing on practice-based and practice-as-research at Cambridge University, provides an inspiring interpretation of deterritorialisation in the context of teaching and learning. In her book “Posthuman Pedagogies in Practice” Bayley describes it as “a process by which systems demonstrate their creativity by freeing up relations that have been coded into rigid meanings, and reordering them into new organisations” (Bayley, 2018a, p. 37). Lines of flight are unique paths of mutation triggered by the unfolding forces of the multiplicities that characterise complex systems or assemblages (Bryden, 2008, p. 145). They engage in a deterritorialisation / reterritorialisation process that continuously destabilises or disrupts fixed meanings without setting out to generate “a translated, correspondent or commensurate meaning” (Bayley, 2018a, p. 38). Instead, the never-ending process of rearrangement enables an evolution of “creative metamorphoses of the assemblage and the assemblages it affects” (Bryden, 2008, p. 145). I see this as an open-ended cycle where chaos replaces order, only to morph into chaos again, then starting all over indefinitely.

Acknowledging this ongoing deterritorialisation / reterritorialisation process is acknowledging the scepticism I was fearing when writing my chapter for Dr Bakhru, grounded in the belief that “one must necessarily choose between professional depth or breadth” (Buanes and Jentoft, 2009) and that deep subject discipline knowledge is more valuable than the ability to span across several disciplines. It is also acknowledging the fact that, in the process of writing that chapter, various lines of flight emerged, disrupting, and destabilising the paradigms and norms I used to abide by until then. The ultimate acknowledgement is that taking risks, even at the expense of contradicting myself, helps me embrace the multiplicities that keep me in constant rearrangement, enabling creative metamorphoses to take place. As Walt Whitman wrote in “Song of Myself”:

“Do I contradict myself?

Very well, then, I contradict myself

I am large. I contain multitudes” (Whitman, 1855)

The whole chapter-writing experience was as euphoric as it was traumatic. I wasn’t just “writing a chapter”, I was injecting life into it that I was living every day. And vice-versa. The subjects I was covering were branching out my curiosity about other subdisciplines in the same field. I was also exploring literature laterally as well as going deep into some areas of knowledge to come back up to surface for air before diving again from another angle. Doing that repeatedly for many months I ended up creating the first consciously aware iteration of my own process for the production of knowledge. I might have been unconsciously aware of the process for a while, but I hadn’t been able to articulate it

until then. I know now that my creative process embraces the fact that chaos and order coexist everywhere around me, as well as within me. My own mind can be downright orderly one moment, only to feel as if my thoughts were written in pieces of paper that had been blown around by an industrial-grade fan. I now know what clarity arises suddenly after a period of chaos, and that chaos then replaces order after a while. Seeing this process as cyclical and iterative helped me generate a whole load of ideas that I saved in a folder to be explored at a later date. Some have never been revisited again. And one of them was “my Harnessing paper”.

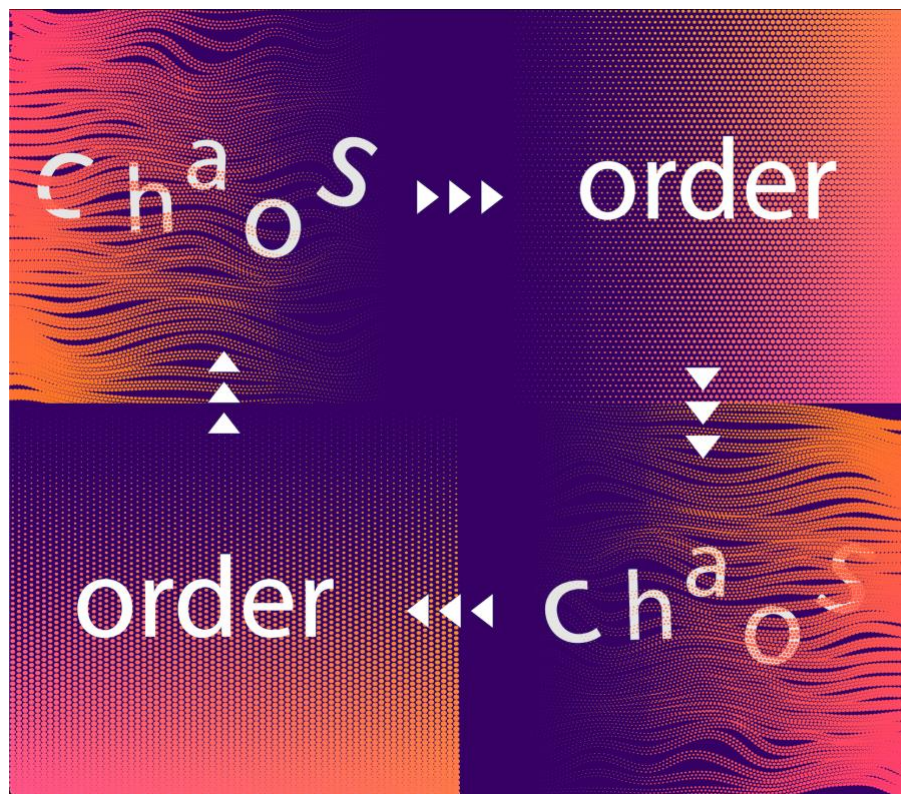


Figure 21. Chaos and order

My own interpretation of my creative process, alternating states of chaos and order.

Dr Bakhru's textbook was finally published by CRC Press / Taylor Francis in August 2018 (Bakhru, 2018). From that whole experience I learned about myself and about the kind of things I wanted to share with the world. I learned to balance what ignites me with what is expected of me, and to behave in a way that doesn't compromise one or the other categorically or permanently. I also learned that striking this balance is tricky because there are no fixed rules as to how to do it, so I find myself constantly challenging my assumptions and my frameworks for interpretation of the situations I am immersed in. A lot of the time all I can do is to use "good judgement", which takes me back to the value of phronesis yet again. However, when that elusive balance is stricken, the alignment in personal values and professional interests triggers an explosion of creative energy within me that is best described by Oliver Wendell Holmes' passage in "Autocrat of the Breakfast Table":

"Every now and then a man's mind is stretched by a new idea or sensation, and never shrinks back to its former dimensions" (Holmes, 1892, p. 468).

3.11. Iterations and constellations

In September 2018 “my Harnessing paper” became Microorganisms’ most read article since the journal’s inception in 2015. It was highlighted by the editors for a special display on MDPI’s homepage for a whole week. Since then, it has been cited 25 times in other articles and chapters by researchers from countries around the world, and it has been shared over 300 times on Twitter. As a result of that dissemination of my work, I was invited by MDPI to join the reviewer panel for the journals Brain Sciences and Microorganisms. I realised that reviewing papers written by others is one of the best ways to learn about my own work, so I have conducted 30 reviews for MDPI journals including Nutrients, Diseases, Brain Sciences, Psychiatry International, Microorganisms and the International Journal of Environmental Research and Public Health. I love the fact that all MDPI journals are open access because I believe this publishing model helps democratise access to scientific knowledge. I was also received multiple invitations to write for MDPI and other journals, many of which I had to decline because committing to the process of writing requires time and dedication, so I would love to be able to do more of this once I don’t have to spend every evening and weekend working on this thesis! I will discuss my aspirations further in [chapter 5](#) through some specific examples that apply to my professional situatedness.

I could share many more stories and insights about the works that I’ve been immersed in throughout my DProf, each of them interesting in their own right. However, there is a fascinating golden thread about them; the fact that they are connected in time and space, but not in a “cause and effect” way, i.e., there is no linearity about them. Instead,

they present themselves as clusters of stars in a constellation where every individual light helps form a diffractive pattern that “records a history of interaction, interference, reinforcement and difference” (Haraway, 1997, p. 273). I have already referred to some of the stars in that “publications constellation”, e.g., the paper I wrote with Professor Spector (Toribio-Mateas and Spector, 2017). Prior to that I collaborated with a senior dietitian and a public health nutritionist in conducting a systematic review of the literature on nutrition and healthy ageing during 2016. The project took 3 months to complete and the paper – entitled “Role of fatty acids and micronutrients in healthy ageing: a systematic review of randomised controlled trials set in the context of European dietary surveys of older adults” – was published in the Journal of Human Nutrition and Dietetics in 2016 (Ruxton et al., 2016) and has been cited over 35 times since then. Each of those experiences are different, but the learning I generated as a result of them interferes with and reinforces one another. Additionally, the interaction amongst them is iterative. Each publication has triggered interests in me that I wish to explore and provides confirmation of aspects I no longer care for.

To illustrate this point, I co-created a poster with my LSBU research colleague Adri Bester for the conference “Exploring Human Host-Microbiome Interactions in Health and Disease” that took place at the Wellcome Trust Genome Campus in Hinxton (Cambridgeshire) in December 2018. The poster was entitled “Integrated multi-omics of the gut microbiome: assessing the beneficial effects of fermented foods to human health” (Bester et al., 2018) and we happened to be selected for an oral presentation. The poster summarised the research work that I had been doing at the London Agri-Food Innovation Clinic (LAFIC) during 2018 and it was influenced by the work on personalised healthcare and consumer choice I did for my paper with Professor Spector,

as well as by my research and practice in the use of the MYMOP questionnaire that I had discussed in “my Harnessing paper”. A lot of trawling through literature in a systematic way was involved in order to create this one pager, so I drew from the review skills I had developed through my work on the healthy ageing paper. Additionally, there was a third person involved in the process, another LSBU academic who was part of the research team, the poster provided me with another opportunity to co-create knowledge as part of a team.

Following that conference, I got an invitation by one of the leading gastroenterologists in the world, Dr Joel Faintuch, to write a chapter in a book he was editing: “Precision Medicine for Investigators, Practitioners and Providers”. He had read my article in *Microorganisms* and the conference proceedings from Hinxton, and he wanted me to write a chapter on nutrition and the microbiome.

Integrated multi-omics of the gut microbiome: Assessing the beneficial effects of fermented foods to human health



A. Bester¹, M. Toribio-Mateas³, K. Mileva², N. Gaoua²

¹ Food Nutrition and Health Research Group, School of Applied Science, London South Bank University.
² Sport and Exercise Science Research Centre, School of Applied Science, London South Bank University.
³ School of Health and Education, Middlesex University.



Introduction

Evidence for health benefits of probiotic foods are increasing, studies support the potential to prevent and treat disease, suggesting fermented foods should be part of national dietary recommendations.

Increasingly understood, is the potential for enhanced nutritional and functional properties due to transformation of substrates and formation of bioactive or bioavailable end-products. Many also contain living microorganisms, some of which are genetically similar to strains recognised as probiotics and potentially psychobiotics.

There is a need for systematic clinical trials that measure outcomes which reflect a direct benefit for humans to better understand the effects of regular use of fermented foods as part of the diet.

Ingested bacteria can temporarily complement residential communities as part of a transient microbiome. Extent of integration is highly specie and strain dependent, and may vary depending on dietary context and baseline microbiota structure. Delivery matrix may affect the health benefits.

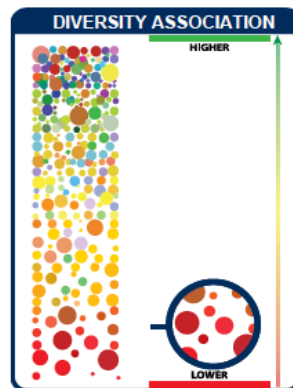
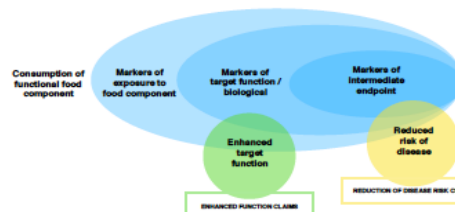
Aim

We hypothesise that regular consumption of unpasteurised fermented foods will improve gastrointestinal health biomarkers, host-microbe interaction, and cognitive function.



Multi-Omics Approach

We propose a multi-omics approach, providing more evidence for biological mechanisms, which is best suited to the complex nature of fermented foods. Faecal samples will be tested for biomarkers of digestive function and intestinal inflammation; metabolic indicators of host-microbe interactions; Commensal Bacteria; a PCR evaluation of 24 key bacterial groups/species; and Bacterial and Mycologic Culture.



Foodomics

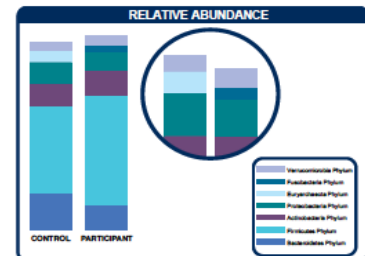
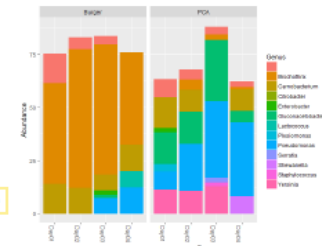
Metagenomic sequencing of the 16S gene of the fermented foods over the course of its viable shelf life.

Psychobiotics

Cognitive function and baseline mood.

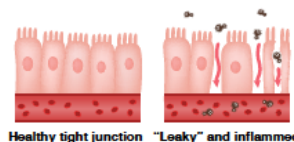
PROMs

Participant self-reported outcomes: MYMOP and PSYCHLOPS.



LAFIC / Bowels and Brains™

The Bowels and Brains™ Lab is part of the London Agri-Food Innovation Clinic (LAFIC), a research and enterprise programme sponsored by the European Regional Development Fund.



European Union
European Regional
Development Fund

Figure 22. Integrated multi-omics of the gut microbiome

I created this poster for the conference presentation at the Wellcome Trust Conference.

Dr Faintuch is known in South America as “the father of clinical nutrition” and is currently Senior Professor of Gastrointestinal Surgery in the Department of Gastroenterology, Sao Paulo University Medical School (Faintuch, 2018). I was honoured to be given this opportunity, but I was also really nervous because I didn’t want to produce a mere repetition of the same work that had stricken a chord with Dr Faintuch. Instead, I wanted “a return of the similar in a renewed form”, just like [the concept of rhythm that I quoted in the context of *Mā* in the foreword](#) (Kono, 2019). I see new projects that come about as a result of existing ones as an opportunity to reconfigure my own thinking by looking at the situation through a different lens, exploring “the points of difference and starting a conversation from those points of departure” (Niesche and Gowlett, 2019, p. 113), engaging with that opportunity in ways that enable me to – in Barad’s words – “bring inventive provocations” (Barad, 2012, p. 49). And this is exactly what I have been doing throughout my DProf. I have been deeply motivated to pursue my research interests and to create as I’ve gone along, which is what I have attempted to illustrate in this publications timeline. Each individual work has contributed to aspects of the one that ensues. With each iteration I have become better at embracing the tacit and weaving it into the explicit.

<i>August</i> 2015 Role of fatty acids and micronutrients in healthy ageing: a systematic review of randomised controlled trials set in the context of European dietary surveys of older adults. <i>Journal of Human Nutrition and Dietetics</i> <i>Carrie Ruxton, Emma Derbyshire, Miguel Toribio-Mateas</i>	<i>August</i> 2018 Neuroprotection, Aging, and the Gut–Brain Axis <i>In book: Nutrition and Integrative Medicine: A Primer for Clinicians, 1st Edition, Taylor and Francis / CRC Press</i> <i>Miguel Toribio-Mateas</i>	<i>January</i> 2020 The Evidence Base in Personalized Nutrition. Cognitive Health through Gut–Brain Communication. <i>In book: Case Studies in Personalized Nutrition (Personalized Nutrition and Lifestyle Medicine for Healthcare Practitioners), 1st Edition, Singing Dragon</i> <i>Miguel Toribio-Mateas, Angela Walker</i>
<i>May</i> 2017 Could food act as personalized medicine for chronic disease? <i>Future Medicine</i> <i>Miguel Toribio-Mateas, Tim Spector</i>	<i>December</i> Integrated multi-omics of the gut microbiome: assessing the beneficial effects of fermented foods to human health. <i>Conference: Exploring Human Host-Microbiome Interactions in Health and Disease</i> <i>Adri Bester, Miguel Toribio-Mateas, Natalie Gaoua</i>	<i>July</i> Becoming a Professional Opinion Leader. <i>Informal Learning, Practitioner Inquiry and Occupational Education: An Epistemological Perspective, Routledge</i> <i>Miguel Toribio-Mateas</i>
<i>April</i> 2018 Harnessing the Power of Microbiome Assessment Tools as Part of Neuroprotective Nutrition and Lifestyle Medicine Interventions. <i>Microorganisms MDPI</i> <i>Miguel Toribio-Mateas</i>	<i>November</i> 2019 Diet and the microbiome in precision medicine. <i>In book: Precision Medicine for Investigators, Practitioners and Providers. 1st Edition, Academic Press</i> <i>Miguel Toribio-Mateas, Adri Bester</i>	<i>October</i> Role of health technology and knowledge translation in personalised nutrition. <i>Agro FOOD Industry Hi-Tech</i> <i>Miguel Toribio-Mateas</i>

Figure 23. Published works to date

2021

Works **IN PROGRESS**

PUBLISHED

January

Myth-busting toolkit: Expert advice

In book: The Gut Stuff

Miguel Toribio-Mateas

April

Innovation vs Voice of Customer: The need for balance in consumer healthcare.

Agro FOOD Industry Hi-Tech

Miguel Toribio-Mateas

June

Reference values for intake of 6 types of soluble and insoluble fibre in healthy UK inhabitants based on the UK Biobank data.

*Public Health Nutrition,
Cambridge University Press*

Artem Shevlyakov, Dimitri Nikogosov, Leigh-Ann Stewart, Miguel Toribio-Mateas

August

Impact of plant-based meat alternatives on the gut microbiota of consumers: a real-world study

Foods (MDPI)

Miguel Toribio-Mateas, Adri Bester, Natalia Klimenko

Trialling a microbiome-targeted dietary intervention in children with ADHD – the rationale and a non-randomised feasibility study.

*Manuscript rejected by Microorganisms MDPI.
Implemented reviewer feedback and submitted to
BMC Pilot and Feasibility Studies in June 2021.*

Kate Lawrence, Kyriaki Myrissa, Miguel Toribio-Mateas, Lori Minini and Alice M Gregory .

Identifying the gut microbiota signatures of stress and resilience in the midst of the COVID-19 pandemic.

*Study currently on hold due to internal issues at
Atlas Biomed.*

Miguel Toribio-Mateas, Adri Bester

Effects of Ashwagandha on mood states via the gut-brain axis.

*A review of the effects of this herb, that's used
as a food supplement for stress and anxiety. To be
submitted to the journal Brain Sciences .*

Miguel Toribio-Mateas, Adri Bester, Nicole Simms

Impact of a botanical formula on the gut microbiota of healthy people: an open label prospective study with embedded analysis of participant-reported outcomes.

*Single-arm clinical trial to be run over 4
weeks. Recruitment started May 2021.*

Miguel Toribio-Mateas, Adri Bester

Use of a multi-strain probiotic product for the maintenance of health: impact on gut microbiota and participant-reported outcomes.

*Double-blind placebo-controlled clinical trial
to be run over 4 weeks. Recruitment started May 2021.*

Miguel Toribio-Mateas, Adri Bester

Studies currently on hold because of my leaving Atlas Biomed, which was going to provide the microbiome testing service for them. As of 18th June, I have identified another partner to work with (SeqBiome, a company affiliated to University of Cork in Ireland) that will process the microbiome samples. Ethics should be amended and recruitment resumed accordingly.

Figure 24. Works published and waiting to be published during 2021 alone

I really wanted to work collaboratively. I wanted for my insights to be challenged by someone who shared some of my professional background, someone who understood that being a scientist isn't just about being in a lab wearing a white coat. For that reason, I invited my LSBU colleague Adri Bester to co-author the chapter with me. Adri was one of the founding members of BANT back in mid-90s. After a short career in nutritional therapy, she moved onto the fields of food science and microbiology and, although our professional journeys are very different, she understood where I was coming from and got my transdisciplinary approach a lot more than other people. Together we tapped into new areas that we were both excited about, whilst renewing the references to the material that we had already written. Most importantly, this renewal wasn't just a matter of choosing more recent reading to inform our writing, providing more up-to-date bibliographic references. It was about acknowledging the fact that I wasn't the same person I was when I produced the content that Dr Faintuch had read, so I wanted to bring the most current version of my thinking to the chapter, which I entitled "Diet and the microbiome in precision medicine" and was published by Academic Press / Elsevier in January 2020 (Toribio-Mateas and Bester, 2020, p. 445-452).

3.12. Cycles of action and reflection

As explained beautifully by Maguire, transdisciplinary practitioners "theorise practice, not pre-existing theory of disciplines". We contribute to knowledge which emerges out of our professional activities and, in doing that, not only do we transform our engagement with our own practice, but we also transform ourselves (Maguire, 2018, p. 109). My professional practice is characterised by the coexistence of the dissimilar,

which means that a range of new problems and opportunities keep me adapting and co-evolving fluidly so that I can continue to transform myself over time (Loo and Sutton, 2020b, p. 172). In practical terms, this means that the learning I continue to experience today is the result of the consolidation of past events and ongoing reflection on what it feels like to be immersed in my professional activities, which I then conceptualise to form my own theoretical frameworks about my practice. This allows me to assess whether things “feel right” for me or not, and whether this feeling holds under different circumstances. This fits within the integrative goal-directed learning cycle proposed by Lewin as an action research model for electrical engineering (Lewin, 1947, pp. 143-153) and reviewed by Kolb in his classic book “Experiential Learning: Experience as the Source of Learning and Development” (Kolb, 1984, p. 21), which I have interpreted in figure 21 below.

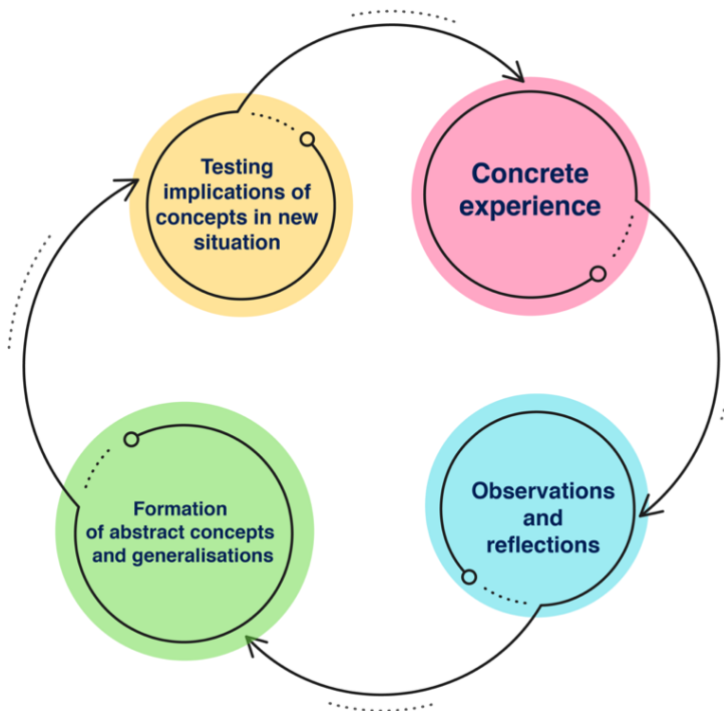


Figure 25. Lewin’s experiential learning model as viewed by Kolb

My adaptation of the Lewinian experiential learning model (Lewin, 1947, pp. 143-153) as viewed by Kolb (Kolb, 1984, p. 21, Kolb, 2014, p.32)

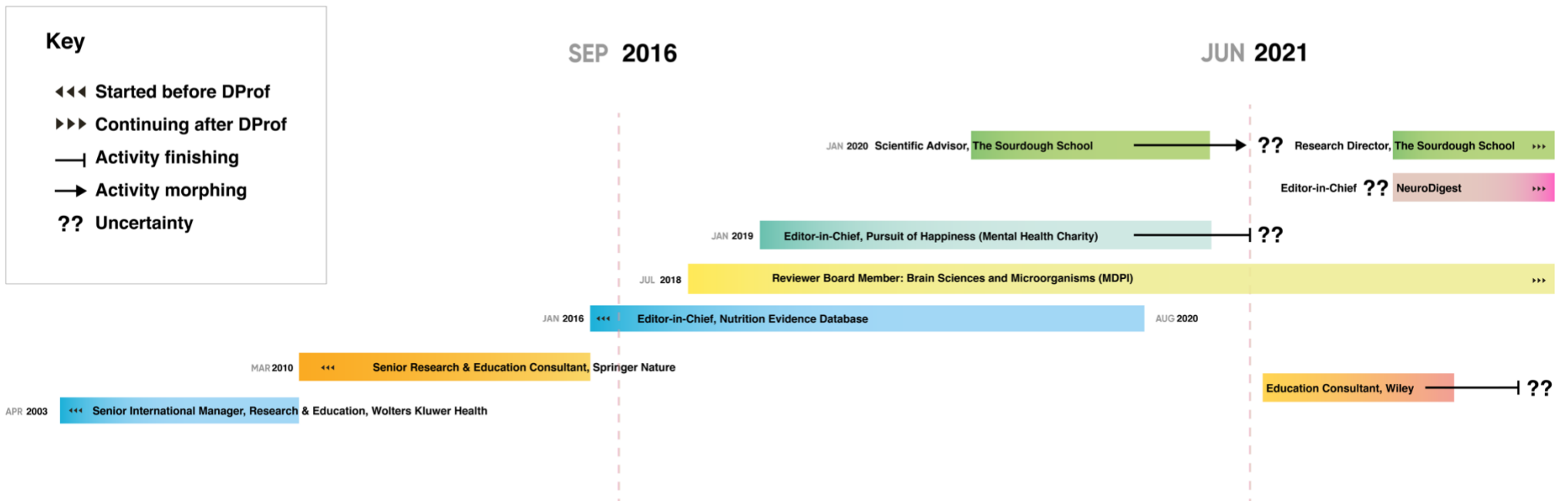
From my days of studying systems thinking at the Open University in the early 2000s, I had always assumed that these cycles of action and reflection were bound to specific activities over a short time span. However, when I look at my practice and how that has evolved over time, there are obvious examples of these learning cycles but spread across years, rather than weeks or months. I have chosen three of them to illustrate how these clusters of people, events and organisations keep reoccurring as “constellations with a theme” that keeps reappearing throughout my professional life, providing me with endless opportunities to learn, adapt and transform myself and my practice.

I have assembled an example of such constellation under the banner of “scientific information work” – as shown in figure 22 below – to describe how my experience in health information systems preceding my DProf enrolment has had a significant impact in my professional practice years later. Through my longstanding background in this field, with senior roles at Wolters Kluwer Health / Ovid and Springer Nature, I developed a deep understanding of matters relating to scientific knowledge management. I see my experience of working with scientific and healthcare databases for over 16 years as a snowball rolling down my professional landscape, changing in shape as it melts in parts, whilst incorporating new elements that have emerged along time. That part of my professional past may seem a little disconnected with my current lines of work, but I believe that without the skills I developed as a result of my indwelling throughout my years of work in scientific information I would not be the professional I am today. I think back to my days of training researchers at Novartis in Basel or food scientists at Barilla in Parma and remember feeling inspired by them. Serving the needs of these people, helped me realise I wanted to do some of the things

they did, and ignited me to find a way to create my own professional path to get there. Along the way I may have been frustrated because that path was different to theirs and, at times, I realise I have seen that as a handicap. Upon reflection, I now see my non-traditional career pathway as an advantage because of the richness in the landscape that I've been travelled through in order to be where I am today. As David Kahneman says in his recent book "Noise", "in real-world decisions, the amount of noise is often scandalously high" (Kahneman et al., 2021, p. 15). But the journey of transformation that I have experienced through my DProf has enabled me to realise that – also in Kahneman's words – "In noisy systems, errors do not cancel out. They add up." (Kahneman et al., 2021, p. 59), and that being proud of the professional I am today starts by owning that non-traditional trajectory of travel that continues to allow me to explore opportunities other "traditional scientists" would not have access to.

Here are some of the salient activities in this constellation that have taken place within my DProf journey and that I see as the outcome of previous iterations of similar events, but influenced by a whole new set of circumstances:

- **My work as Editor-in-Chief of the Nutrition Evidence Database.** I conceptualised this database as a platform for members of healthcare practitioners in the nutrition field to source good quality clinical evidence from. The original concept pre-dates my enrolling in the DProf by a few months, but the bulk of the work, including developing the algorithm, creating the database, recruiting an editorial team to index the articles, and publishing monthly alerts to subscribers, happened between 2017 and 2020.



Constellation 1: Scientific Information Work

Figure 26. Scientific information constellation

An illustrative timeline of the organisations, roles, and activities I have been engaged with in the field of scientific information.

This role allowed me to consolidate the know-how I had developed during my days working in scientific publishing but, most importantly, the project run under the auspices of BANT and the funding was minimal. This set of circumstances enabled me to gain confidence in becoming a true bricoleur in action, having to make do with whatever resources were at my disposal in order to make the Nutrition Evidence Database a success.

- **My editorial work at “The Pursuit of Happiness”.** In 2018, I connected with Dr Mark Setton, the co-founder and CEO of US-based charity the “Pursuit of Happiness” (PoH) (Happiness, 2021). Dr Setton had an interest in the microbiome and mental health and was very complimentary of “my Harnessing paper”. He also loved the Nutrition Evidence Database, and he had an interesting proposition for me. He had set up PoH as a non-for-profit in 2004 with Dr Paul Desan, the Director of the Psychiatric Consultation Service for Yale New Haven Hospital, with the aim to provide “free, science-based information on life skills that promote happiness, empowering nearly five million visitors with new strategies to fight depression and experience greater psychological well-being” (Fortier and Morgan, 2021). After a few meetings to discuss what I could bring to the team, I was invited to join as Editor-in-Chief of their database on the science of happiness. The database is used as a source of data to populate the website, which is visited by up to half a million people monthly because Google supports the charity by prioritising it on search results related to depression and anxiety.

Google does this as part of a non-financial support grant, which effectively gives the Pursuit of Happiness the equivalent to \$500,000 of Google Ads credit every year, making it appear at the top of the results lists for mental health-related searches.

The knowledge base I manage at the Pursuit of Happiness includes studies on the key factors known to contribute to happiness, including acts of kindness (Jasielska, 2020), gratitude (Cianfaglione et al., 2016), optimism (Fortier and Morgan, 2021), physical activity (Bai et al., 2016), relationships (Arlier et al., 2010), flow (Bellows et al., 2013), and life purpose / meaning (Van Tilburg and Igou, 2019). The overlap between human emotions and health is something that I have always found fascinating, so working with this kind of literature is really fulfilling, as is knowing that the outcome of my voluntary work is benefiting people from around the world who come to the Pursuit of Happiness website seeking for trustworthy material to read.

PURSUIT OF HAPPINESS

HAPPINESS IS UNDERSTANDABLE, OBTAINABLE, AND TEACHABLE

[ABOUT](#) [HISTORY OF HAPPINESS](#) [SCIENCE OF HAPPINESS](#) [RESOURCES](#) [COURSES](#) [CONTACT](#) [JOIN THE FIGHT](#)

The Team



Mark Setton

Mark Setton, D.Phil., is the co-founder and CEO of Pursuit of Happiness. He has studied and published works on East Asian philosophy and well-being for the past 30 years. He earned his B.A. and M.A. at Sungkyunkwan University in Seoul, and his doctorate at Oxford University. He has taught at the State University of New York at Stony Brook, the University of California at Berkeley, Oxford University, and presently, the University of Bridgeport. Mark and his team design and teach educational programs on the science and implementation of well-being for secondary schools, universities, and corporations such as Google, Mediamax, the China Accelerator, Dartmouth College, etc. He is especially interested in recent

scientific discoveries on well-being, as well as the remarkable resonance between modern science and ancient wisdom.



Paul Desan

Paul Desan, MD, Ph.D., is the co-founder of Pursuit of Happiness and the Director of the Psychiatric Consultation Service for Yale New Haven Hospital. He obtained an A.B. in psychology at Princeton University, a Ph.D. in neurobiology at Harvard Medical School and an M.D. at Yale University School of Medicine. His present research interests include mood disorders, particularly Seasonal Affective Disorder or S.A.D., and how S.A.D. can be used as a model to measure the interaction of psychological factors such as stress and cognitive style, and biological factors including seasonal cues. One focus of interest is the question of how a resilient individual can regulate mood and maintain life satisfaction in medical illness and existential loss.



Miguel Toribio-Mateas

Miguel Toribio-Mateas is the Editor-in-Chief of Pursuit of Happiness. Based in London (UK), Miguel has over 20 years of expertise in online research. Miguel's academic background is multidisciplinary and features postgraduate degrees in Nutritional Medicine (BSc Hons) and Clinical Neuroscience (MSc) as well as previous studies in International Business (MSc) and Systems Complexity (PgDip). Most recently, in 2016, he was awarded a prestigious Santander Bank scholarship for transdisciplinary doctoral research on gut-brain communication and neuroprotection, with particular focus on patient-reported outcome measures and their clinical

application by healthcare professionals to support their patients' brain health upstream from the gut at the Faculty of Health and Education at Middlesex University. Miguel also has a lead investigator role in a series of human interventions to assess the effects of food-based sources of probiotic microbes on mood, alertness and cognitive function at the Bowels and Brains Lab.

FREE Mini-Course / Certificate Course

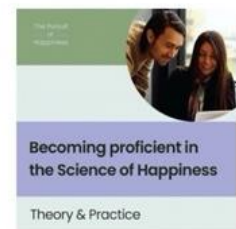
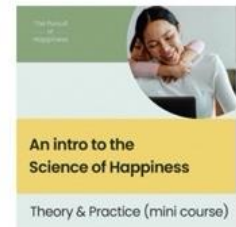


Figure 27. The Pursuit of Happiness

A screenshot from the “Team” page on the Pursuit of Happiness website (Fortier and Morgan, 2021).

- **My editorial work at NeuroDigest.**

Whilst I was a Chair of BANT, I connected with the Director of External Affairs of the British Society of Lifestyle Medicine (BSLM), Dr Neil Bindemann, a fellow neuroscientist who runs a company called “Innervate UK” which provides a range of services to medical societies. One such activity is NeuroDigest, a UK-based online journal “created with the aim of providing a central resource to keep health professionals up to date with news and reviews from across the neurology community”, particularly those “involved in the planning and implementation of care for patients with chronic neurological conditions, helping them to identify and keep abreast of best practice” (Bindemann, 2015). NeuroDigest is published in conjunction with the Primary Care and Community Neurology Society by the same team who edits the journal “Advances in Clinical Neuroscience & Rehabilitation”. It used to be printed once a year and distributed to over 2,500 subscribers, with an electronic newsletter sent every 3 months.

I have been discussing with Dr Bindemann plans to renew NeuroDigest as part of a wider initiative that involves transforming the Primary Care and Community Neurology Society (P-CNS) (Pcns, 2021) into the “Person-Centred Neurosciences Society” (PCNS). As part of this transformation, NeuroDigest would have an editorial board and a reviewer board, and it would aim to become an authoritative peer-reviewed journal with a focus on distilling brain (neuro) and gut (digest) health science - hence the name – in a scholarly but applied manner with the purpose of supporting the clinical decision making of subscribers. The subscription base is currently around 3,000, mostly medical doctors and allied health professionals. My role would be to manage various aspects of

the running of the journal, potentially being the Editor-in-Chief. In any event, this is an exciting opportunity for me to bring in the collaborative approaches that I've been growing so fond of throughout my DProf into an organisation that is relevant to my current professional development, in a subject discipline (neurology) that I feel very passionate about. On that basis, I shall discuss this project further [in chapter 5](#).

- **Dissemination of The Sourdough School's research activities.** I have forged a close working and personal relationship with Vanessa Kimbell, the founder of the School. We have a lot of mutual admiration for our lines of work. As Scientific Advisor to the School from January 2020 I have been helping with strategies to disseminate the findings of the School's research activities. The School has recently received some funding from global baking company Puratos (Puratos, 2021a) to develop some specialty sourdough flours. This means that this position may evolve into a Research Director role later in 2021, my remit being to coordinate the R&D activities of the School, as I will discuss in more detail [in chapter 5](#).
- **My opportunity to do some work with world-leading scientific publisher Wiley.** I have kept in touch with some of my colleagues from Ovid and Springer / Nature. Recently one of them contacted me to say that she was really keen for me to run some webinars on the benefits of having access to a

good quality research library as an R&D professional. She thought that my first-hand experience working in innovation and product development, combined with my background in scientific publishing made me a unique advocate for the use of services such as the Wiley Online Library. As a result, I am running a set of webinars entitled “Unlocking the value of research to drive innovation within your organisation” (or “Descubrir el valor de la investigación para la innovación empresarial” for the Spanish market) to run from June 2021 for UK and Spanish R&D professionals in a range of areas, from fast moving consumer goods to pharma and technology.

The Wiley example illustrates perfectly the “snowball effect” I was referring to above. I had a solid career in STEM publishing that I left to one side to develop other areas of my professional practice. Years later, the key sources of value Wiley feels I bring to this project are my uniqueness as a professional, and the growth that I’ve experienced by being out in the field doing what I do best, creating the best possible outcomes for the projects I am immersed in with whatever means are at my disposal at that time.



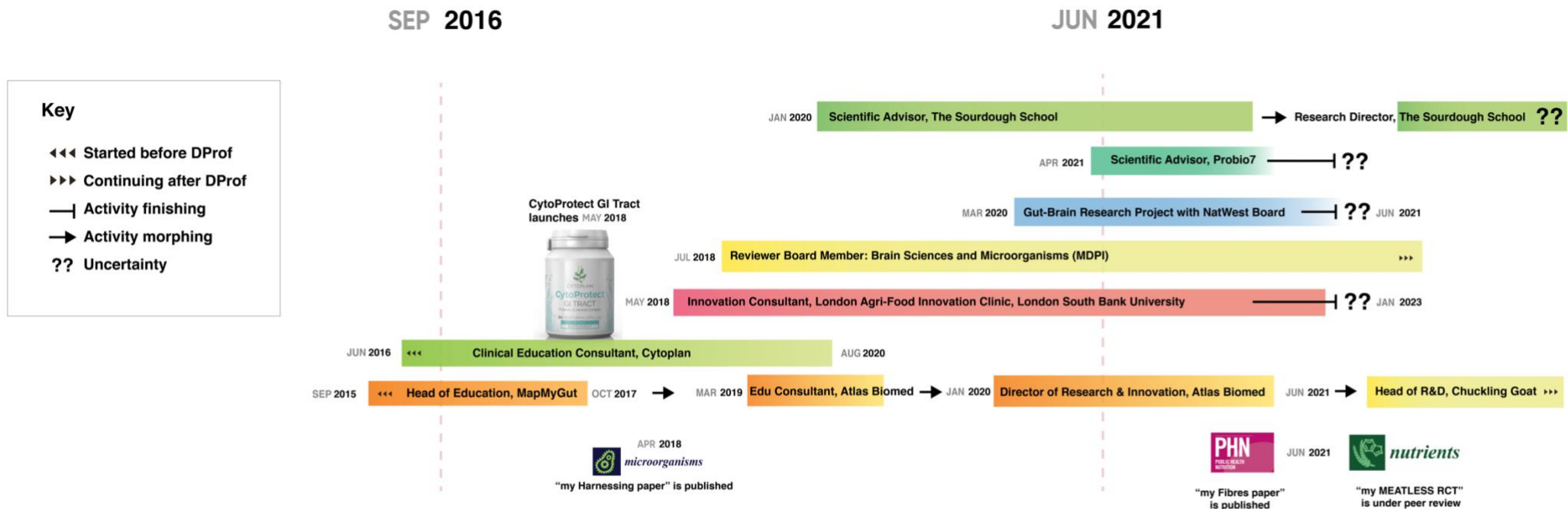
Figure 28. One of the flyers for my sessions with Wiley.

3.13. Recognisable patterns: guts and brains

Just as constellations are perceived as easily recognisable patterns in the night sky, there are two groups of star professional activities that instantly convey focus of my current work. The first one refers to my work on the translation of microbiome science to real world settings, and the second one illustrates my work on brain / mental health. Providing a stool sample is simple and non-invasive, and its analysis gives us access to the gut microbiome which, in turn, provides us with insights into the health of the gut. As a matter of fact, a recent study of the gut microbiome of 3,409 individuals published in Nature found that health and disease markers correlate with gut microbiome composition (Manor et al., 2020). Conversely, getting an insight into what might be going on with someone's brain is an altogether more difficult

task. Structural brain imaging is of little clinical usefulness for mental disorders (Peter et al., 2018), and the American Psychiatric Association (APA) recently published a position paper stating that neuroimaging provided no benefit to the diagnosis and treatment of psychiatric disorders (Henderson et al., 2020, Michael B. First et al., 2018). There is a distinct lack of biomarkers for mental health that could be identified by means of blood or urine tests, and getting a tissue sample of someone's brain is next to impossible. On that basis, patient-reported outcome measures (PROMs) become essential tools when it comes to measuring an individual's mental wellbeing (Roe et al., 2019) with views to providing them to nutrition and lifestyle strategies that help them improve their mental wellbeing. Consequently, the PROMs constellation represents an assemblage of PROMs, brain, and neurosciences.

I should also make it explicit that I could include many other entangled constellations of people, subject disciplines and organisations that resonate with each other “through a multiplicity of unique individual viewpoints and their relationships” (Murray-Rust et al., 2019). If I were to design other variations of the constellations I've included in this chapter, I would reach a point of saturation where I would end up looking at the same activities from different angles. I will be doing that [in chapter 5](#), which is why I have chosen to highlight only the scientific information, microbiome, and PROMs (brain) areas.



Constellation 2: Applied Microbiology / Human Microbiome Work

Figure 29. Microbiome constellation

An illustrative timeline of the organisations, roles, and activities I have been engaged with in the field of the applied microbiology.

I have been fully immersed in professional activities directly linked to research, education, and translation of science in the microbiome field for the last 6 years. In addition, I had ongoing professional exposure to intersection of the fields of applied microbiology and nutrition for another 10 years as a regular user of microbiome tests in clinical practice. My exposure started during a month of work practice at the end of year 1 of my degree in 2004 as an intern at a health retreat centre in Spain. I worked closely with a microbiologist who used to analyse the stool of clients attending the centre to tackle various different conditions, using nutrition and lifestyle approaches such as extended overnight fasting, medically supervised nutritional therapy, psychodrama therapy (with a qualified practitioner) and Yoga. I was fascinated by his explanations on how microbes in clients' guts were related to various conditions. I went back every summer for at least 2 weeks to continue to absorb as much knowledge as possible from him and the rest of the team at the retreat. And as soon as I started practising in 2009, I started using microbiome testing in my own clinics. My journey down this professional development pathway has come a long way since then, which explains why the microbiome work constellation is rather eventful. These are some of the highlights:

- **My work with Professor Tim Spector at MapMyGut**, which I have already discussed in detail in [section 3.4](#), was a perfect opportunity for me to consolidate the tacit knowledge I had developed since my days as an intern and throughout my clinical practice experience - both from my own clinics and from my work with Claimont Health – with new formal knowledge I acquired through my master's degree and professional CPD by the Royal Society of Biology, the Society for Applied Microbiology, and the Microbiology Society, of which I become a

member in order to keep abreast of developments in the field of applied microbiology and the human microbiome.

- **The practitioner roadshows.** With all that knowledge fresh in my mind, I was able to create a wealth of educational materials on nutrition and the microbiome for **Cytoplan** throughout my 4-year contract with the company, including the 2018 practitioner education roadshow, entitled “The Human Microbiome: Translating the Science and Making Sense of the Connections” (Cytoplan, 2018), which comprised a number of events around the country, designed by me in a participatory style that enabled delegates to contribute to the sessions, rather than just “be lectured to”. I drew from the growing body of clinical research documenting how this complex microbial ecosystem is closely linked with our immune, cardiovascular, and even brain function (Valdes et al., 2018), and I co-designed a practical session that was delivered by my colleague Helen Drake, who is now completing her MSc in Transdisciplinary Practice.

The preceding roadshow, which run from March to November 2017, focused on clinical applications for cognitive, immune, and cardiovascular health. The sessions weaved in applied microbiology and neuroscience and took into account the microbiome as a connecting superorganism with ramifications throughout the health and disease of all body systems (Gilbert et al., 2018). Similarly, the 2019 roadshow focused on the exposome as a new paradigm to study the impact of the environment on human health (Vrijheid, 2014). The human microbiome plays a pivotal role in translating the exposures that we experience on a daily

basis since we are born until we die (Debord et al., 2016). On that basis, there was also a fair amount of microbiome content in the last in-person roadshow before COVID-19. The challenge was to keep delegates engaged by continuing to tap into a key area of interest for nutrition practitioners such as gut bacteria, but without repeating the same concepts over and over again.



Figure 30. Flyers from the Cytoplan practitioner roadshows 2017-2019.

- During my time at Cytoplan I also engaged in new product development, creating a new line of professional-grade food supplements called “CytoProtect”. Of the 6 products I formulated, **CytoProtect GI Tract** (Cytoplan, 2021b), which launched in May 2018, became one of the company’s best-sellers within a couple of months and has continued to perform very well ever since.



Figure 31. CytoProtect GI Tract

A product that I formulated based on my knowledge about the human microbiome, commissioned by Cytoplan.

- **A synchrony of events** including those that I have already mentioned in this section, as well as the publication of “my Harnessing paper”, resulted in an invitation to join the London Agri-Food Innovation Clinic (LAFIC) as Innovation Consultant in May 2018, a research unit hosted at London South Bank University and funded by a grant from the European Regional Development Fund to provide scientific and business support to small and medium enterprises in Greater London. It was through my involvement in various different nutrition, neuroscience, and microbiome-based projects at LAFIC / LSBU that I got in touch with **Atlas Biomed**.
- **Atlas Biomed** is a UK-based Russian biotech company specialising in direct-to-consumer microbiome testing for which I worked from March 2019 until June 2021. Initially, I was employed as an education consultant with a remit including the creation of content such as webinars and blogs, as well as representing the company at public events. After a few months I was offered a more permanent position as Director of Research and Innovation, through which I was able to forge a relationship with the School of Applied Sciences at LSBU, spanning industry and academia, and engaging in activities such as the development of a profile within the microbiome test results that allows consumers to get an indication of the anti-inflammatory potential of their gut bacteria.

Inflammation and the microbiome

Your microbiome contains more pro-inflammatory bacteria than anti-inflammatory bacteria.

Anti-inflammatory potential: 4 out of 10

► [Click here to read description](#)

Microbiome anti-inflammatory potential

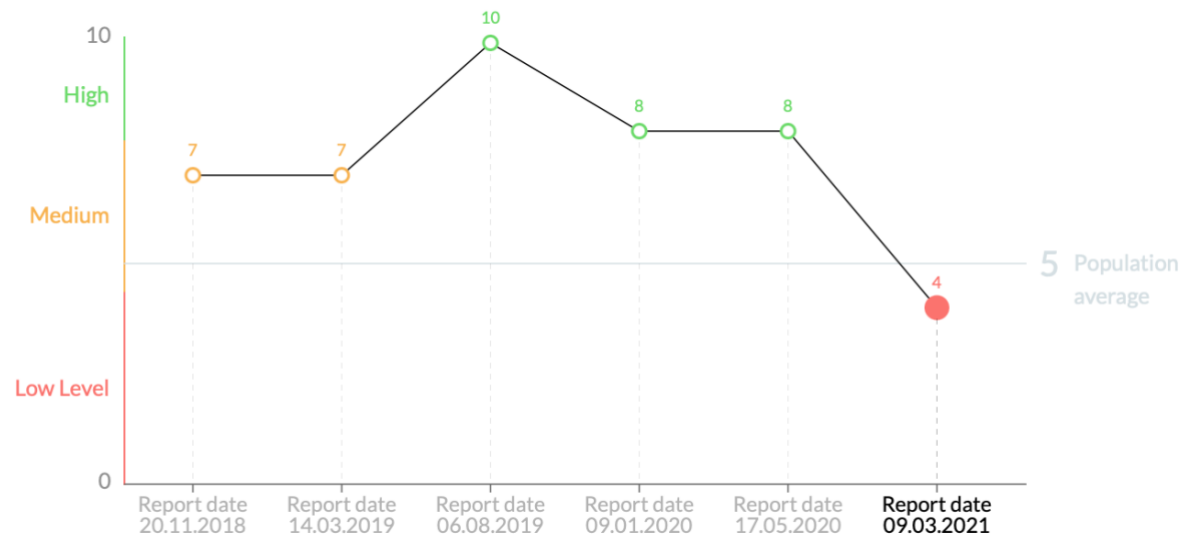


Figure 32. The Atlas anti-inflammatory potential profile

A graph of the anti-inflammatory potential profile I created for Atlas Biomed.

Microbiome influence

The pro-inflammatory functions of your gut microbiome outweigh its ability to suppress inflammation. Although acute inflammation is rare, the body may experience low-grade inflammation that is hard to detect. Follow your food recommendations to help your microbiome protect you against inflammation.

Search

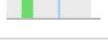
Name	Representation	Effect	Bacterial representation [?]
Salmonella	< 0.02%	Reduces potential	0%  0%
Kluyvera	< 0.02%	Reduces potential	0%  0%
Klebsiella	< 0.02%	Reduces potential	0%  0%
Sphingomonas	< 0.02%	Reduces potential	0%  0%
Akkermansia	7.96%	Increases potential	0%  24.90%
Pseudomonas	< 0.02%	Reduces potential	0%  0%
Proteus	< 0.02%	Reduces potential	0%  0.02%
Escherichia-Shigella	0.06%	Reduces potential	0%  4.91%
Enterobacter	< 0.02%	Reduces potential	0%  0%
Citrobacter	< 0.02%	Reduces potential	0%  0%
Bilophila	0.37%	Reduces potential	0%  4.50%
Faecalibacterium	7.01%	Increases potential	0%  26.65%
Lactobacillus	0.03%	Increases potential	0%  23.87%
Campylobacter	< 0.02%	Reduces potential	0%  0%
Prevotella	< 0.02%	Reduces potential	0%  5.53%
Bacteroides	30.96%	Reduces potential	0.05%  49.81%
Bifidobacterium	< 0.02%	Increases potential	0%  12.07%

Figure 33. The anti-inflammatory potential algorithm

The microbes that make up the algorithm behind the anti-inflammatory potential profile I created for Atlas Biomed.

One of the greatest challenges in defining “a healthy gut” is that most of the variance (~85%) within the human microbiome is still unaccounted for, as confirmed by population-wide studies (Falony et al., 2016, Rothschild et al., 2020). However, the relative abundance of microbes able to ferment non-digestible substrates like dietary fibres to produce short-chain fatty acid (SCFAs) contributes to the anti-inflammatory potential of the microbiome and continues to be one of the indisputable criteria for such definition (Ashaolu et al., 2021, Coppola et al., 2021, McNabney and Henagan, 2017, Sivaprakasam et al., 2017, Wong et al., 2006). I created the project definition for the anti-inflammatory potential profile based on the abundance of SCFA-producing microbes, as well as the presence of pathogenic or opportunistic microbes, which act in the opposite way, increasing the potential for gut-based inflammation that then becomes systemic (Stephens and Von Der Weid, 2020).

Other rewarding learning opportunities that arose during my time at Atlas Biomed include my contribution to a paper on the reference values for intake of 6 types of soluble and insoluble fibre in healthy UK inhabitants based on the UK Biobank data, which pushed my boundaries on the fibre science front a little, and that was recently published on the journal Public Health Nutrition (Shevlyakov et al., 2021). I am also proud of the huge amount of work I did on the design and implementation of **my first ever microbiome-based randomised controlled trial in collaboration with LSBU and plant-based food manufacturer Meatless Farm** (Toribio-Mateas et al., 2021), testing the hypothesis that plant-based meat alternative products, e.g., vegan sausages or burgers, can actually have a beneficial impact on gut microbes, depending on the quality of their ingredients. The paper was recently published in the journal

Foods (MDPI). Although it focuses on assessing the changes to the gut microbiota of participants, the underlining theme is consumer behaviour in the flexitarian age, where "eating less meat is increasingly seen as a healthier, more ethical, more sustainable option, so people adjust their eating behaviours to manage their public image and "to create a certain impression on others"" (Toribio-Mateas et al., 2021, p. 17).

It just so happens that I had already collaborated with the person who was my contact at Meatless Farm, Angela Walker, who edited a book entitled "**Case Studies in Personalized Nutrition** (Personalized Nutrition and Lifestyle Medicine for Healthcare Practitioners)" which I contribute to with 2 chapters, one on a clinical case study on gut-brain communication and nutrition for cognitive function, and another one on the evidence base for personalised nutrition.

In addition to the Meatless Farm trial, I designed 2 further studies, another RCT on the effects of a commercially available probiotic called **Probio7** on the gut microbiome of healthy participants, and a single-arm clinical trial on the effects of a multi-ingredient botanical food supplement of the gut microbiome of healthy participants with a company called **Verm-X** (Verm, 2021) that specialises in herbal remedies for animal gastrointestinal health and that wants to enter the human health market. For both these studies I included semi-structured interviews in the study design in order to capture rich qualitative data from participants.

Sadly, my time at Atlas Biomed was stressful. The organisational culture was aggressive, highly hierarchical, with frequent communication breakdowns, lack of trust between

colleagues and a huge emphasis on presenteeism rather than on outcomes. For all these reasons, I decided to leave at the start of June 2021. Within the same day I was offered a role as **Head of Research and Development** at a company called **Chuckling Goat** (CG). CG is a family-run business that produces goats milk kefir – fermented milk (Rosa et al., 2017) – in a farm in Wales. They have built an extremely successful multi-million-pound business since launching in 2008 and now have over 200,000 customers in 56 countries around the world. They were using Atlas Biomed as a supplier of microbiome testing kits which they sell alongside their kefir products but wanted to develop their own microbiome test. And this is where I come in. From day 1, I have been working on the creation of a research and development pipeline for the company. This pipeline has microbiome tests at its core, on the basis that the tests provide an interface with consumers who provide microbiome samples as well as questionnaire data about their physical and mental wellbeing. Chuckling Goat an average of 300 hundred tests every month, so that is a substantial amount of real-world evidence that will enable customer responsiveness in product development, as well as the dissemination of real-world evidence. To that extent, I am working with academics from Aberystwyth and Cardiff universities to deposit anonymised customer microbiome and questionnaire data into a repository that I'm calling the "Microbiome Health Register". Chuckling Goat customers will be able to opt in or out of the register, which will provide real-world datasets for academics / researchers to work with. I have created a visual workflow for this pipeline that is too large to visualise here, but that is available for you to explore on "The Creative Scientist" website at <https://thecreativescientist.co/creations/landscape#rnd>.

For the microbiome test, I am working in collaboration with scientists from Cambridge University Pathology Services who will be doing the sequencing of the stool samples, as

well as the bioinformatic analysis of the microbiome raw data. My involvement in product development at Atlas Biomed, together with the insights that I carried with me from my time at **MapMyGut**, and my clinical expertise in the use of microbiome tests with mental health patients through my work with **Claimont Health** have helped me develop practical knowledge that has enabled me to put together the data interpretation algorithms that they will be using to visualise the results.

The screenshot shows a Google Sheet titled "CG Microbiome Test parameters". The sheet contains a table with columns A through H, detailing various microbiome parameters and their healthy ranges. Below the table, there is a scoring system section and a visual representation of the results on a scale of 0 to 10.

	A	B	C	D	E	F	G	H
1	Lactic acid bacteria	Healthy range	Bifidobacteria	Healthy range	Metabolic regulators	Healthy range	Butyrate producers	Healthy range
2	Lactococcus	0.01% - 0.02%	Bifidobacterium	0.12% - 0.75%	Akkermansia	0.020% - 1.5%	Faecalibacterium	6.50% - 12%
3	Lactobacillus	0.015% - 0.025%			Christensenella	0.015% - 0.025%	Roseburia	0.70% - 2%
4							Eubacterium rectale group	0.13% - 0.35%
5							Eubacterium hallii group	0.23% - 0.45%
6							Coprococcus	0.015% - 0.025%
7							Ruminococcus	0.6% - 11%
8								
9								
10	All taxa are genera unless otherwise marked as (s) for species.							
11								
12	Scoring							
13	Overall score: 0 to 10 (0= worst / 10= most favourable score)							
14	10	No taxa below the healthy range threshold.						
15	9	≥ 5% of all taxa below the healthy range threshold.						
16	8	≥ 10% of all taxa below the healthy range threshold.						
17	7	≥ 20% of all taxa below the healthy range threshold.						
18	6	≥ 30% of all taxa below the healthy range threshold.						
19	5	≥ 40% of all taxa below the healthy range threshold.						
20	4	≥ 50% of all taxa below the healthy range threshold.						
21	3	≥ 60% of all taxa below the healthy range threshold.						
22	2	≥ 70% of all taxa below the healthy range threshold.						
23								
24								
25	Results to be displayed on a scale of 0 to 10 on a continuum that goes from red to amber to green.							
26								
27								
28								
29								
30								

At the bottom of the sheet, there is a navigation bar with tabs: Diversity, Beneficial bacteria, Opportunistic, Anti-inflammatory potential, SCFAs, Fibres, Mental wellbeing, and Total microbiome welli.

Figure 34. The Chuckling Goat microbiome test

An example of the algorithms that I've developed for the Chuckling Goat microbiome test. These are the instructions that the scientists from Cambridge University are following in order to interpret the raw data from the sequencing of stool samples so that it can be converted into a report for the customer.

In addition, I am putting together a randomised controlled trial to ascertain the effects of goats kefir on stress, anxiety and emotional regulation, using advanced microbiome sequencing techniques, alongside the perceived stress scale (PSS) by Cohen and colleagues (Cohen et al., 1983), the generalised anxiety disorder scale (GAD-7) by Spitzer et al (Spitzer et al., 2006), and the emotional regulation questionnaire (ERQ) by Stanford's psychology Professor James Gross (Gross and John, 2003).

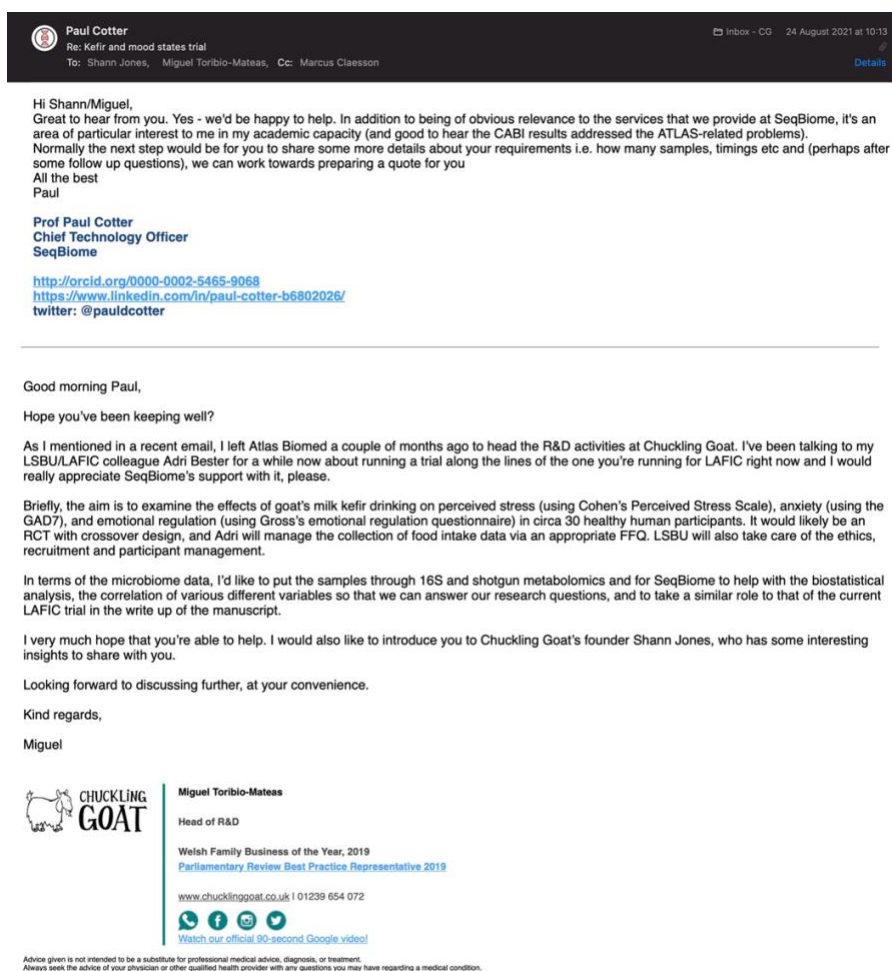
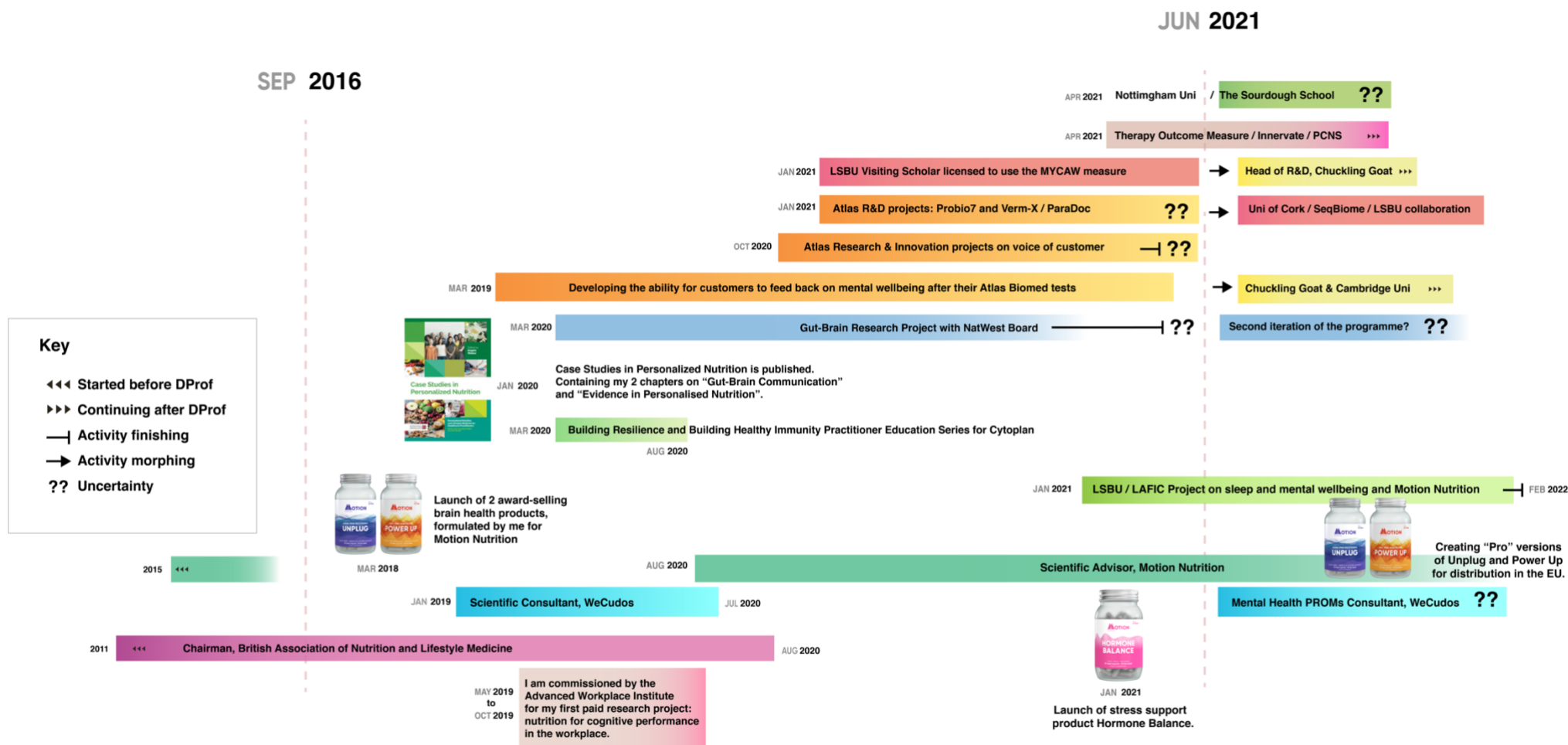


Figure 35. The upcoming kefir and mood states trial

And that's not all. I have already achieved more at Chuckling Goat in two months than in all the two and a half years I was at Atlas Biomed. I am currently developing a microbiome test for mental health specifically targeted at adults from 13 to 18 years of age. For this I am liaising with psychiatrist and gut-brain researcher Professor Ted Dinan of University College Cork, whom I know from my work with NatWest. This is likely to need a study to help us identify the microbiome signature of teenagers with anxiety / depression compared to a control of individuals living without mental health issues, and further compared to 2 adult cohorts that mirror the same mental characteristics. It's a longer-term project, but I am incredibly excited about it. In the shorter run, I've already formulated a "Happy Kefir" product containing a mix of B vitamins that will enable Chuckling Goat to make use of approved health claims for the maintenance of healthy psychological and cognitive function, and to support the function of the nervous system. The "Happy Kefir" will also contain a proprietary blend of 8 different strain of probiotic bacteria researched for their ability to support positive mental health, including specific strains of *Lactobacillus acidophilus*, *Lactobacillus casei* and *Bifidobacterium bifidum* (Noonan et al., 2020). In my role at Chuckling Goat, I am fully immersed in R&D activities where I need to translate microbiome and mental health science into practical applications. Creating products like the "Happy Kefir" that have a tangible effect in people's lives gives me immense satisfaction.

I will discuss how my experience at Atlas Biomed enabled me to forge links with **LSBU**, to develop my aptitude as a reviewer for **MDPI**, and to engage in really interesting projects, such as the nutrition and gut-brain communication research project with the **NatWest ExCo Board** [in chapter 5](#).



Constellation 3: PROMs / Brain / Neurosciences work

Figure 36. PROMs, brain health and neurosciences constellation

An illustrative timeline of the multiple organisations, roles, and activities I have been engaged with in the field of patient-reported outcomes (PROMs), brain health and the neurosciences.

The last constellation I am highlighting here assembles a similarly hectic set of events around my work on brain health, the neurosciences, and patient-reported outcomes (PROMs). The highlights are as follows:

- I spent a whole 18 months embedded in a product development role at a clinical data management company called **WeCudos**. That consultancy role came about because of my interest in participatory approaches to research that invite participants to feed back on their experience of care by means of validated questionnaires. Asking a participant in a study, or even an individual patient at a clinic the simple question “*how do you feel?*” can be really powerful. After a year’s break, I reconnected with Dr Adam Read, WeCudos’ founder and CEO, who had two interesting things to tell me. Firstly, he too had been diagnosed with ADHD only a few months ago. He had realised how his neurodiverse brain worked during the journey of discovery that he’d gone into after his diagnosis and had decided to repurpose WeCudos as a company that helped manage real-world, patient-reported data from mental health projects only. He asked me if I wanted to re-join him as a consultant with that narrowed remit and, given that I was just thinking of leaving Atlas Biomed, I said yes. I shall explore my relationship with WeCudos and its impact on my professional development [in chapter 5](#).
- Throughout my time at **Atlas Biomed** I had been wanting to invite our customers to get involved in dialogue with me in my product development and innovation capacity so that I can better understand their needs. Finally, after months of fighting for this, I was able to
 - launch a consumer research survey involving 7,000+ Atlas customers.

- design the 2 research studies that I mentioned before for **Probio7** and **Verm-X** in which participants would be providing microbiome samples as well as answering questions via a validated patient-reported measure.

The PROM I am using is called the “Measure Your Concern And Wellbeing” (**MYCAW**) (Paterson et al., 2007) and it includes a scale for participants to rate a health concern that is important to them. It also enables them to feed back to the researcher using their own words, and this piece is processed via thematic analysis. The studies also feature semi-structured interviews, which I will be conducting, recording, and analysing myself. At the time of writing, I am just about to finish the transfer of these studies from Atlas Biomed to another supplier of microbiome testing, SeqBiome, a biotech company affiliated to University of Cork. I shall discuss this further in the relevant section in [chapter 5](#).

- Around the same time as I was dealing with the research ethics application for the studies, I was also arranging the licensing of the **MYCAW** with the scientists from Bristol University who have taken it over recently and was in talks with Vanessa Kimbell of **The Sourdough School** about using a similar approach for the studies that she is planning to conduct at the school. She recently got funding by Gail’s (the bakers) (Bread, 2021) and Puratos (Puratos, 2021b) – a large Belgian family-run business that provides bread for global companies like McDonalds – to start running small-scale studies that would involve participants providing microbiome samples and having interviews with the researchers. I was already involved in a pilot of this approach with Vanessa during 2020, and as soon as she got the funding, she asked

me if I would like to be the **Research Director** of the School because she loves my pluralistic approach to “doing science”.

One of my responsibilities at the School would be to get ethical approval for the studies. I already have access to ethics at LSBU, so this should be simple, right? I am afraid it is not that straightforward. This access has been historically attached to Atlas and to one particular person at LSBU, Adri Bester, whose research interests I also need to take into account and who may not be 100% aligned with mine if I was to upset the status quo. For that reason, I have started talks with an ex-colleague of mine from my days with Professor Spector at MapMyGut, Amrita Vijay, who now works at Nottingham University and, so far, it is sounding as though I may have found another academic partner for the School.

- I was recently given the opportunity to train on the use of another PROM called the “**Therapy Outcome Measure**” (TOM) (Enderby, 2014, Enderby and Sutton, 2020, John et al., 2005, John et al., 2001) with its creator, Professor Pamela Enderby of Sheffield University. This training would enable me to become a “train the trainer” expert in the TOM, and my ability to train healthcare professionals in its use would be linked to the project led by neuroscientist Dr Neil Bindemann to transform the existing Primary Care & Community Neurology Society into the updated Person-Centred Neurosciences Society, which I mentioned previously, and I shall discuss in more detail [in chapter 5](#).

- **Motion Nutrition and LAFIC.** In 2015 I formulated the whole product range for the nutrition start-up **Motion Nutrition**. I then started working for **Cytoplan** but kept in touch. In 2017 they got back in touch with a new project. They wanted me to develop 2 innovative food supplements that supported cognitive function, lessening the negative effects of stress on the brain, and promoting healthy sleep. I formulated **Power Up** and **Unplug**, which launched in 2018 and won a number of awards in the UK and internationally, helping the company get to number 54 in the top 100 start-ups chart in 2020 (Startups.Co.Uk, 2020). In 2020, my colleague Adri Bester at LAFIC / LSBU told me that there was an opportunity to create one “legacy” research project with LAFIC funding focusing on mental health and that she wanted me to lead it. LAFIC helps SMEs in the Greater London area, and I knew that Motion Nutrition were keen to engage in a research project with me because they had recently completed a survey of the Unplug product and sleep quality, which was responded by over 33,000 people. My idea was to use a bespoke combination of sleep, stress, and cognitive function PROMs for this project, and to give users access to their data during their study, so they could track their progress from the Motion Nutrition website. It took a while to get the project set up, build the questionnaires, get ethical approval by LSBU, etc. but this is one of the research projects that I am most proud of to date. It involves the politics of my involvement with Motion Nutrition as a consultant as well as in my role of academic researcher, and the complications that this has brought to the fore, as I will discuss [in chapter 5](#).

- **My move from Atlas Biomed to Chuckling Goat.** When I joined Atlas, I was promised by the CEO that I would be able to lead the development of a mental wellbeing profile that took into consideration gut bacteria known to influence mental health outcomes. This never happened. I also put together the project specification for a “Real World Evidence” database that would enable me to run searches within consumer data, in an anonymised way, in order to test hypotheses such as “women over 40 have fewer Lactobacilli”. This never happened either. One of the key reasons why I joined Chuckling Goat immediately after leaving Atlas was the fact that our interests were aligned. They already had an idea of this “research interface” they wanted to build, which is equivalent to my “Real World Evidence” database, and a mental wellbeing profile was also at the top of their priority list. In fact, they had been talking about this with academics at Cardiff University in the past and I had met some of those involved in the conversations. I will discuss my journey through Atlas and into Chuckling goat in more detail [in chapter 5](#).
- **The Advanced Workplace Institute (AWI)** was my first paid research project for a company that expected me to deliver academic standard results, but for application in a corporate setting. I was tasked with producing a report based on a systematic literature review of the effects of nutrition and hydration on cognitive function in the workplace. AWI is a membership organisation with a vision “to create a world where people and organisations work in better ways to enhance business performance, enable healthy lives and create a sustainable future” (Institute, 2021). My findings were shared with representatives from

some of the membership organisations, which included LinkedIn, Balfour Beatty, Zurich Insurance Company, and the IT services company CloudSense, to name but a few, who then fed back to AWI before a final report was sent to them. My experience with this project was rocky because of mismatching expectations that had to be managed before trust was gained and my research could continue, as I will discuss in detail [in chapter 5](#).

3.14. Concluding remarks

I could keep writing about this sort of entanglements for another few weeks, which would not be practical. Instead, I will tackle them from other angles [in chapter 5](#). To conclude this section, I would like to highlight some points that might already be obvious. As I have mentioned before, I believe that professional practice exhibits many of the qualities of a complex adaptive system. These three sample constellations help illustrate the multiplicity of professional fronts I am immersed in, and the fact that they cannot be seen in isolation. Each and every one of the activities I have featured – and indeed all of those that I haven't discussed in detail but that are covered in the journal of professional activities and in the constellation figures – is linked with other activities in the same and other constellations, which means that every single activity has the potential to influence the outcomes of other activities in any constellation. This means that the themes showcased in this section emerge out of the interference by each individual activity and their links with other activities and constellations.

In Peter Senge's words, being immersed in those constellations has allowed me to "generate the depth of understanding and commitment that is required to generate change in truly demanding circumstances" (Senge et al., 2005, p. 87). I am driven by curiosity, by the connectedness of things, projects, people, and organisations, which I tend not to see as separate entities, but as parts of a bigger system. Throughout my DProf journey I have realised that my approach to inquiry has changed. I have moved away from wanting to go deep into the subject disciplines that I am immersed in, adopting a softer focus on the interdependencies amongst all the factors that play a role in the lines of inquiry I continue to explore. I have gained an awareness of my own engagement with my professional practice that I had not anticipated as one of the outcomes of my doctoral programme, but that I am delighted with. This explains my choice of first-person action research as the overarching methodological lens through which I have looked at the entangled professional and personal experiences that I am sharing in this thesis.

3.15. The Creative Scientist companion website

As I mentioned in the foreword, I have created a companion website to this thesis with the purpose of hosting the research papers, chapters, and other creative outputs such as videos, blogs, or podcasts that I mention in throughout this thesis. I could have added these resources to an appendix, but I committed to the process of building the website to provide an outlet for my creativity, and to engage in self-reflection by means of entwining presentational, experiential, practical and propositional ways of knowing, as per Heron & Reason's insights from "A Participatory Inquiry Paradigm" (Heron and Reason, 1997).

I have called my companion website “**The Creative Scientist**”, a nickname that quite a few people know me by, so much so that I decided to trademark it last year. The URL is <https://thecreativescientist.co> and the site is password protected, so you will need to type **thesis2021** when prompted. Please note that the password is case sensitive. From the home page, please feel free to read the introduction, where I share some projects that I am really proud of, or use the menu to navigate to <https://thecreativescientist.co/creations> where you’ll be able to browse by chapter and find a range of interactive supplementary materials.

Chapter 3 summary

In this substantial chapter I have aimed to illustrate the value of indwelling, tacit knowledge, and experiential learning in professional practice. Informal learning is about situated action, collaboration, co-creation, and reflection. It’s flexible and often unpredictable. Most of what I’ve learned about the emerging field of the gut microbiome and mental health isn’t yet written in textbooks. Through my own lived experience, I realise that a deeper, more critical, more creative inquiry is required. This chapter is best understood by exploring the accompanying website alongside it.

[Click to go back to the table of contents.](#)

Chapter 4. Methodological Framework

“Research is always carried out by an individual with a life and a lifeworld”

Valerie Bentz and Jeremy Shapiro in “Mindful Inquiry in Social Research” (*Bentz and Shapiro, 1998b, p. 3*)

4.1. What's Chapter 4 about?

In this chapter I bricolage the individual methodological components into the critical lens of first-person inquiry through which I look at my professional practice. I delve into the different constructivist approaches to qualitative research that I have assembled into my own methodological stance, and I introduce writing as inquiry as the core device that enables me to tell the story about my experience and to make sense of my practice by looking at it from a completely different angle. I conclude the chapter by introducing my validity parameters and substantiating them with evidence that allows me to assess the quality of my inquiry in [chapter 5](#).

4.2. Justifying knowledge

According to Avner Segall, Professor of Teacher Education at the University of British Columbia, “any study is always more than the sum of its methods. What gives meaning and direction to a piece of research is not the choice of methods but its methodology, i.e., the theories and pedagogies the researcher “assumes and utilises for (and during) the process of conducting that research” (Segall, 2002, p. 28). However, methodological choices are guided by epistemology, the theory and justification of knowledge (Carter and Little, 2007), thus I argue that epistemological considerations must be the starting point of any definition of the “analysis of the assumptions, principles, and procedures in a particular approach to inquiry” (Schwandt, 2001), regardless of whether the methods chosen are qualitative, quantitative, or a combination of both / mixed (Bowleg, 2017). In preceding chapters, particularly [in chapter 1](#) and [chapter 3](#), I have touched upon my views on research practice as a mode of knowledge creation. Therefore, I believe it is important to start this chapter by discussing how different ways of knowing continue to shape the methodological framework that underpins my practitioner inquiry.

This chapter focuses on how I developed my methodology, which is rooted in the epistemology of practice, where a strong relationship between knowledge and action exists because, in essence, practice is *what we do*, and the sheer act of doing generates knowledge that is most often practical. Cook and Brown discuss how explicit knowledge, i.e., “knowledge that can be explicated, verbalised, and communicated” (Thornton and Lanzer, 2015, p. 4707) and that is transferred by means of formal learning, e.g., a university degree, tends to be prioritised over tacit knowledge (Cook and Brown, 1999), defined as comprehensive embodied knowledge that is “difficult to verbalise and transfer and that is expressed as skills” (Thornton and Lanzer, 2015, p. 4707).

Of the many definitions of tacit knowledge, in my view Polanyi provided the most eloquent one in his book “The Tacit Dimension”:

“I shall reconsider human knowledge by starting from the fact that we can know more than we can tell. This fact seems obvious enough; but is not easy to say exactly what it means” (Polanyi, 2009, p. 4).

Hungarian-British Polanyi was an extraordinary polymath who contributed to a wide range of scientific fields of research in the physical sciences. His view on tacit knowledge wasn't limited to acknowledging the difficulties in its articulation, he actually thought that all knowledge was rooted in tacit knowledge (Polanyi, 2009). In order to illustrate the concepts of reality and tangibility, he wrote:

“I regard the significance of a thing as more important than its tangibility; I shall say that minds and problems are more real than cobblestones. This is to class our knowledge of reality with the kind of foreknowledge which guides scientists to discovery.” (Polanyi, 2009, p. 33)

Polanyi's tacit knowledge isn't the kind of knowledge that emerges out of a lab, as per Latour and Woolgar's "laboratory life" (Latour and Woolgar, 1986). It is created in open communities facing complex problems that require practitioners to apply insight across multiple disciplines in order to find solutions, generating new knowledge as a result. This is what Gibbons and colleagues describe as Mode 2 approach to developing relevant and actionable knowledge (Gibbons, 1994), or what Greiner refers to as "actionable knowledge in action" (Poulsen and Buono, 2020) cf. (Greiner and Metzger, 1983). In John Dewey's words, "development does not mean just getting something out of the mind. It is a development of experience and into experience that is really wanted" (Dewey, 1974, p. 278). That is the kind knowledge that my thesis focuses on, the kind of real-world knowledge that promotes the coexistence of experiential, personalised and applied learning experiences (Morley and Jamil, 2021) and that has allowed me to integrate rigour and relevance to, ultimately, bridge "the unbridgeable" worlds of industry and academia (Finch et al., 2018, p. 152).

These considerations are of the utmost relevance to my research because my ultimate purpose is to provide a legacy for other practitioners in similar circumstances to mine, so that they can learn about what it is like to be a scientist out of a lab, stitching together a patchwork of different ways of knowing to guide my methodological choices whilst I engage with scientific inquiry in real-world settings. It would be most gratifying for me to enable others in my position to understand that the choice of methods is only one of the pieces of the jigsaw, and that aside from the pertinent subject discipline knowledge at hand, personal, ethical and political concerns must also be taken into account because "research is always carried out by an individual with a life and a lifeworld" (Bentz and Shapiro, 1998b, p. 3).

4.3. Lifeworlds

According to Ron Valle, lifeworld – from the German *Lebenswelt* – is a phenomenological concept used “in existential-phenomenological writings that express the total interrelatedness or mutual dependence of a phenomenon's distinguishable aspects, e.g., that the person and his or her world coconstitute one another” (Valle et al., 1989, p. 9). In other words, a lifeworld envelops “the always already lived embeddedness of human beings in their own worlds” (Seamon, 2013, Seamon, 2015, p. S389). According to human and organisational development researchers Bentz and Shapiro, lifeworlds are full of “embodied relationships located in time, place, space, history, and the natural environment” (Bentz and Shapiro, 1998b, p. 41) that we are immersed in. In the words of David Seamon, Professor of Environmental and Architectural Phenomenology at Kansas State University, “every moment of our lives, we always find ourselves caught up and immersed in a world that is there before us in inescapable presence” (Seamon, 2018, p. 44). Writing about the phenomenology of human situatedness, Seamon tells us how

“in our ordinary daily experience, we find ourselves in a particular moment of comprehensible experience that necessarily incorporates a taken-for-granted but understandable world in which our experience unfolds. In the sense that this world is there alongside us in a particular way without any necessary effort on our part, we can say we are enmeshed and entwined in our world, which, simultaneously, is enmeshed and entwined in us.”

(Seamon, 2018, p. 44).

Situatedness involves "indwelling", a central concept to Polanyi's epistemology which the polymath used as a term to describe the experience of immersing ourselves "in the clues of perception" by assimilating the particulars of the situation, making them part of ourselves so that we can "gain a knowledge of the whole" (Brownhill, 1968, p. 118).

As a practitioner-researcher looking into real world phenomena, I have seen my personality, my social/professional context, and various other different personal and practical challenges and conflicts – such as my own physical and mental health – affect my research. These issues can sometimes get in the way, but they can also enable the emergence of unexpected insights that lead to the development of a particular line of inquiry, particularly if one takes an attitude to personal and professional development that wholly embraces inquiry as a life process beyond mere reflective practice, "consciously treating reflexivity as a *practice* of doing research rather than an academic virtue or source of authority over knowledge" (Subramani, 2019, p. 2). In fact, I now know from my own experience that life *and* lifeworld have the power to affect not just the choice of a research questions or topics, but the methods used to report "the project's outcome" (Bentz and Shapiro, 1998b, p. 3). Fortunately, throughout my DProf journey I have been afforded numerous opportunities to appreciate how professional learning goes beyond traditional explicit knowledge transfer, and how it involves the ongoing interaction between context, culture, activity, discourse, people, and action that the Encyclopaedia of the Sciences of Learning defines as "situated cognition" (Ataizi, 2012, p. 3082). Thanks to the situations I shall discuss [in chapter 5](#), I have been able to see how the blurred boundaries between my work, my life, and my research in has forced me to immerse myself in activities that are entangled in multiple physical, social, organisational,

cultural, and political contexts. Before the DProf, I used to believe that explicit knowledge ranked higher in terms of value compared to informal knowledge. However, having dedicated the last 5 years of my life to various stands of work-based inquiry, I conclude that professional practice is inextricably interwoven as part of the full fabric of interconnected factors that is life, and that only by allowing myself to honour my sense of what Dewey would describe as intellectual curiosity (Dewey, 1997), am I able to engage with forms of inquiry that help me learn about myself and my practice, as opposed to just gain knowledge about a particular subject discipline.

Thanks to my lived experience, it is now very clear to me that my approach to practitioner inquiry is committed, value-laden, and far removed from the disengaged stance of value-neutral scientists (Thacher, 2006). Furthermore, I no longer see learning being “a thing” that is acquired or transferred, but the outcome of my engagement with the lifelong, ever-evolving process of “implication and enculturation” that is practitioner inquiry (Loo and Sutton, 2020b, p. 172). I have attempted to illustrate some of these insights on the epistemology of professional [in chapter 5](#).practice in figure 31.

4.4. Writing as inquiry

In his essay “The Logic of Tacit Inference”, Polanyi writes:

“All tacit knowing requires the continued participation of the knower and a measure of personal participation is intrinsic therefore to all knowledge, but the continued participation of the knower becomes altogether predominant in a knowledge acquired and upheld by such deep indwelling.

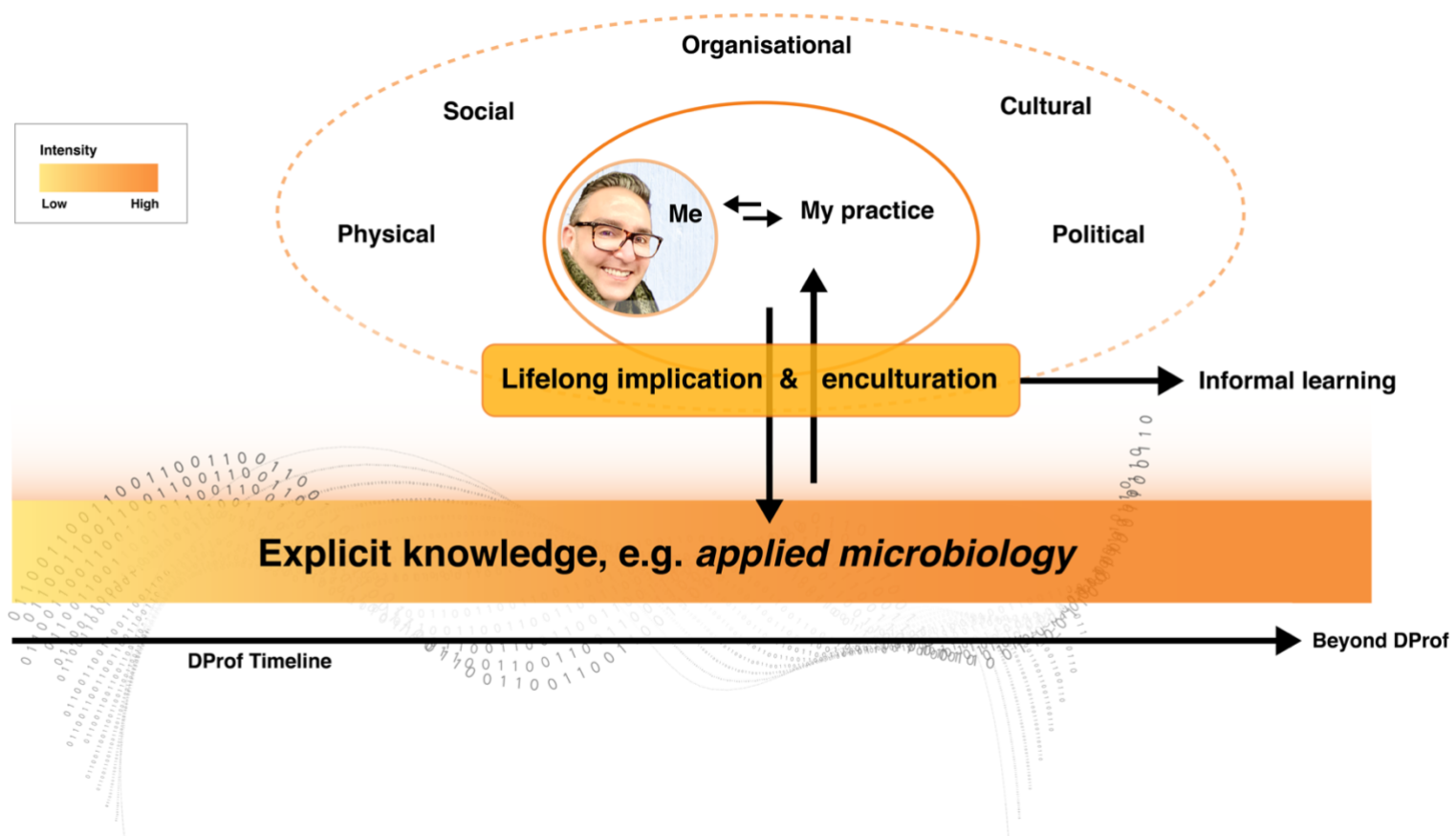


Figure 37. Lifelong implication and enculturation

An illustration of practitioner inquiry as a lifelong implication and enculturation process out of which informal learning emerges. In this instance I am taking the subject discipline of applied microbiology as an example.

An attempt to de-personalise our knowledge of living beings would result, if strictly pursued, in an alienation that would render all observations on living things meaningless.” (Polanyi, 1966, p. 13-14).

Polanyi believed that all understanding is tacit knowing, and that all understanding is achieved by indwelling. He was of the opinion that tacit knowing is “an act of indwelling by which we gain access to a new meaning” (Polanyi, 2009, p. 160). Throughout my doctoral research, I have grown increasingly interested in capturing the essence of the experiences that have led me to the discovery of the meanings Polanyi refers to. I have found value in reflecting on the events that have been woven through my life, and in sharing stories about them that help me represent them in their full richness and complexity. In psychology professor Donald Polkinghorne’s words in his classic book “Narrative Knowing and the Human Sciences”:

Our lives are ceaselessly intertwined with narrative, with stories that we tell and hear told, with stories that we dream or imagine or would like to tell.”

We live immersed in narrative. Recounting and reassessing the meanings of our past actions, anticipating the outcomes of our future projects, situating ourselves at the intersection of several stories not yet completed”
(Polkinghorne, 1988, p. 160)

In chapter 5 I discuss examples of research projects that I’ve started but that got stuck for different reasons and never got finished. I also discuss examples of projects that got completed to the point of submission to a peer-reviewed journal, only to be rejected, leaving me wondering what to do next. In both these situations, I have not

got tangible proof of my work that I can share with others by the usual routes of dissemination of scientific findings. However, what I have is the lived experience of a unique situation which I could narrate, thereby engaging with that situation in a reflective, generative manner out of which emerges an altogether different type of knowledge to that which resulted from my interpretation of the numerical data that came out of a microbiome sequencing. Telling the story about my experience – which might well be one of alleged failure – helps me make sense of my practice from a completely different angle. From that point of view, my narrative is both the phenomenon under study *and* the method of study, as I use stories that I've lived and told as the connection between me and the world around me (Downey and Clandinin, 2010, p. 385).

There's an element of reflexivity in the method too, in that "lived experience is constructed, at least in part, by the stories people tell about it" (Berger and Quinney, 2005, p. viii). That's partly what sociologists Ronald Berger and Richard Quinney write about in "Storytelling Sociology: Narrative as Social Inquiry", a book where they discuss the growing interest in individual and group narratives in the social sciences commonly referred to as "the narrative turn" (Berger and Quinney, 2005, p. 4). Educationalists Goodson and Gill claim that the narrative turn "emerged in the context of a new wave of philosophical discussion on the relationships between self, other, community, social, political and historical dynamics, [including] questioning and challenging the positivist approach to examining the social world and understanding human experience" (Goodson and Gill, 2011b, p. 18).

As a methodology, narrative inquiry provides a golden thread that connects the chain of experiences woven into the lived experience of an individual, whether the focus is the experience itself or the person's view of the experience. One would think that in the health and medical sciences – a field ruled by positivist and Cartesian worldviews – first-person accounts, interpretation and lived experience are often considered nothing more than worthless opinion and tainted sources of bias. Much to my surprise, however, the impact of narrative inquiry in the methodological literature in some branches of the health sciences is tangible, and it is not difficult to spot the influential thoughts of great phenomenologists such as Heidegger (Koch, 1994, Koch, 1995, Wheeler, 1995), Husserl and Dilthey (D'souza, 2019), Gadamer (Lingiardi and Grieco, 1999, Risser, 1997), Merleau-Ponty particularly around the concept of phronesis (Landes, 2015, Svenaeus, 2003), and Ricoeur (Charalambous et al., 2008, Franeta, 2021). The contribution of their methodological approaches – ranging from Husserl's transcendental phenomenology to Heidegger and Gadamer's philosophical hermeneutics (Lavery, 2003) – bring a deeper integration of “evidence and subjectivity, scientific data and patient experiences” (Russo, 2021, p. 3) to health sciences that allows for a more rounded understanding of “the world as lived by a person” (Valle et al., 1989, p. 9) and wholeness of life (McCarthy, 1992, p. 135).

From my own point of view, I have found narrative inquiry particularly appropriate as a means to make sense of the world around me whilst researching the authenticity of my lived experience, often confronting things about myself that are “less than flattering” (Ellis, 1999, p. 672). That's what Carolyn Ellis refers to as “heartful autoethnography”, a type of narrative that “includes researchers' vulnerable selves, emotions, bodies, and spirits; produces evocative stories that create the effect of reality; celebrates concrete experience and intimate detail; examines how human

experience is endowed with meaning; is concerned with moral, ethical, and political consequences; encourages compassion and empathy; helps us know how to live and cope; features multiple voices and repositions readers and “subjects” as coparticipants in dialogue” (Ellis, 1999, p. 669), and that I have been trying to use throughout my thesis.

4.5. A process of transformation

My DProf learning experience has been as immersive as it has been transformative. It has enabled me to adopt an “intellectual bricoleur” stance (Lévi-Strauss, 1966, pp. 16-17) to my inquiry, absorbing multiple epistemological influences and learning to question “taken-for-granted assumptions and habits” that I had become encultured into throughout my professional development (Hofmann, 2016, p. 141) in what French social theorist Pierre Bourdieu would describe as fields (Bourdieu, 1990, Bourdieu, 2018) of study and practice “anchored within the objective post-positivist paradigm” (Flutter, 2016b, p. 4). As Polanyi wrote in “The Growth of Science and Society”, “science is governed by common beliefs, by values and practices transmitted to succeeding generations. Each new independent member of the scientific community adheres to this tradition, assuming at the same time the responsibility shared by all members for re-interpreting the tradition and, possibly revolutionising its teachings” (Polanyi, 1967, p. 544-545).

As a boundary spanner across many fields, I have had to figure out how to re-interpret multiple traditions, which has left me exposed to the innervating helplessness of never being sure what might constitute valid knowledge. Julia Flutter – a member of the Faculty of Education at Cambridge University – writes about this in her book

“Transformative Doctoral Research Practices for Professionals”, where she discusses how “for some professional doctorate students the tensions and vulnerabilities” they experience when stepping out of their comfort zone “are likely to result in changes in direction that will lead to and arrive at destinations far distant from those they had set out for at the point of embarkation” (Flutter, 2016a, p. 160). That’s exactly how I feel. Coming from a “hard sciences” background as I did – I registered for the DProf immediately after finishing my masters’ degree in clinical neuroscience – it took me a while to free myself from the “positivist shame” that blinded me from considering the multiple forms of knowing with “epistemological validity that is not inherently connected with objectivism or power” (Heron, 1996, p. 158) I could choose from. Through my engagement with literature from a wide range of disciplines I had not ever envisaged needing to read, I have become aware of the fact that my experience of reality as it unfolds from its entanglement with nature and culture (Dixon-Román, 2016) provides me with a fertile field of inquiry that sits between, above and beyond the individual subject disciplines I had originally thought of as the objects of my inquiry. On that basis, the big “aha!” moment for me wasn’t the realisation that I could learn about those subject disciplines whilst still making my professional practice the focus of my inquiry. It was recognising that by engaging in self-reflective practice and adopting “a field of study approach” that’s not subject-based but *work-based* (Costley and Armsby, 2007, p. 24) I was getting unprecedented access to practical insights across the very subject disciplines that underpin my day to day practice, including applied microbiology, clinical neuroscience, nutrition, food science, and entrepreneurship.

Until I started my DProf, I hadn't even conceived writing my thesis in the first person. I was expecting to churn out 80,000 words in neutral, disengaged scientific language. Thanks to my immersion in the process of transdisciplinary implication and enculturation that I have found my DProf to be, I now realise "how inquiring is a core of my being and that my full being is involved in any "researching" I undertake" (Marshall, 2001a, p. 438). These inspiring words written by Judi Marshall in a chapter entitled "Self-Reflective Inquiry Practices" that is only included in the first edition of "The Sage Handbook of Action Research" made me take a step back in my writing nearly 18 months ago – scraping two incomplete, but fairly advanced previous versions of this thesis – to reflect on the fact that, just like her, "I have not distinguished readily between "research" and the rest of my life", and that I have been "experimenting with the translation processes between the two, with how they are interwoven and inform each other" (Marshall, 2016, p. xvi). As a matter of fact, just as Marshall, I too have been "living [my] life as inquiry" (Marshall, 1999b), but I did have to pause and ask myself whether using first person action research as tool to help me articulate and critique the knowledge that emerges from my actions in order to gain a deeper and richer understanding of my professional practice was "good enough". I was acutely aware of the fact that making sense is a personal process and I was worried about being judged on the validity of my method by third parties looking at me from the outside. I guess I had to get over the fear of being criticised for not choosing a methodology that would be seen as bona fide in the life sciences, ignoring the "positivist shame" and focusing on becoming more effective in the pursuit of worthwhile aims for myself and my professional community (Adams, 2014, p. 349).

It took me a while to be at peace with the idea that my writing had become my inquiry. Looking at my practice through a lens that combined elements of Polanyi's "participative realism" (Polanyi, 2009, pp. 28-29), John Heron's "extended epistemology" (Heron, 1996, p. 52) and "lived inquiry" (Heron, 1998), Heron and Reason's co-operative / participatory inquiry (Heron and Reason, 1997, Heron and Reason, 2008), Deleuze and Guattari's assemblages (Deleuze and Guattari, 1987c, p. 8) and rhizomes (Deleuze and Guattari, 1980), Donna Haraway's situated knowledges (Haraway, 1988b), and Karen Barad's diffraction and entanglement (Barad, 2010, Barad, 2007), and Carolyn Ellis' "heartful autoethnography" (Ellis, 1999), I was demonstrating to myself through my narrative that I was able to learn about myself and my practice as I reflected on the multiple professional activities I am engaged with every day. The most exciting thing about working with the theoretical schemata for which these authors are exemplary representatives is tapping into the "union between poetics and science" (Richardson, 1990, p. 134) that emerges out of using writing as a method of inquiry to subvert the positivist / postpositivist paradigm that dominates in the life sciences field. Laurel Richardson – Professor Emeritus at The Ohio State University – a scholar who dedicated a lifetime to the use of narrative in qualitative research, believes that writing stories that situate our narrative in parts of our lives "such as disciplinary constraints, academic debates, [organisational] politics, [...] research interests, [...] and personal history [...] evoke[s] new questions about the self and the subject; remind us that our work is grounded, contextual, and rhizomatic; demystify[ing] the research/writing process and help[ing] others to do the same" (Richardson and Adams St. Pierre, 2008, p. 1420).

“Experimenting with different writing formats and audiences simultaneously, locating oneself in multiple discourses and communities, developing critical literacy, finding ways in which to write/present/teach that are less hierarchal and univocal, revealing institutional secrets, using positions of authority to increase diversity both in academic appointments and in journal publications, engaging in self-reflexivity, giving in to synchronicity, asking for what one wants, not flinching from where the writing takes one emotionally or spiritually, and honouring the embodiedness and spatiality of one’s labours [we are empowered to] challenge the grounds of authority, [thereby] experiencing [the intellectual pleasure, delight, or ecstasy that French call] jouissance” (Richardson and Adams St. Pierre, 2008, p. 1419).

Reading Richardson’s work I could see a trajectory before me, a Deleuzian line of flight of sorts (Deleuze and Parnet, 1977), mapping what I could achieve by embracing writing as a method of inquiry where I (the producer) am intrinsically entwined with the product of my research as well as with “the mode of production, [and with] the method of knowing” (Richardson and Adams St. Pierre, 2008, p. 1415). I felt empowered to “write down my soul” as a wounded researcher who is obliged to commit himself or herself to the task of accepting responsibility for the shadow she or he casts upon the work, as well as to attend to the unfinished business in the soul of the work (Romanyshyn, 2021, p. xi). In a Foucauldian kind of way – by writing creatively or “without a parachute” in Barbara Turner-Vesselago’s “freefall style” (Turner-Vesselago, 2016) – I was practising self-care, just like ancient Greeks did to sustain “the art of living” (Foucault, 1997, pp. 208), and it felt good to be able to pour myself into every sentence.

4.6. Bricolaging my methodological approach

Even though I have already mentioned Marshall's "living life as inquiry" (LLI henceforth) as a major source of inspiration for my research, I spent considerable time assessing the suitability of other methodological approaches that I could borrow from. In fact, I had envisaged bricolaging my own methodological framework based on the most pertinent pieces of various different methodologies, adopting a creative, pluralist stance to constructing my own way of making sense of my lifeworld, and of my practice within it.

One of the approaches that really piqued my interest was Clark Moustaka's heuristic inquiry. Through the lens of Moustaka's work – spelled out in his book "Heuristic Research: Design, Methodology, and Applications" (Moustakas, 1990) – I could see how "my researcher self" is been "present throughout the process [of inquiry] and [on how], while understanding the [phenomena] with increasing depth", I experience "growing self-awareness and self-knowledge" (Moustakas, 1990, p. 9). Moustaka borrows heavily from Polanyi's core themes, which I found rather appealing. Additionally, in his original paper on heuristic inquiry – co-authored with colleague at the Center for Humanistic Studies of the Michigan School of Psychology Bruce Douglass – he features a well-defined three-phase model that provides structure to the application of this type of qualitative research, including and immersion phase during which researchers explore the question, problem, or theme by indwelling and self-searching, an acquisition or data collection phase, based mostly on tacit knowing through self-dialogue, collection of data), and a realisation phase, which the authors define as an opportunity to synthesise, verify and disseminate knowledge developed through the previous phases (Douglass and Moustakas, 1985, pp. 45-

46). Moustaka expanded these three phases into 6 in his book (Moustakas, 1990, pp. 26-34), detracting slightly from the attraction of being provided with one of the clearest step-by-step guidelines to follow I had found in self-reflective research approaches.

Moustaka believed that "in every learner, in every person, there are creative sources of energy and meaning that are often tacit, hidden, or denied" (Hiles, 2001). Sadly, despite loving his philosophical principles, I closed his book after reading it from cover to cover missing some of the rebellious feminist stance that I had found in Marshall's work. Was it an issue of gender identity issue? Conceivably. Does the oppression I have experienced as an openly gay man who embraces queer culture influence my affinity with social feminism? Perhaps. Is it that I see myself as a ourselves as a "tempered radical", often "struggling to act in ways that [Meyerson and Scully (1995, p. 587) would describe as appropriate professionally and authentic personally and politically"? Quite possibly. I was still happy to have given Moustaka a chance. It was refreshing to re-discover some of Polanyi's insights through his lens, so that is definitely something I am grateful for.

Another approach that I still find fascinating is that of Bentz and Shapiro's "mindful inquiry" (Bentz and Shapiro, 1998b, p. 5). I developed an interest in Buddhism back in my 20s, so I valued the author's introduction of this angle, along with philosophical hermeneutics, phenomenology, and critical social science. Bentz and Shapiro say that their "mindful inquiry" is not really a research method but a set of guidelines that, in the author's own words, can "lead to significant research, promote a personally meaningful and rewarding experience for you as a researcher, and contribute to the surrounding society and world" (Bentz and Shapiro, 1998b, p. 38). However, as an adult living with

ADHD, I am only too aware of how difficult I find it to suppress irrelevant or distractive stimuli, which is one of the characteristic features of the condition (Aboitiz et al., 2014). Bentz and Shapiro's model proposes over 20 different criteria to take into consideration as part of 4 overarching "turns", e.g., "Buddhist turns", "hermeneutic turns", etc., (Bentz and Shapiro, 1998a, pp. 36-57). That level of complexity, whilst exciting, provided me with too many opportunities to get lost down a dangerous rabbit hole. I have been there before, spending weeks on end reading material that I then completely discarded, and whilst I find that is part of my own approach to learning, I wanted to avoid giving my brain too much to cope with when it came to the methodology. On that basis, I came to the conclusion that I was happy for my inquiry to be mindful, but that Bentz and Shapiro's model of mindful inquiry wouldn't be the one to guide my research process.

4.7. My living life as inquiry

Although I kept an open mind to different methodological approaches, I kept coming back to some basic facts that kept drawing me close to Marshall's LLI. First and foremost, my research is grounded in my professional practice, and I wanted to develop practical and conceptual contributions by doing research *with*, *for* and *by* people (including me, but not exclusively), rather than *on* people. These are some of the defining criteria of "good action research" according to Bradbury and Reason (Bradbury and Reason, 2003, p. 171), who describe first person inquiry as "the foundation for all good action research" but see second person inquiry as "the arena where the most energy and practical opportunity for really impacting practice occurs" (Bradbury and Reason, 2003, p. 169). Whilst inquiring in the first-person has helped me research my own thinking and learning, it is entangled with second-

and third-person inquiry, as originally introduced by Peter Reason and William Torbert in their co-authored paper “The Action Turn: Toward a Transformational Social Science” (Reason and Torbert, 2001). Second-person inquiry allows me to voice the collaborative engagements between myself as an actor and other colleagues and co-researchers. Most of the research projects that I’ll share [in chapter 5](#) have a strong second-person inquiry component, and how my focus on reflexive practice incorporate Marshall’s “inner and outer arcs of attention” (Marshall, 2001b, p. 433-434), a couple of self-inquiry tools that reminded me of Gadamer’s reflective dialogue as acts “of interpretation toward understanding” that lift us from “the limitations and barriers created by our own reality” (Nyholm et al., 2018, p. 2) by directing our attention to our relationships with others in and beyond our networks, into third-person inquiry, an impersonal practice that aims at creating communities of inquiry, involving people beyond the direct second person action who are reached through dissemination by reporting, publishing and extrapolating from the concrete to the general (Gearty and Coghlan, 2018, p. 467), providing a contribution to knowledge for a wider audience (Coghlan and Shani, 2020, p. 1).

The reason why I am re-introducing these concepts, is to illustrate the fact that my inquiry is not bound to the realm of my beliefs, assumptions, values, and emotions through self-reflection, and that my attention is diffracted from those inward matters to their relationship with matters of collaborative / co-operative / organisational concern, as I shall be discussing by means of practical examples as illustrations from my practice [in chapter 5](#).

I was clear that my overarching methodological stance would involve systematic and sustained inquiry into my personal practice with the ultimate purpose to transform it.

For that very reason, I have drawn from multiple ways of knowing and have used multiple tools of inquiry, “assembled to suit the occasion” (Adams, 2014, p. 350). I am also acutely aware of the fact that my process of inquiry is iterative and cumulative. I tend to freefall write (Turner-Vesselago, 2016), writing a lot and then going through my writing over and over again, engaging in what Hiles and Čermák call “simple content analysis” (Hiles and Čermák, 2014, p. 551), a scanning process that helps me identify emerging themes in my narrative, but without the use of any software or a validated process such as Braun and Clarke’s thematic analysis (Braun and Clarke, 2006, Braun and Clarke, 2014). This allows me to spot similarities across the different versions of my saved documents, which I often save with the same name but with a different date as a suffix. Most importantly, this allows me to think diffractively, focusing on the differences and using them as a new potential departure point. Sometimes I draw diagrams to help me spot the dissimilarities in my thought process. This helps me reflect on what might have triggered that transformation, and to decide what to do with it. Is it useful? In what way? Am I just overindulging in the process, or is that diffraction really meaningful? I do draw a lot of diagrams, in fact. Charts, and illustrations, sometimes in pen and paper – typically using an A3 sketching pad – and sometimes using Adobe Illustrator. All of the figures and illustrations that in this thesis are my own creation.

I like to think of them as “the metaphors of aesthetic creation” that clothe my experiential knowing of the world, turning them into presentational knowledge (Heron and Reason, 1997, pp. 280-281).

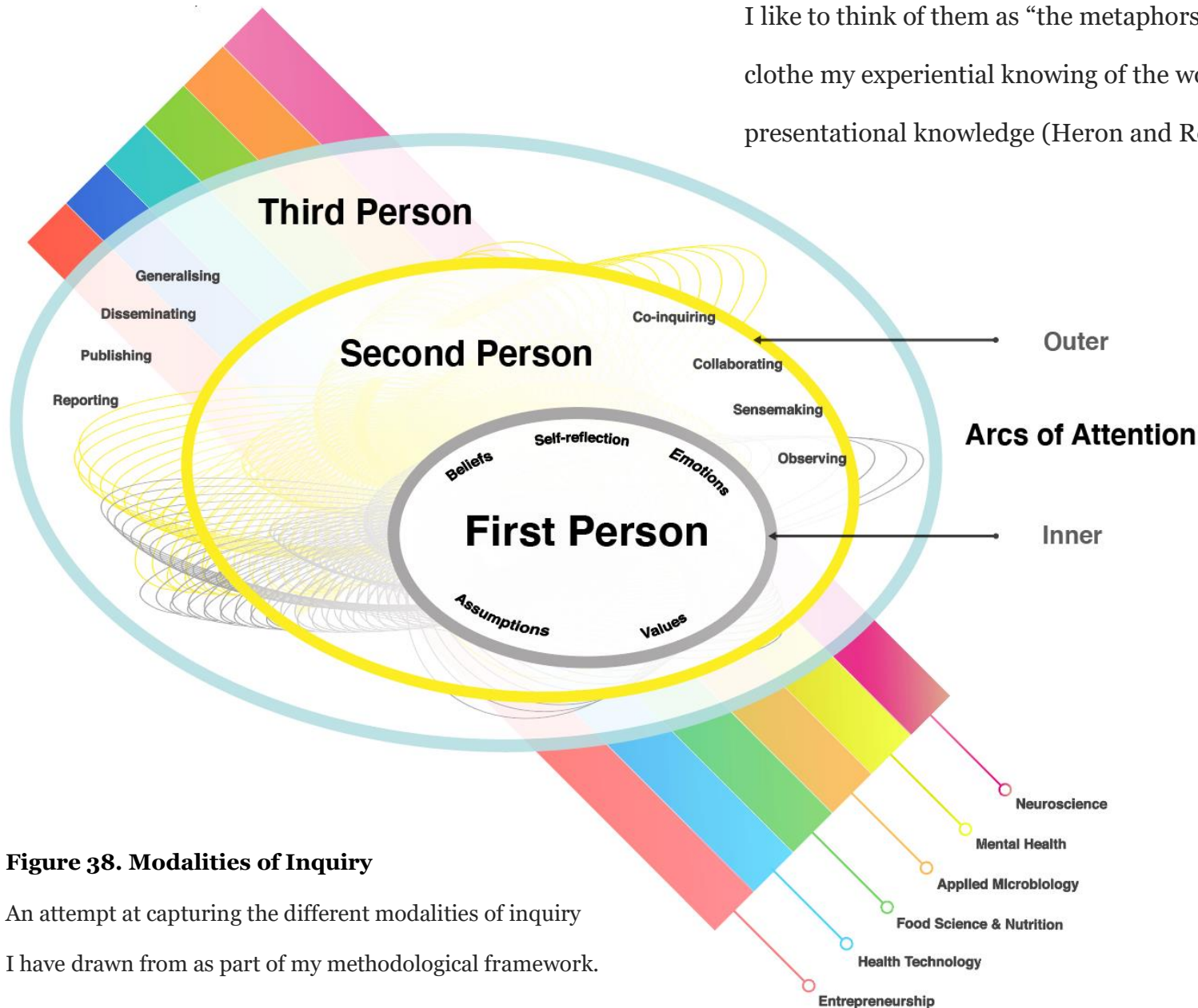


Figure 38. Modalities of Inquiry

An attempt at capturing the different modalities of inquiry
I have drawn from as part of my methodological framework.

I end up discarding more of these graphic art forms than I keep, so most of them didn't make it to this thesis for various reasons. Being high boredom-prone is another characteristic feature of ADHD (Malkovsky et al., 2012), so quite often I take them so far and then get bored with them. But I believe that they all serve a purpose, even if they end up in my recycling bin, because they frequently open up other avenues for me to explore, making me start a new keyword search on SpringerLink – my best friend database throughout this thesis – or enabling me to have the clarity of mind to delete a whole section because it was just “full of weeds”.

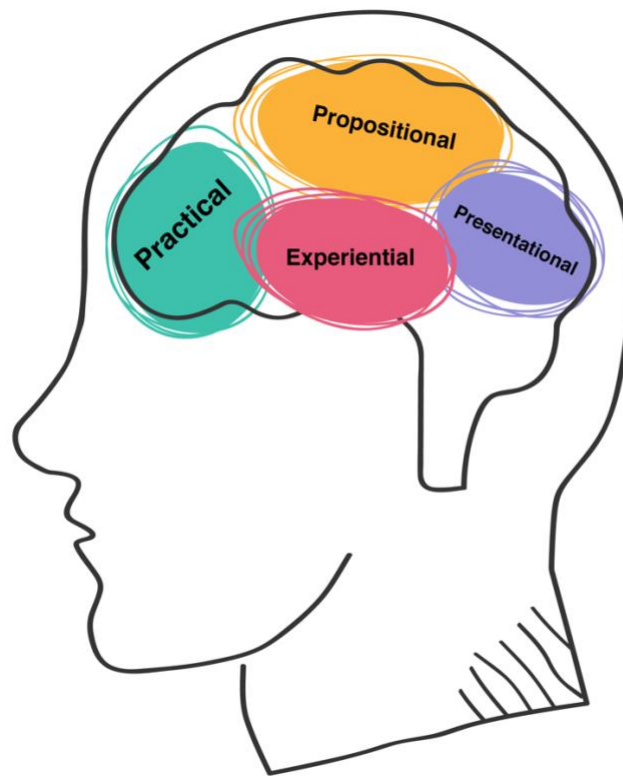


Figure 39. Multiple ways of knowing

My adaptation of Heron & Reason's insights from "A Participatory Inquiry Paradigm" (Heron and Reason, 1997).

Therefore, I was happy to read that Marshall engages in the same practice, as per the following extract from her contribution “Making Sense as Personal Process” in Reason and Rowan’s “Human Inquiry” (Marshall, 2015, p. 384).

“I continually build up diagrams and arrows and spaces and schemas which for me are very much part of the conceptual development. I find that some survive the analysis, but others break down in time, perhaps they don't work out because there is some sort of tension in the data that I wasn't aware of. So diagrams that don't work help me understand and are almost as valuable as diagrams that do work.”

(Marshall, 2015, p. 384)

Judi Marshall’s work wasn’t just one of the layers that made up my methodological lens. At one point, her work became an obsession as I felt that her approach to inquiry as a way of life – as opposed to as something that you dip in and out of – really resonated with the way I had “become with” my research (Haraway, 2008). As I continued to absorb insights from her papers, chapters, and books, I felt butterflies in my stomach. Reading her work made me realise how I had spent too much time worrying about what others would think about my way of assessing the rigour and validity of my practice. It helped me become more aware of the interconnectedness of the myself and my research, and how that relationship was continuously shaping each other through the process of inquiry (Lincoln and Guba, 1985, p. 37).

In addition, I believe that inquiring into my own life narrative enabled me to engage with what Denzin describes as “post-modern concerns such as discourse and power” (Denzin, 2004, p. xiii). Reacquainting myself with social feminist ways of seeing the world allowed me to recognise the value of my own voice as a boundary spanner who has frequently felt side-lined because of my non-traditional career pathway. It made me understand in a more meaningful way what black American poet Audre Lorde meant by “difference is that raw and powerful connection from which our personal power is forged” (Lorde, 1984, p. 112). It made me want to stand out proud, sharing with the world the chaotic, emergent nature of my practice, borrowing some of Lorde’s subversive thinking to implement it within my methodological framework. Ivor Goodson and Scherto Gill, known for their work on critical narrative, narrative pedagogy and lifelong learning (Goodson and Gill, 2014, Goodson and Gill, 2011a), describe how detailed narratives help researchers do just that:

“Detailed studies of individuals’ lives also allow stories to function as political responses, broadcasting Voices’ that are excluded from or neglected within dominant political structures and processes. These new voices from people in previously marginalised groups bring to light their own ‘truths’ (which are inevitably multi-vocal) about the social systems and institutions as they experience them. Hence narratives unfold the depth and complexity of human experience, power, and other social dynamics, enabling researchers to extend their analyses to consider multiple levels of the phenomenon under research”

(Goodson and Gill, 2011b, p. 20).

Whilst it was extremely easy for me to engage with the process of narrative inquiry, I did find some challenges, chiefly:

- **Risk of excessive brain-dumping.** I sometimes wrote in depth about an experience that was important to me at the point in time, only to read it again a few days later and wonder why I had written about it in the first place. I could safely say that I've written enough content for at least 3 theses, and that what you can read here today is one of the many potential versions of it that there could be. Marshall warns of the challenge that is writing accounts that are "alive, rich and multi-faceted but also succinct" in first-person action research, and how one risks drawing the reader into too much detail (Marshall, 2004e, p. 310).
- **Managing tensions.** Marshall's warning was ever present at the front of my mind when writing, but I wanted to "let my stories breathe" (Frank, 2012), finding balance in this tension and allowing different influences to coexist happily, like in *Mā*. This was often challenging.
- **What does it all mean?** The above point is a bit of a double-edge sword. Coghlan and Brydon-Miller's Narrative Inquiry entry in The SAGE Encyclopaedia of Action Research does warn about the fact that "one might first stare at the text slightly bewildered, wondering how to make sense of it", and how "gradually, insight into the core themes of the narrative, the active construction of meaning and the subtleties of the telling become clearer, and deeper critical issues begin to emerge" as the researcher sifts through the text (Hiles and Čermák, 2014, pp. 549-552). I end up editing and discarding a huge percentage of my writing, to the point that I have

been known for providing up to 5 completely different drafts of the same piece of work. I see this technique as deeply nourishing of my learning, but I do have to acknowledge how time consuming and intense it is.

- **From hyper focus to stress.** One of the “cool” features of living with ADHD is that I can get into a mental state known as “hyperfocus”, absorbing myself completely in a task, to the point where I can just completely ignore or ‘tune out’ everything else (Ashinoff and Abu-Akel, 2021). That does sound good, doesn’t it? It is wonderful when it happens, but the flipside is that ADHD increases the risk of obsessing about things for no particular reason, triggering stress and anxiety in ways that would not affect neurotypical folk (Brem et al., 2014). One of these sources of stress was not knowing whether first-person inquiry was enough. According to David Coghlan, “interiority is the integrating factor that enables action researchers to hold both [*what* we know and *how* we know it], to appreciate the value of both and to move from one to the other” (Coghlan, 2010, p. 288). I find that exciting, but I also fear “getting too much in my own head” as part of the process. As an example, in Mezirow’s transformative learning theory, meaning is shaped as a result of the convergence of a wide range of epistemic and sociolinguistic factors that are deep rooted into our psyche (Mezirow, 1991, p. 118-144). So I often wonder, what about if I haven’t engaged enough in reflective discourse with other first-person action researchers to stop myself from developing what Mezirow calls “inadequate meaning schemes” that can lead to self-deception? (Mezirow, 1991, p. 44). I discuss this and other factors relating to research quality assurance in the next section.

4.8. Questions of quality / validity

In “Living systemic thinking: Exploring Quality in First-Person Action Research” Marshall shares her concerns about the challenges and paradoxes posed by “reflecting on the nature of first-person inquiry as the narrative [of the stories she tells] unfolds” (Marshall, 2004e, p. 306) whilst she “hold[s] in mind ideas of connectedness [...] and respect[s the] emergence [of the] unfolding process” (Marshall, 2004c, p. 307). She admits to the fluidity of her inquiry, which evolves along with her own thinking, and suggests that “we cannot know everything through rational intelligence and must accept incompleteness (Marshall, 2004e, p. 306). She proposes the use of device she refers to as “quality notes” (Marshall, 2004h, p. 308) to comment on key issues of validity in the conduct of first-person inquiry. Sieving through the paper, I identified each of the areas that she highlights within her quality notes. They are displayed in a table below, along with some relevant questions to help me contextualise each of the areas as parameters to assess the validity of my inquiry. My intention is to engage in the following analytical process:

1. **Identify themes.** Go through the list for each of the research projects I am bringing up [in chapter 5](#) and run a “simple content analysis” (Hiles and Čermák, 2014, p. 551) of my narrative, highlighting the key themes I am discussing as part of that real-world example.
2. **Draw generic questions from the story.** For example, I will be telling a story about my nutrition neuroscience research project for the Advanced Workplace Institute (AWI), which involved a huge amount of self-reflection, but also constant interaction with the AWI team, and dissemination of my

findings beyond the community of stakeholders I was in touch with. This illustration from my practice may therefore warrant my commenting on “research cycling” as one of the areas highlighted by Marshall in her “quality notes” (Marshall, 2004h, p. 308) to invite me to reflect on the interconnectedness between first-, second-, and third-person inquiry and how I’ve moved from one mode to another in this particular situation. I have drawn a list of quality parameters and potential questions to ask myself when inquiring into a particular situation, borrowing heavily from Marshall’s paper “Living systemic thinking: Exploring quality in first-person action research (Marshall, 2004b, pp. 310-323). The parameters and the questions are displayed in table 1 below.

3. **Articulate more specific research question or questions that I wish to find answers for as part of my inquiry into the situation.** For example, I may ask “what can I learn about this project by looking at it through a first-person action research lens?”, “what issues in relation to personal agency can I relate to in this instance?” or “what opportunities are afforded by this situation for me to learn from?”. These are all additional questions to my overarching research question, namely “how can I become more aware of the complex processes of interpretation, reflection and action I engage in as part of my professional practice, so that I am able to theorise them, and verbalise them and transform them?”.

Please note that I have included “transferability” as a factor that’s not featured in Marshall’s work. I discuss this as part of a set of additional quality assurance factors below.

Validity parameters	Questions to draw from the story / context / situation
Inquiry intent	What is the pull of the inquiry? Can I sense a strong desire to learn from it? How can I keep my awareness of it and work with it?
Succinct but alive writing	Have I been able to bring experience to the reader sufficiently well without drawing them into too much detail?
Research approaches	Have I embraced epistemic pluralism, purposely engaging with different ways of knowing?
Sense making	What's the meaning of this experience? What can I learn from it that helps me transform my practice?
Theorising	What kind of theories can I draw from this situation? Are they practical enough or are they too abstract and difficult to articulate? How do they enable me to make sense of this context?
Saturating inquiry	How do I know when I have inquired enough, to the point that the learning experienced out of any further research would just be minimal?
Working with feedback	What kinds of feedback can people give me? What about testimonials or reviews of my work?
Representation	Am I presenting all the data that I want to present, or am I choosing to hide some of the narrative because of fear of criticism of sharing too much personal detail, or due to political implications that might leave me feeling exposed?
Research cycling	Am I allowing first-, second-, and third-person voices to be heard in my storytelling? Is my approach balanced?
Transferability*	Do the results from one context or case apply – or transfer, hence the name – to another?

Table 1. List of possible quality parameters.

Inspired by, and borrowing heavily from Marshall's paper "Living systemic thinking: Exploring quality in first-person action research (Marshall, 2004b, pp. 310-323).

* This additional parameter is discussed further.

Marshall provided two further contributions to the subject of quality in self-reflective practice, co-authored with Peter Reason, and published a year apart in 2007 and 2008. The 2007 paper was an article in *Management Research News*, entitled “Quality in Research as “Taking an Attitude of Inquiry” (Marshall and Reason, 2007a), where the authors discuss two types of quality considerations, developed from the point of view “quality becomes having, or seeking, a capacity for self-reflection, so that we engage our full vitality in the inquiry and attend to the perspectives and assumptions we are carrying” (Marshall and Reason, 2007b, p. 370): “qualities of being” and “practices of presence”, as shown in table 2 below.

A year later, “Taking an attitude of inquiry” was published as a chapter in the book “Towards quality improvement of action research: Developing ethics and standards” (Marshall and Reason, 2008b), edited by a group of Dutch sociologists where Marshall and Reason share a similar but not entirely identical list of factors that they consider encapsulate the essence of what it means to take an attitude of inquiry. The list is reproduced verbatim from page 64 of the chapter (Marshall and Reason, 2008a, p. 64).

- Curiosity and commitment
- Willingness to articulate and explore purposes
- Paying attention to framing
- Dancing in Beauty rather than fighting ugliness
- Participation
- Practices of Power
- Systems and Wholes
- Evidence
- Humility

Qualities of being	Practices of presence
Curiosity	Pay attention to framing and its pliability.
Willingness to articulate and explore purposes.	Enable participation to generate high quality knowing
Humility	Work actively with issues of power.
Participation	Develop capacities for working with multiple ways of knowing.
Radical empiricism	Engage in, and explicate, research as an emergent process.
Empowerment **	Adopt an appreciative inquiry perspective**.
Neurodiverse perspective**	Systems thinking**

Table 2. Factors contributing to quality in taking an attitude of inquiry

Adapted from Marshall's paper "Quality in Research as "Taking an Attitude of Inquiry"" (Marshall and Reason, 2007a, pp. 368-380).

** These additional factors are discussed below.

NB. Please note that I have included "empowerment" under "practices of presence" and that this is not featured in Marshall's work. I shall discuss this additional factor as part of a set of additional quality assurance factors further down this section.

Some of the original factors are repeated exactly as they appeared in the 2007, whereas some other ones have slight variations. For example, there's an explicit mention of commitment as a joint quality to curiosity, and radical empiricism is

referred to as “evidence”. In addition, there are two new factors: “dancing in beauty rather than fighting ugliness” and “systems and wholes”. “Dancing in beauty rather than fighting ugliness” refers to having an “appreciative inquiry perspective [that] places emphasis on generative capacity, looking for that which brings life rather than [focusing on romancing] with critique” (Marshall and Reason, 2008c, p. 77). I really like this quality, as I have myself been caught in downward spirals of negativity trying to justify myself thinking that someone with a positivist / postpositivist approach could be reading my work. On that basis, I would very much like to adopt that as a factor, which I would rename “adopt an appreciative inquiry perspective”. With regards to “systems and wholes”, the authors emphasise the importance of “act with integrity, in participation, [of not acting] alone, but in context, in concert with [a] world, [without] fixed boundaries, [...] [that] is a shifting, fluid, emergent [and full of] systemic patterns, connecting relationships, multiple ‘systems’ overlapping (Marshall and Reason, 2008d, p. 75). My Open University postgraduate diploma in systems thinking and practice back in the early 2000s really stirred up my way of looking at the world. I still remember really enjoying reading Peter Checkland’s “Systems Thinking, Systems Practice” (Checkland, 1999) and finding his insights absolutely fascinating. On that basis, I should also like to include this factor in my revised list.

I have included these additional quality measures in table 2 above, marked with a double asterisk (**).

In addition to the factors I have already discussed, I would like to build the following three supplementary considerations into my research quality assessment framework:

1. **Empowerment.** I am aware that Marshall and Reason highlight the need to work actively with issues of power, but I would like to highlight instances where my inquiry has made me feel empowered by “raising self-consciousness, learning to stand up for [myself] (self-advocacy) and self-actualisation (Boog, 2003, p. 428), raising my “own sense of agency and empowerment as [a] change agent, [helping me actively resolve] the issues [I am] confronted with” (Percy-Smith, 2018, p. 164). I see this factor fitting nicely under the “practices of presence” in table 2.
2. **Transferability.** Or generalisability. Denzin and Lincoln (1994) call for a “serious rethinking of such terms as validity, generalisability and reliability” (Denzin and Lincoln, 2008, p. 11) of research, which they see grounded in positivist epistemology. Instead, they advocate the use of the term “transferability”, coined by Lincoln and Guba as a reinterpretation of Robert Stake’s “naturalistic generalisation” (Stake, 1978, p. 4). In his landmark paper “The Case Study Method in Social Inquiry”, the American educationalist proposed that the reader of a case study should be able to determine whether the experiences shared by the author have the ability to help them understand a completely new setting, i.e., whether the results from one context or case apply – or transfer, hence the name – to another (Lincoln and Guba, 1985, pp. 28-32). Naturalistic generalisations are the product of experiential knowledge and tacit knowing “of how things are, why they are, how people feel about them, and how these things are likely to be later or in other places with which this person is familiar” (Stake, 1978, p. 4). I believe transferability is an

important factor in assessing the procedural quality of my research and, on that basis, I have added it to the quality parameters shown in table 1, marked with an asterisk (*).

- 3. Neurodiverse perspective.** I received my formal medical diagnosis of ADHD in 2020, and that helped me understand my brain, my behavioural patterns, and my life in general much better than I did before. I always knew my brain was kind of “funky” but having the confirmation by a specialist psychiatrist that it is actually wired differently to the brain of a neurotypical person triggered an interesting process within me. Firstly, it made me replay every difficult situation I had experience in my own head, as if I was watching a classic movie that has just been digitally remastered, getting nuances that I couldn’t understand before. As I started to know what to do with the new information that was at my disposal, I started experiencing a strong urge to voice the way I saw the world, celebrating the differences, rather than trying to blend in. From that point of view this is an emancipatory quality of being that overlaps with that of empowerment, but it has its own subtleties that I should like to highlight. For example, I may ask “how does this situation feel for a person with ADHD?”. I have already mentioned hyperfocus, anxiety, stress, and susceptibility to get bored with tasks. With that in mind, I should ask myself how a certain context may have the ability to affect the appreciation of a situation, and how that contributes to the learning experience of someone who actually learns differently? Are the effects positive or negative? Was there something in that particular experience that other professionals living with ADHD could learn from and that I could share with them? If the impact is negative, what can I do to prevent it from happening again, and how might my increased awareness of those situations contribute to the development of support guidelines for other professional doctorate candidates? And there’s of course the possibility that the

experience of an ADHD person may be positive. As discussed previously, there are many positives. Although this perspective was not part of my original aims, it is something that has become quite important to me and, with my “neuroscientist turned action researcher” hat on, I would like to add to my toolbox as an additional lens through which to assess the qualities of my inquiry.

I have included these additional quality measures in table 2 above, marked with a double asterisk (**).

Chapter 4 summary

In this chapter I explained my rationale for using narrative inquiry as a device to make sense of my practice whilst remaining in touch with the authenticity of my lived experience. My methodological stance is heavily influenced by the work of Richardson and Adams St Pierre, Ellis, and Marshall with regards to autoethnography, from Bentz and Shapiro’s mindful inquiry and Moustaka’s heuristic inquiry, and by various leading voices in phenomenology, particularly Heidegger’s and Gadamer’s philosophical hermeneutics. My aim was to be explicit about the fact that I am intrinsically entwined with my chosen mode of knowledge production, as well as with the method of knowing and, ultimately, with the product of my research. A highlight of this chapter is my inclusion of a neurodiverse perspective as a factor contributing to quality in taking an attitude of inquiry.

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Chapter 5. Stories of Inquiry

“When we experience something we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return: such is the peculiar combination.”

John Dewey in "Democracy and Education" (Dewey, 1916, p. 16)

5.1. What's chapter 5 about?

In this chapter I introduce a set of illustrations from my practice in the form of stories of inquiry to which I apply the methodological framework that I spelled out in [chapter 4](#). Throughout the chapter, you will have the opportunity to witness the evolution of my core action research projects, and how my thesis action research adapted around them. I make use of diagrams as ways to present complex ideas, whilst hoping that their meaning can easily be translated into practical application of the concepts summarised in them. I wrote the chapter with the keywords I used in the title of this thesis right at the front of my mind. Therefore, I hope that reading it will help you understand that my choice of wording wasn't whimsical. You will find plenty of guts, both physical – as in references to the human gut microbiome – as well as metaphorical, as in the bravery, the resolve needed to make sense (using cognition/brain) of the complex/messy situations I share with you in each of the stories, embracing radical creativity in order to do so. By using writing as inquiry, I aim to use language that conjures up images of my being immersed in learning and living between, across and beyond disciplines. I then take all of those elements and put them through the critical lens of first-person inquiry. I hope this introduction whets your appetite for the journey I'm about to invite you to take with me.

5.2. Illustrations from my practice

Writing the previous chapters has not only allowed me to lay out the principles and practices of my inquiry. It has also allowed me to develop “epistemic insight” – defined as “knowledge about knowledge and how knowledge of one discipline relates to other disciplines” (Billingsley et al., 2018, p. 1121, Konnemann et al., 2018, p. 1188) – by means of self-reflection. As a result, I have been able to assemble a collection of true stories that

demonstrate the link between the science that underpins my professional practice and my living constantly questioning the things I do. Through this process of inculturation I have been fortunate enough to explore multiple professional fronts, realising how deeply committed and engaged I am with my practice and – most importantly – how uniquely positioned I am to make a change, not only to my own by understanding it better, but also to that of others with whom I have had the chance to interact and, beyond them, impact the lives of those whom I shall never meet but who happen to come across my legacy.

Each of the following 3 stories highlights the recurring themes that I have experienced throughout my DProf journey. Through my writing, I aim to share joys as well as the challenges of being a curious practitioner devoted to scholarly research. Through each of the storylines I hope to come across as “a living and breathing boundary spanner”⁴ who creates and extends knowledge with “intellectual quality and confidence, independence of thinking, enthusiasm and commitment, [showing the] ability to adapt to changing circumstances and opportunities” (Denicolo and Park, 2013, p. 193). The focus of this chapter is on my practice and my engagement with it, rather than on the subject disciplines I have *drawn knowledge from* and *created knowledge in* as part of my daily work activities, include clinical and applied neuroscience, mental health, applied microbiology, food science, nutrition, health technology and informatics, and business / entrepreneurship.

I argue that looking through the natural lens of first-person inquiry does not detract from the value of the artefacts resulting from my engagement with those activities,

⁴ A lovely phrase that Professor Brian Sutton used to describe me during one of our Zoom calls in 2020.

such as peer-reviewed articles, book chapters, educational videos, or consumer products that I have formulated during my DProf. The tangibility of these creative outputs helps me demonstrate the doctorateness in me as a “transdisciplinary producer of shared understanding” in the health sciences (Miller, 2020b, p. 31), whilst allowing me to understand myself and my engagement with my own practice. In addition, each of the products of the professional activities I have been immersed in during my DProf also help me demonstrate the acknowledgement I have received by members of my professional community and beyond, representing second- and third-person ramifications of my practice. All the works mentioned in my stories are available to read / download / watch from the “The Creative Scientist” website: <https://thecreativescientist.co/creations/stories>. Please remember to type the password **thesis2021** when prompted.

In terms of structure / presentation, I open every story with a box highlighting the themes that unfold in that example of my practice, whilst linking it up with the validity parameters I discussed [in section 4.6 of my methodology chapter](#). This box features the core subject disciplines, validity parameters, qualities of being and practices of presence that are discussed in the narrative, as well as the top three keywords that emerge out of a simple content analysis (Hiles and Čermák, 2014, p. 551) for that particular story. For clarity, the process involves reading – and often rewriting – the story several times. Engaging with my own writing through that iterative process enables me to keep my story alive without bogging it down with too much small detail. I also include:

- **Quality notes**, following Marshall’s example in “Living systemic thinking: Exploring quality in first-person action research (Marshall, 2004b, pp. 310-

323), to draw my attention to specific areas, and to support my process of self-reflection.

- **Illustrations.** Relevant pieces of work that help me develop my capacity for working with multiple ways of knowing, in particular my engagement with knowledge that's contained and/or expressed in images (Heron and Reason, 1997, pp. 280-281).
- **Feedback.** Whenever possible, and in a variety of formats, from an email to a testimonial.

I'd like to share just one more consideration before starting the storytelling. I am only too aware of the myriad of untold stories that I could have shared but that I have chosen not to. Writing in the first person it seems difficult not to stumble into confidential or personal business matters which, in Marshall's own words, "I have no remit or willingness to reveal" (Marshall, 2004g, p. 323). On that basis, I have kept this quote from the book "The truth about stories: a native narrative" by novelist and scholar Thomas King at the front of my mind as the *modus operandi* for my story choice: "...once a story is told, it cannot be called back. Once told, it is loose in the world. So you have to be careful with the stories that you tell" (King, 2010, p. 10).

5.3. The quantitative supremacy

Subject disciplines: applied neuroscience, cognitive neuroscience, nutrition

Validity parameters: inquiry intent, research approaches, research cycling

Qualities of being: curiosity, humility, empowerment, neurodiverse perspective

Practices of presence: develop working with multiple ways of knowing, adopt an appreciative inquiry perspective, working actively with issues of power

Keywords: thematic analysis, first-, second- and third-person inquiry, backstaging

In May 2019 I was contacted by the managing director of a company called Advanced Work Associates, a workplace consultancy firm that “brings together experts in the fields of technology, workplace design, facilities management, business strategy and behavioural change management, our mission is... quite simply, to change the world (of work)” (Associates, 2021). Advanced Work Associates had a research arm called the Advanced Workplace Institute (AWI), with the goal to encourage the use of scientific research and evidence-based practice to enhance the professionalism of the ever-evolving Workplace Management discipline (Institute, 2021). The AWI team had a project in mind that they wanted to discuss with me, involving a piece of in-depth research on the effects of nutrition on the cognitive function in the specific setting of the workplace. The intended outcome of the project was twofold. The primary aim was to generate an extensive research report featuring the latest evidence supporting the most appropriate choice of foods for people in the workplace to enjoy optimal cognitive function, defined as the intellectual processes of acquiring, understanding and using information and transforming it into knowledge through experience, thinking and the senses in such manner that adapting to new situations

and adopt new preferences is easy (Andrianopoulos et al., 2017). The secondary aim was to translate those findings into recommendations that could be shared with the members of the Institute at one of the events that AWI run regularly for its members. These events, both in person and online, were interactive and enabled members – typically leaders from companies in all areas of business (including Operations, Corporate Real Estate, Facilities Management, HR, and IT) – to provide feedback on the research, with views to creating a final report that incorporated their insight. In this particular instance, the ultimate aim was to influence the decision making of those in charge of employee wellbeing, such as human resources or operation directors who could propose changes to the menus in their organisation’s canteen, or the types of foods available via vending machines in their office buildings. Some of the AWI members I would be presenting would include the social media company LinkedIn, the corporate real estate firm Balfour Beatty, Zurich Insurance Company, and the IT services company CloudSense.

The research aimed to answer one primary question, namely “what does the scientific literature tell us about the nutritional factors that impact cognitive performance in the workplace?”, but the client wanted me to break it down into a wider set of questions, including:

1. *What should people be eating and drinking and why?*
 - *Should they follow a specific diet to improve cognitive performance and why?*
 - *When should they be eating those foods / drinking the drinks?*
2. *Do some foods affect different brain domains, e.g., working memory, executive function, concentration, etc.*

3. *Do different combinations of foods produce specific outcomes?*
 - *Is this the same for everybody, i.e., are these outcomes age or sex dependent?*
 - *Do these factors make a difference?*
4. *Do specific diets work differently depending upon DNA or other aspects of existing health?*
5. *What are the implications for people who travel across time zones on business (and shift workers)?*
6. *What are the implications for people who:*
 - *Work very long days*
 - *Work at peak performance for a period*
 - *Need to “recover” after any of these*

My first impression was that my client was being overly ambitious, particularly because there were hints that my answers should provide “figures”. I guess what was meant by that was that I should be grounding my inquiry in Bayesian meta-analysis principles involving the identification of variables, e.g., whether someone uses olive oil, and the calculation of their effect (Crandell et al., 2011). However, the specification wasn’t 100% clear, and I was assuming that the client was relying on me as the expert to come up with the most appropriate method, as opposed to prescribe a specific plan of action. Sadly, I was wrong.

As part of the project, I had to meet with the AWI team twice monthly to provide updates on the progress of my research. At the first meeting I presented the basic concept that cognitive processes can be divided into four to six neuropsychological

domains including learning and memory, visuospatial and motor function, attention/concentration, language, social cognition/emotions and executive functions (Harvey, 2019). Each of these domains contains specific functions that provide humans with specific capabilities – from basic to complex – that contribute to their personal intellectual skills and knowledge (Sachdev et al., 2014). I could sense strange atmosphere in the room, so I asked if anyone had any questions. I was told that social cognition and emotions were of no relevance for this project, and to focus exclusively on areas that were “easily quantifiable”, like memory, attention, executive functioning, and reaction time / processing speed. I thought to myself “this is a great start!”, but I was keen to forge a good relationship with the team because this was my first paid job as a professional researcher and I did not want to appear opinionated from the word go, so I excluded the social and emotional aspects of cognition and started to work on the four cognitive domains that I illustrate in the following figure.

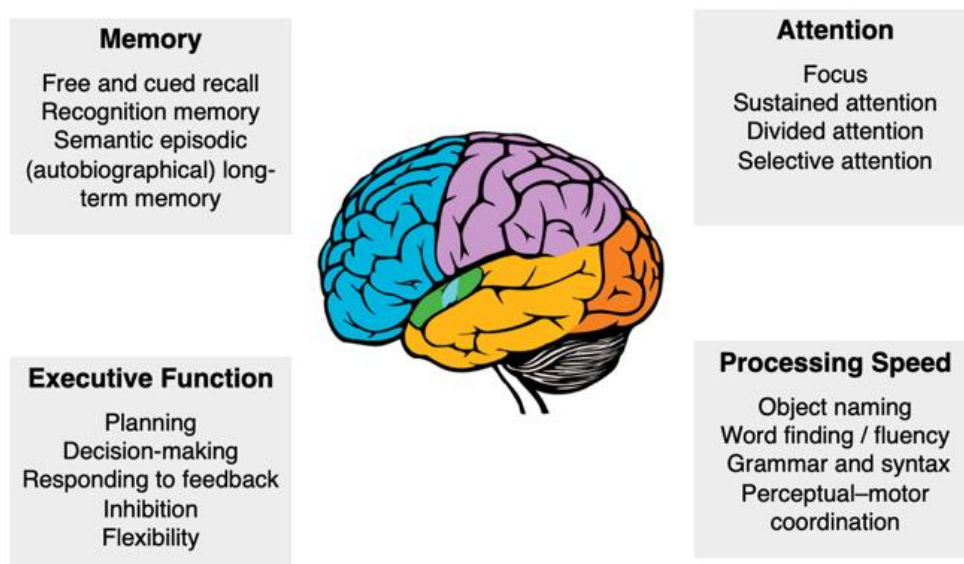


Figure 40. The four cognitive domains used for this research project

In this illustration I created for this research project the social and emotional aspects to cognition are missing. If I could go back in time, I would make a real fuss about keeping them.

At the next meeting, I presented my research strategy, which I've displayed in figure 34 above. I had been playing around with different databases and started to realise that assessing the effects of food choices on cognitive function in the workplace was a difficult task because of the huge heterogeneity of the studies that I was finding. Even after excluding animal, in vitro and non-interventional studies, I was being left with a large hotchpotch of studies that would not fit into a classic systematic review model, which is typically conducted on quantitative data with at least some resemblance of homogeneity (Macmillan et al., 2019). I had to explain my rationale for choosing thematic analysis as my way of making sense of the data which, otherwise, would be too difficult to translate into practical recommendations. Doing thematic analysis a la Braun and Clarke (Braun and Clarke, 2006, Braun and Clarke, 2014) was not something my client was familiar with, so my proposal triggered a hundred questions. Getting that kind of response, I asked myself how they would react when I told them that my approach was meta-aggregative and that it incorporated multiple methodologies. Was I supposed to justify my constructivist / interpretative methodological stance? What about explaining the process of reciprocal translation (Melendez-Torres et al., 2015) that allowed me to understand each of the studies that I had included in the thematic analysis in relation to each other? It was quickly becoming clear to me is that I was not going to be able to come up with a table of "top 10 foods that affect cognitive function", presented with a percentage of effect and a whole bunch of "risk diagrams and effect size diagrams", in the client's own words. Given that the aim wasn't academic but practical, I explained that this was a legitimate or "evidence-based" way of dealing with data. The evidence-based bit was really important for my client, to the point that he used the term in a way that made me feel as if I was a fraud.

This project run from April to October 2019. Those were extremely stressful months for me at a personal level, as I felt I was taking my transdisciplinarity to extremes and literally spreading myself too thin, as you can probably surmise from [the journal of professional activities I created for chapter 3](#). This was the time that I started to become aware of the fact that my own mental wellbeing wasn't "made of cast iron", which is how I treated it throughout my life, trusting my psychological resilience, which had always tended to be high. It was also the time leading to my ADHD diagnosis. I was working with Dr Adam Read at WeCudos, the clinical outcomes tracking company, and we had extended talks about the possibility that both of us were ADHD from young age. I now know that adults who multitask and live with ADHD tend to experience fear of failure differently to neurotypical adults (Gawrilow et al., 2011), so I can understand feeling completely paralysed in situations that I would normally not have a problem with. The pressure of delivering a really high-quality piece of work was immense, and on top of that I had another 3 or 4 work projects going full steam ahead at the same time.

Even though I was confident enough to justify my methodological choices, this was uncharted territory for me as a practitioner. I found myself in a situation where I was having to negotiate my position of authority as half outsider – brought in as a consultant for that particular job – and half insider, representing my client in front of AWI's member organisations. I was engaging in what Buchanan and Badham refer to as "backstaging" (Buchanan and Badham, 1999), a second-person inquiry practice discussed by Coghlan in the context of the generation of actionable knowledge (Coghlan, 2007). I am not one to bluff when it comes to knowledge, i.e., I'd happily and humbly tell you when I don't know something in enough depth to do it justice. I am acutely aware that I don't know everything there is to know, but I am also curious

and motivated to explore and articulate different situations. Consequently, I was happy to be challenged in choice of my methods, but I couldn't help feeling that it was my duty to stand for epistemic plurality, which made me want to take risks and to be creative, even at the expense of spoiling my chances of being commissioned to carry out any further research work by this client. I also wanted to adopt an appreciative inquiry perspective as a tool to "support discovery, dreaming, design, and creation of a vision that inspires people in an organisation to move to a collective destiny" (Keefe and Pesut, 2004, p. 103).

For all of the reasons I've shared thus far, this was probably the first time I really understood the sentence "the choice of method or approach for a meta-synthesis is informed by the purpose and epistemological position but also the nature of the evidence in the field" (Dawson, 2019, p. 44), variations of which I had read hundreds of times before. What was different this time is that this wasn't me writing an academic essay. It was me making a choice that I had to substantiate in front of a demanding client with a strong post-positivist focus which guided their own view of how the research project should be conducted. On that basis, I decided to dig my heels in and continue with a pragmatic approach to dealing with my data, in a Deweyan kind of way (Cherryholmes, 1992), i.e., aiming for the results to trigger positive change, not just for them to be an impressive – but pretty pointless – bunch of numbers and diagrams. The data synthesis that I was required to produce was the result of questions that arise out of specific needs, e.g., LinkedIn's interest in supporting their employees' cognitive function with food, so my focus should be on delivering practical, applied insights (Hannes and Lockwood, 2011) that those beyond my client, would find useful.

I see that as third-person practice from the point of view that I was backstaging with my client, but I ultimately aiming for my report resulting from my research should encourage the HR Director at the LinkedIn offices in London to recommend that green tea should be available in the self-service kitchens on all floors – as just one example – so what I should be able to do was to find good quality clinical data to substantiate that green tea supports the ability to remember and use relevant information while in the middle of an activity, otherwise known as working memory (Constantinou, 2021). The effects are believed to be driven by a combination of tea-specific antioxidants (epigallocatechin gallate or EGCG) and the amino acid L-theanine, which tend to decrease anxiety and improve response to stress (Unno et al., 2018).

Looking at the project from these angles, I can understand completely what Marshall meant when she wrote that a key aspect of self-reflective practice is to be mindful of “what forms of inquiry and writing are favoured by “mainstream” power-holders” [... because] “creating knowledge is political business” (Marshall, 1999a, p. 158). On one hand, I kept working with my inner arcs of attention (Marshall, 2001c, p. 433), checking my own values, tallying them up to my assumptions of this piece of work, “rooted in a genuine and legitimate concern with issues of power” (Edwards and Mauthner, 2002), trying not to become overly anxious about the pressure to meet my client’s standards whilst still managing to abide my responsibility as a researcher to care for the recipients of my work, particularly knowing that it wouldn’t be my client would benefit from the recommendations that emerged out of my research, they were just funding it. Those who were likely to use my research output to support positive change in their organisations would have probably loved my approach, but I didn’t get to consult with them until the day when I presented my results.

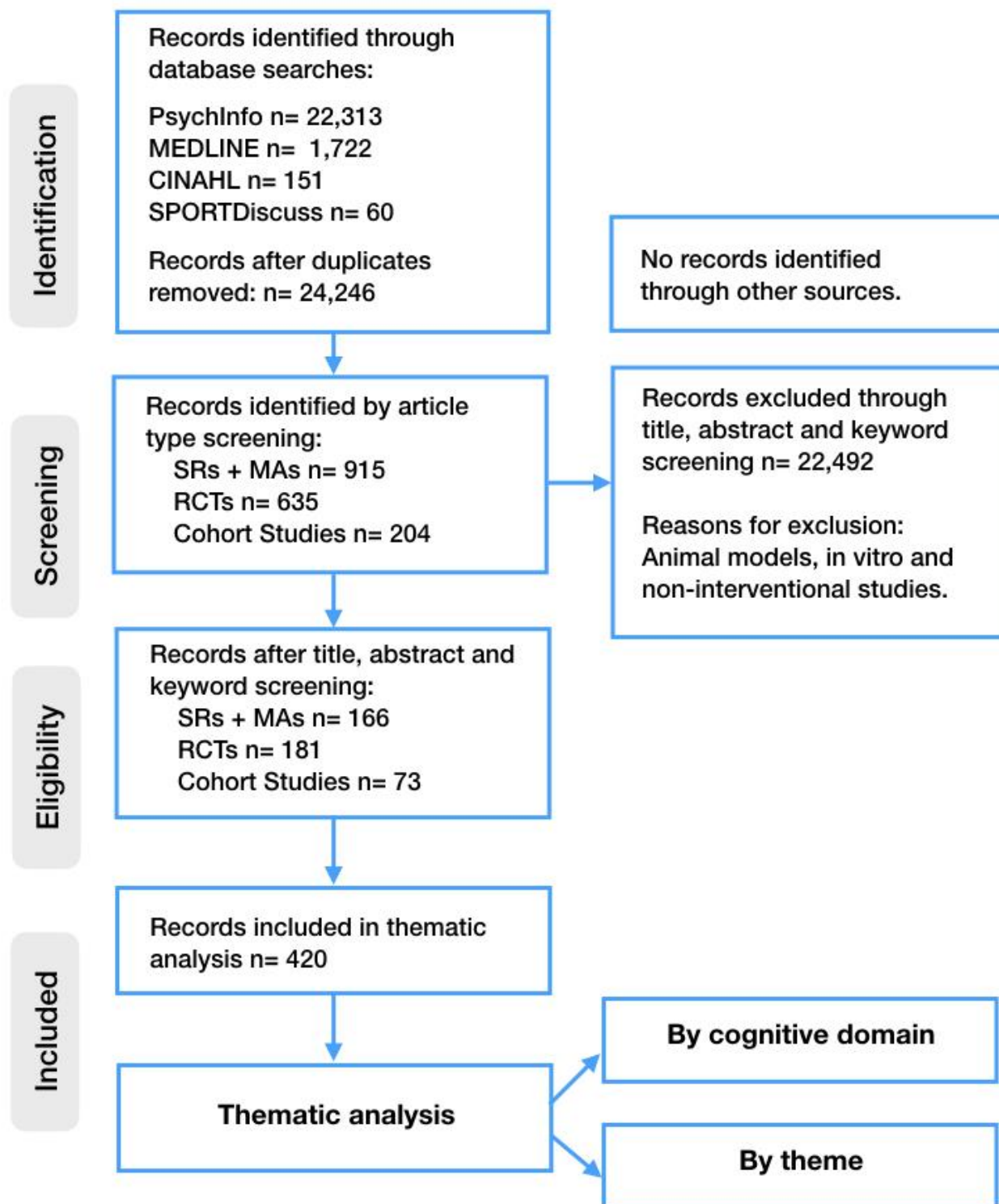


Figure 41. Flow diagram of study identification and selection.

Adapted from PRISMA flow chart. PRISMA, Preferred Reporting Items for Systematic Review and Meta-Analysis (Moher et al., 2009).

On the day of the workshop with representatives from LinkedIn and others, there was an opportunity for these people to comments on my research, focusing on the applicability of the findings. The comments were extremely positive. A couple of the delegates said that they found the recommendations easy to implement in their organisations, and that the evidence presented had compelled them to do that. In addition, I had the chance to chat with some of them during the break and I got complimented on my way of presenting the data visually, which I found extremely rewarding. As an example, [figure 36](#) features a visual representation of my thematic analysis. Despite the support by the delegates, my client insisted that I had to come up with some kind of effect size calculation, for which I had to create method largely based on groupings I created as part of the thematic analysis. I also created a summary table with the items that weighed the most in my analysis. [Please see table 3 below.](#)

Upon reflection, I felt I was rebelling against authority for a large part of the project. At some stages, the constant need to check on “the evidence base of my work” by my client really frustrated me, to the point that I thought I was experiencing Oppositional Defiant Disorder, “a pattern of (a) angry/irritable mood, (b) argumentative/defiant behaviour, or (c) vindictiveness” that seen in the behaviour of many ADHD people (Klyce, 2017). According to Karl Weick, problems that are big and unwieldy tend to produce anxiety, limiting people's capacities to think and act creatively. In his book “Redefining the Scale of Social Issues”, Weick suggests taking a “small wins approach” (Weick, 1986, p. 29-30), i.e., breaking down the problem into more manageable chunks. In their interpretation of Weick’s concept, Meyerson and Scully see small wins as potential experiments in “may uncover resources, information, allies, sources of resistance, and additional opportunities for change”

(Meyerson and Scully, 1995, pp. 595). I could have got completely overwhelmed by the pressure of my client to deliver a project that I did not think should be carried out the way that they wanted to commission it.

Instead, my small win was to see this project as an opportunity to challenge the grounds of authority and to use my positions of authority as visiting research fellow at LSBU to increase defend my approach, through which I actually experienced “jouissance” (Richardson and Adams St. Pierre, 2008, p. 1419). I had read a lot about thematic analysis and found a paper entitled “Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars” by Moira Maguire and Brid Delahunt of the Dundalk Institute of Technology (Maguire and Delahunt, 2017) absolutely priceless as a guide to accompany Braun and Clarke’s papers and videos tutorials, which were also very useful. Through my experience in this project, I discovered the power of the qualitative, which I had myself underestimated before, and seen as “second class” compared to the strength of “hard” quantitative data. From that point of view, the anxiety, and the struggles I had to endure as part of the process were worth it, and I could safely say that the learning I developed during those months had a really strong impact on the practitioner that I am today. Ramifications from this experience permeate throughout the rest of the stories I am sharing in this chapter, including my willingness to explore multiple ways of knowing, and to try to include some kind of qualitative aspect in all the studies that I am part of as a researcher.

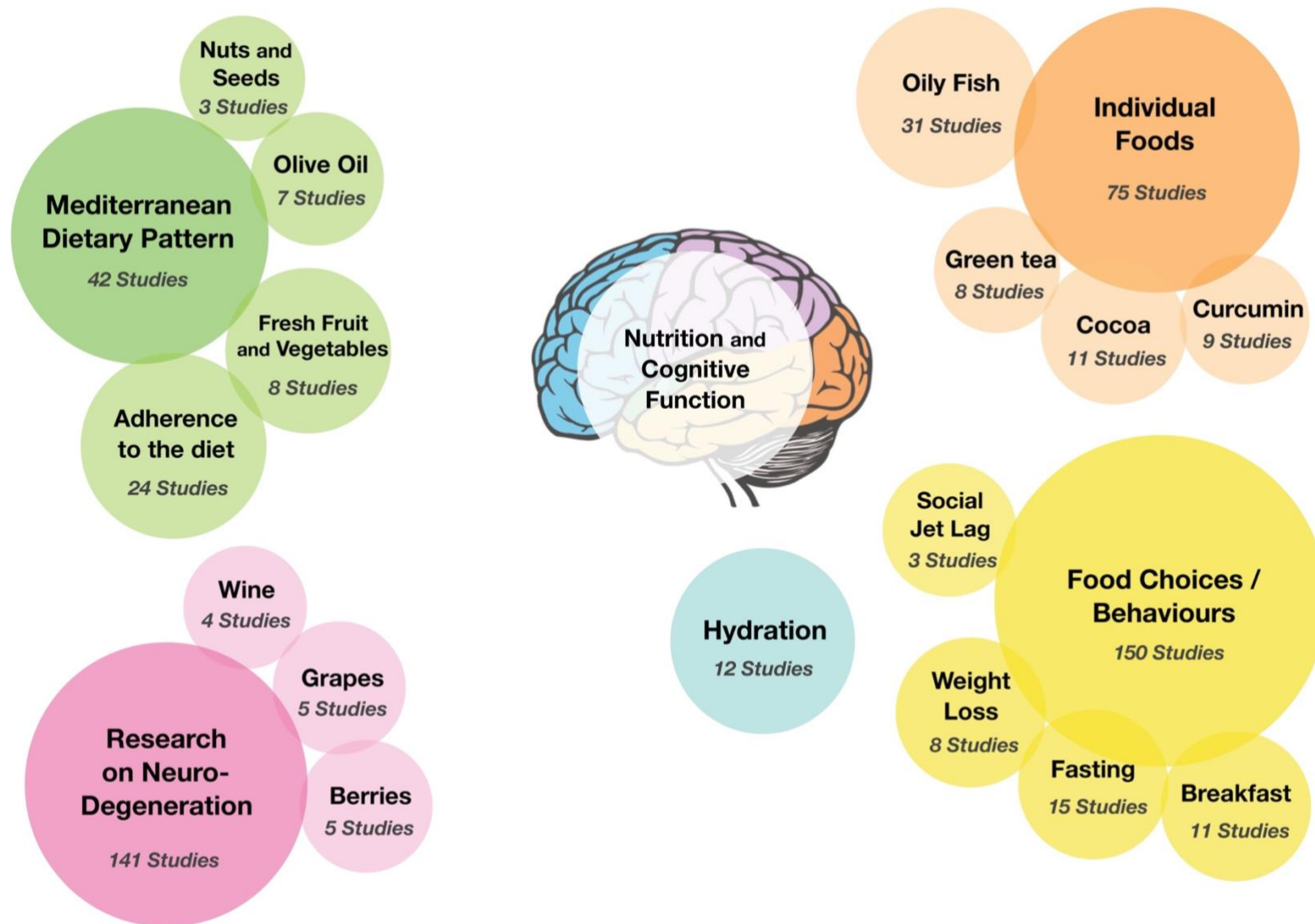


Figure 42. Eating for cognitive function: the thematic analysis visualised

My visual representation of the results of my thematic analysis of the 420 studies included in my research.

This experience also enabled me to realise how first-person inquiry is enriched through engagement, a validity parameter referred to by Marshall as “research cycling” that acknowledges the balancing value of second- and third-person voices of inquiry (Marshall, 2004f, p. 322). An essential part of that cycling is represented by my translating transdisciplinary knowledge, in this case nutrition and neuroscience, and brokering it across to my client and, further, to their client. This translation involved my working with my outer arcs of attention (Marshall, 2001c, p. 433), making sense of the situation so that I could choose the most appropriate translation, just as when I’m using a Spanish-English dictionary and there are several different meanings for the same word. Knowing that there was a third-person voice involved in this project gave me some steer as to how to best direct my inquiry, but not having access to them and only being able to deal with my client – and their not-so-progressive attitudes towards my way of conducting the research – made me realise of the importance of translating knowledge across stakeholder boundaries, and how this is a professional activity that is most often invisible. I got the concept Faye Miller’s “Producing Shared Understanding for Digital and Social Innovation” book, where she discusses revealing transdisciplinary invisible work (Miller, 2020b, p. 31). Miller developed into a social scientist through a non-traditional career pathway. Her writing is informed by her own experience between disciplines and industries such as journalism, social media, higher education, research services and public policy. She believes that there are invisible mindsets and skills that are extremely difficult to verbalise, and that seeing them requires “imagination, creativity, listening and noticing, [so that we can bridge] the gaps through problem emergence, multiple stakeholders, informed learning and personal change” (Miller, 2020b, p. 31).

One of the most valuable lessons I learned out of this project was to listen and to notice these skills that I know I have but that I sometimes can't even find words to describe. Rather than dismiss them, I have become comfortable with my curiosity about them and have indeed been able to verbalise them in ways that I had not anticipated doing at the start of my DProf journey. As I mentioned in [chapter 4](#), I committed to providing a neurodiverse perspective to my stories as part of the integration of me – the inquirer - with my research. Interestingly enough, one of the characteristic features in ADHD is novelty seeking behaviour, which is also linked with creative attitudes (Carson, 2014, De Dreu et al., 2015).

A couple of key terms that I now feel confident verbalising are knowledge creation and knowledge translation. I see myself as a practitioner able to highlight the usefulness of [...] data / results in [a range of different contexts]" (Bourbonnais and Michaud, 2018, p. 1). I see myself as a facilitator of inclusive, "compassionate and realistic dialogue" (Rappoport, 2014, p. 197) by brokering translated knowledge – which I have developed by multiple ways of knowing (Heron and Reason, 1997) – to diverse stakeholders across disciplinary boundaries. I shall be touching upon these facets of my professional identity in the following story. In the meantime, the full "Eating for Optimal Cognitive Function" report, including an extensive methodology section, is available to download from the Stories of Inquiry page on "The Creative Scientist" website: <https://thecreativescientist.co/creations/stories#AWI>. Simply click on the link to jump to that particular story, and remember the password is **thesis2021** if you're prompted. To help you get an idea of my ability to translate nutrition and cognitive neuroscience concepts to a layperson's audience, the PowerPoint presentation that I created to share the results with the Institute's members at the interactive workshop is also available from the same page.

	Memory	Attention	Executive Function	Processing Speed	Global Cognition
Food, Diet or Behaviour					
Mediterranean Diet	?		?	?	?
Nuts and seeds		?	?		
Extra Virgin Olive Oil	?	?	?		?
Red wine	?		?	?	
Grapes	?		?	?	
Berries	?		?	?	
Hydration	?	?	?	?	?
Oily fish					?
Green tea	?	?		?	?
Cocoa	?	?		?	?
Coffee	?	?	?	?	?
Turmeric	?	?			?
Breakfast					?
Avocados	?	?		?	
Weight Loss	?	?	?	?	
Fasting			?	?	?

Table 3. Effect matrix

A table I created to summarise the effects of foods, dietary patterns and behaviours on the cognitive domains covered in the AWI report.

5.4. Building reality, layer upon layer

Subject disciplines: applied neuroscience, mental health, nutrition

Validity parameters: sense making, theorising, research cycling

Qualities of being: participation, empowerment, neurodiverse perspective

Practices of presence: Engage in, and explicate, research as an emergent process,
Enable participation to generate high quality knowing, working with issues of power

Keywords: participative inquiry, reciprocity, reflexive practice

According to Kemmis, “action research aims to be a practice-changing practice” (Kemmis, 2009, p. 464), and that change is brought about by iterative cycles of “planning, acting and observing, reflecting and then re-planning”, also referred to as “self-reflective spirals” (Kemmis et al., 2014, p. 2), characteristic of this type of inquiry. When reading action research literature, it is easy to think that the planning, the acting, the reflecting, and the re-planning happens in clear chunks of time and space, whereas in reality all of these stages can happen at the same time. Conversely, in my own lived experience opportunities for reflection on a particular professional matter can emerge weeks, months or even years later, by which point a whole array of situations have developed that influence the outcome of any action taken upon that reflection.

At the end of 2017, I was commissioned by food supplements company Motion Nutrition (MN) to create two products that – in the CEO’s vision – would tackle mental wellbeing from a different angle. The first product was to supporting mental energy and cognitive performance during the day, but without including stimulants

like caffeine. The second one was to support healthy relaxation in the evening, leading to good quality sleep. I had already worked with the company a couple of years back, as they hired me to formulate their launching product range, but the remit at this point was quite narrow. It involved making the most of the fact I was “a bona fide neuroscientist with a qualification to prove it plus an expert nutritionist with an excellent track record in new product development” which, in their own words, would help the credibility of a new set of products focused on brain health. It'd been a year since I finished my master's in clinical neuroscience, so I took MN's CEO's words as a compliment. However, the fact that he saw my qualifications a source of credibility and trustworthiness in MN's products made me reflect on “the high symbolic power of university degrees” and how qualifications instead of skills can determine access to jobs (Van Damme, 2016, p. 130). In any event, I proceeded to formulate “Power Up” and “Unplug”, which launched in March 2018 and has won a number of awards to date, both in the UK and internationally. As an example, at the height of the COVID-19 pandemic, “Unplug” was featured as a noteworthy product for managing stress and supporting good quality sleep by the senior science and innovation editor of global nutrition website NutraIngredients (Hancocks, 2020), and MN was ranked as 54th most influential start-up by Startups.co.uk in 2020 (Startups.co.uk, 2020). In addition, MN products have an average rating of 4.4 out of 5 with over 1,400 customers on TrustPilot (Trustpilot, 2021).

My mindset when I was researching the ingredients for each of the two products was purely to stick to the best quality clinical evidence available which, following the evidence-based medicine (EBM) model, ranks systematic reviews / meta-analyses and randomised controlled trials at the top of a “pyramid of evidence” based on the work of Canadian epidemiologist David Sackett (Sackett, 2000, Sackett et al., 1996)

which I summarised in an illustration I created for a chapter entitled “The Evidence Base in Personalised Nutrition” in a practitioner textbook that was published last year, entitled “Case Studies in Personalized Nutrition”, figure 37 below.

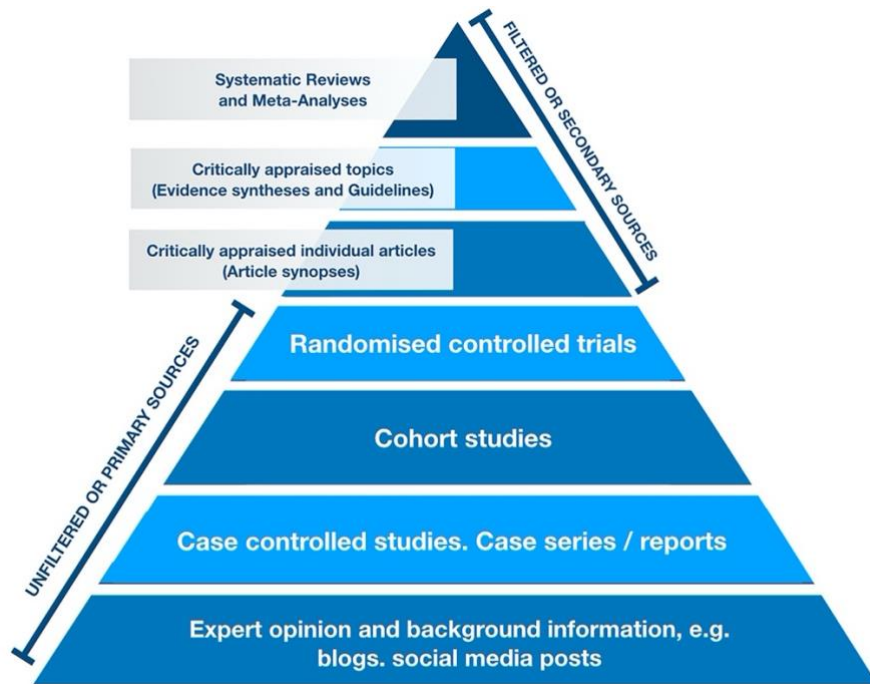


Figure 43. The hierarchy of evidence-based practice

My own representation of the hierarchy of evidence-based practice as a pyramid. From the chapter “The Evidence Based in Personalized Nutrition” (**Toribio-Mateas and Walker, 2020, p. 23**).

The conundrum in the health sciences is that the EBM model reigns supreme. The importance of professional judgement is acknowledged in biomedical literature (Cartwright, 2018), but it’s not encouraged. The placebo-blinded randomised controlled trial (RCT) – its gold standard method – is indeed a valued research method in evidence-based practice in medical and clinical settings because it provides guidance that slots into the EBM hierarchy of evidence. However, the RCT

is “associated with an ontological and epistemological perspective that is situated within a positivist world view” (Rowe and Oltmann, 2016, p. 6) and it can be limiting when it comes to practical applications. For example, I wanted to combine my knowledge of nutrition and neuroscience to create two multi-ingredient products that had ingredients supported by the quality measure of multiple RCTs / systematic reviews, but I didn’t want to exclude some ingredients that had a long history of traditional use and that didn’t have a long track record of clinical data.



Figure 44. Power Up and Unplug

The products I created for Motion Nutrition at the end of 2017.

Fortunately, the founders of MN trusted my vision and I engaged in a process of inquiry that started in September 2017 and culminated in the launch of “Power Up” and “Unplug” in March 2018. Typically, when I’m employed by a company on a new product development project, I create a document that I call a “portfolio of evidence”, which features my rationale ingredient by ingredient with supporting literature.

Brain Focus		At a glance
Nutrient	Why	Amount per day
L-tyrosine	Enhances dopamine release, thereby enhancing focus and drive.	400mg 50mg
Taurine	Works as a natural anxiolytic. Enhances focus.	200mg
Acetyl-L-Carnitine	Works as a trophic factor, enhancing neuroplasticity.	100mg
Vitamin B12 (as methyl-adenosyl and hydroxycobalamine)	EFSA approved for energy.	400µg
Vitamin B9 (folate)	EFSA approved for energy.	400µg
Biotin	EFSA approved for energy.	500µg
Vitamin D3 (Cholecalciferol)	EFSA approved for energy. Works as a neurotrophic factor enhancing neuroplasticity. Enhances boron absorption.	25µg (1,000IU)
Vitamin B6 (as Pyridoxal-5-Phosphate, P5P)	EFSA approved for energy. P5P is a metabolically active form of vitamin B6 with higher bioavailability.	20mg
Vitamin B3 (as nicotinamide riboside - NR)	EFSA approved for energy. NR is a neuroprotective form of niacin.	50mg
Boron	Dexterity, attention, and short-term memory. Also supposed to help with testosterone production.	2mg
Iron (as bisglycinate)	EFSA approved for energy. Bisglycinate is non constipating and highly bioavailable.	20mg
Manganese (as bisglycinate)	EFSA approved for energy.	3mg
Citicoline	Memory, as a precursor to acetylcholine.	100mg
Gotu Kola (Centella asiatica)	Neuroprotector	100mg
American Ginseng (Panax quinquefolius)	Memory, clarity	100mg
Bioperine	Increases bioavailability	2.5mg
Total in mg		733mg
Lion's Mane mushroom	Known for its neuroprotective and antioxidant properties.	Use as filler to 1,000mg

Brain Health Product Portfolio

MOTION
—NUTRITION—

15 October 2017

Brain Focus: research by ingredient

L-tyrosine

The amino acid tyrosine is the precursor to the catecholamine neurotransmitters dopamine and noradrenaline. Increasing tyrosine uptake may positively influence catecholamine-related psychological functioning. There is evidence that tyrosine may benefit healthy individuals exposed to demanding situational conditions. There is also evidence that tyrosine may benefit cognitive performance. **Please note the reduction of L-tyrosine to 50mg/day. from the previous version of this document. This takes into account other nutrients that are processed as part of dopamine and serotonin metabolism, e.g. vitamin B6, as well as herbs that contribute to the metabolism of these neurotransmitters, e.g. Kappicacchu.**

Supporting literature for L-tyrosine

Attipoe, S., Zeno, S. A., Lee, C., Crawford, C., Khorsan, R., Walter, A. R. & Deuster, P. A. (2015). Tyrosine for Mitigating Stress and Enhancing Performance in Healthy Adult Humans, a Rapid Evidence Assessment of the Literature. *Mil Med*, 180, 754-65.DOI:10.7205/milmed-d-14-00594

Hase, A., Jung, S. E. & Aan Het Rot, M. (2015). Behavioral and cognitive effects of tyrosine intake in healthy human adults. *Pharmacol Biochem Behav*, 133, 1-6.DOI: 10.1016/j.pbb.2015.03.008

Steenbergen, L., Sellaro, R., Hommel, B. & Colzato, L. S. (2015). Tyrosine promotes cognitive flexibility: evidence from proactive vs. reactive control during task switching performance. *Neuropsychologia*, 69, 50-5.DOI:10.1016/j.neuropsychologia.2015.01.022

Brain Health Product Portfolio

MOTION
—NUTRITION—

15 October 2017

Figure 45. My portfolio of evidence

A sample of my thinking process in designing Power Up and Unplug. The full document is available for download from

<https://thecreativescientist.co/creations/stories#brainhealth>. Simply click on the link to access and type the password **thesis2021** when prompted.

The document builds in feedback from client meetings, so it develops as part of an iterative process. In this particular case, I created 5 versions of the portfolio, which were shared with my client, effectively disclosing my thought process to them, inviting them to share their voice with me and opening the results of my inquiry to challenge. According to Torbert, interweaving first- and second-person research/practice helps put “personal and interpersonal assumptions” to the test (Torbert, 2000, p. 82). In particular, “second-person research/practice includes all conversations where those present share an intent to learn about themselves, about the others present, [and] about a shared activity” (Torbert, 2000, p. 83). In this case the shared activity involved agreeing on what the formula of final product would look like, taking into account practicalities such as the regulatory status of the ingredients, i.e., whether they had approved health claims or not in the UK / Europe, dosages, and pricing. For example, some of my proposed ingredients in version 1 were too costly and my initial dose had to be reduced to make the product marketable. If you would like to take a look at one of the versions of my portfolio of evidence to immerse yourself in my thought process at that time, a copy of the document is available for you to download from the Stories of Inquiry page on “The Creative Scientist” website: <https://thecreativescientist.co/creations/stories#brainhealth>. Please remember to type the password **thesis2021** when prompted.

Fast-forward to January 2020, when I am working with my colleague Adri Bester at the London Agri-Food Innovation Clinic (LAFIC) trying to identify an opportunity to create a “legacy” research project that focused on mental health. I am paid by LAFIC as Innovation Consultant, with a particular focus on applied nutrition and neuroscience. LAFIC is a research unit funded by a grant from the European Regional Development Fund and hosted at the School of Applied Sciences (SASEC)

of London South Bank University. LAFIC's remit is to help SMEs in the Greater London area develop science-based businesses that had a social impact. I had kept in touch with Motion Nutrition, and I knew they were keen to engage with me in a research project that helped them leverage the 33,000+ responses they had had to a consumer survey on the perceived effects of Unplug on sleep quality. This was appealing for several reasons. First and foremost, I had formulated Unplug and I was really keen to obtain some evidence of its effects from users. Additionally, at this point I had been working with Dr Adam Read at WeCudos on patient-reported outcome measures (PROMs) – which included sleep measures - and had a year of first-hand experience working with validated questionnaires on sleep, stress, resilience, and cognitive function. MN's records indicated that there were over 40,000 Unplug users, so the volume sleep data I could capture was potentially huge, and its translation into a practical application would definitely have a social impact because, according to the National Health Service (NHS), chronic sleep complaints are highly prevalent in the United Kingdom, with as many as 1 in 3 people suffers from poor sleep (England), so that fitted perfectly with the aims of LAFIC's projects. The project was a substantial enough venture to qualify as legacy, so I put together a proposal that I submitted to the programme management team at LAFIC / South Bank Innovation for approval. A week later I got confirmation that the project had the go-ahead funding-wise, pending ethical approval by the School of Applied Sciences at LSBU.

I was delighted. As a neuroscientist, I am intensely aware of the ramifications of inadequate sleep. In fact, it is a well-known factor contributing to the decline of both physical and mental health (Van Dalfsen and Markus, 2018), with epidemiological data revealing parallel trends of decreasing sleep duration and increases in metabolic

disorders such as obesity, diabetes and hypertension (Gangwisch, 2009, Gangwisch, 2014, Nedeltcheva and Scheer, 2014). Additionally, mounting evidence implicates both disturbed sleep *and* lack of sleep as risk factors for common psychiatric and/or somatic complex disorders such as anxiety, depression, insomnia, chronic pain and fatigue syndromes (Chrousos and Kino, 2007). Cognitive impairment (Gorgoni and De Gennaro, 2021) and the development of neurodegenerative conditions such as Alzheimer's disease (AD) (Bubu et al., 2017), Parkinson's disease (PD) and Dementia with Lewy Bodies (Galbiati et al., 2019) are also significantly affected by the chronic occurrence of sleep issues. Conversely, sleep duration and quality also influence the mental wellbeing of non-clinical populations, where these factors have been seen as predictors for mental health conditions such as stress, anxiety and depression (João et al., 2018). In addition to being associated with poorer physical and psychological activity, sleep disorders have an important societal and economic impact, with a consequent reduction in labour productivity or increased risk of accidents (Kessler et al., 2011, Léger and Bayon, 2010, Sarsour et al., 2011).

With this project, I was cutting across disciplinary boundaries and directing my attention to the consumer demand for natural and herbal remedies, which has been growing steadily for the last decade, with the global herbal medicine market size expected to exceed USD 411 billion by 2026, according to Globe Newswire (Newswire, 2020). Food supplements containing herbs, spices and other botanical extracts, have been used traditionally by consumers for centuries, and for a range of reasons, including as sleep aids that are generally safe and well tolerated (Guadagna et al., 2020). However, regardless of the quality of the evidence for the efficacy of individual ingredients such as ashwagandha or tart cherry juice – both of which have been found to promote sleep quality in placebo-controlled clinical trials (Deshpande

et al., 2020, Howatson et al., 2012) – there is a distinct lack of evidence on the effects of multi-ingredient formulations. And this really was the *raison d'être* for this research project. It would allow Nutrition (MN), a young British nutraceutical company, to gather real-world insights on the effects of Unplug, a nootropic formulation containing a mix of botanical extracts, vitamins and minerals aimed at supporting stress relief and restorative sleep. Unplug already had it a rating of 4.4 out of 5 based on over 1,300 customer reviews on TrustPilot (Trustpilot, 2021), so my formula was obviously “doing something” to those who took it regularly, but there were so many different angles for me to take into consideration when embarking on this research project that I thought it would be easier to lay them out as bullet points:

- **What would be the methodology of the study?** Would I just look into participants reactions, following the disinterested methodological stance proposed by the evidence-based medicine model? I was going to be the principal investigator in this project. Did I really want participants to be turned into objects of a research process that anonymised them and muted their voices, forcing them to rely entirely on the researcher who, in turn, observed them from the outside, remaining detached, minimising the chance of any unaccounted unquantifiable factor polluting the knowledge that arose from their observations, which had to be undisputable and not open to interpretation? In my view, this immediately created an issue of power relations by giving me control over the participants. In fact, in Foucauldian terms, I believe this way of conducting research promotes a dynamic that subjugates or *subjectifies* participants (Foucault, 1982a), contributing to the “simultaneous individualisation and totalisation of modern power structures” (Foucault, 1982b, p. 216).

- **How was I going to create the questionnaire?** Was I going to completely prioritise pre-validated questionnaires that may look clunky to the end user? The idea was to invite Unplug users to fill a survey at regular intervals during the space of 6 months, feeding back on their experience of Unplug on different measures, such as sleep time and quality, but also on morning and daytime vitality, and cognitive measures such as memory. It was essential for me to involve participants in the research process in a way that was meaningful for them. I didn't just want to take their valuable data, I wanted to give them value in return. That reciprocity, which is one of the core values of feminist research ethics (Kingston, 2020, p. 533-537), concurred with my ongoing reflection on the power dimensions in my research relationship not just with participants but with my peers at LAFIC and LSBU, as well as with Motion Nutrition. I was concerned with "destabilising unequal relations of power in research" (Burke, 2002, p. 115), and this was my opportunity to show that I was walking the walk, so I needed to co-develop the questionnaire by constantly "pursuing outer arcs of attention [...], reaching outside myself" (Marshall, 2001b, p. 434) by constantly checking in with the MN team and my colleague Adri, co-operating and collaborating with them on all aspects of the development of the measures.
- **How can I build situatedness awareness into the study?** I have a strong affinity with feminist epistemology in that knowing is always partial, situated (Haraway, 1988b), socially constructed (Ellsworth, 1997) and emerges out of collaboration (Griffiths, 1998). I wanted to give participants the chance to "become with" the research project (Haraway, 2008) by researching *with* them, i.e., engaging in participative inquiry (Reason, 1994).

- **I am a great believer in the value of presentational knowledge** and wanted participants to have access to a visual representation of their responses that they could access anytime they wanted from a dashboard on the MN's website. In Heron's words, I wanted for participants to experience knowing "through empathy, resonance, attunement with what is present, in and with the process of radically imaging it, perceptually and in other ways" (Heron, 1996, p. 54).
- **I also wanted the questionnaire to be succinct and as positively phrased as possible.** Most health outcomes questionnaires are phrased in ways that help a clinician diagnose a condition or assess its diversity. I wanted Unplug customers engage with a positive experience, not to feel that they were receiving a clinical diagnosis. I also wanted each section to be as short as possible and plain English enough to maximise engagement by neurodiverse and neurotypical people alike, whilst incorporating enough input from previously validated questionnaires, like the perceived stress scale (PSS) (Cohen et al., 1983) or the Circadian Energy Scale (CIRENS) (Ottoni et al., 2011) so that the resulting data was robust enough to achieve ethical approval by the School of Applied Sciences at LSBU and withstand criticism by peers and industry.
- **The incorporation of validated questionnaires as sub-scales may pose challenges when it comes to the scoring of the overall questionnaire,** so I also had to be mindful of this because I was not a data science expert.

- A key issue I kept pondering on was the impact of me being the principal investigator in a study with an industry partner that had employed me in the past. **What were the ethical implications of this?** Would others think that the study isn't rigorous enough because of my links with MN?

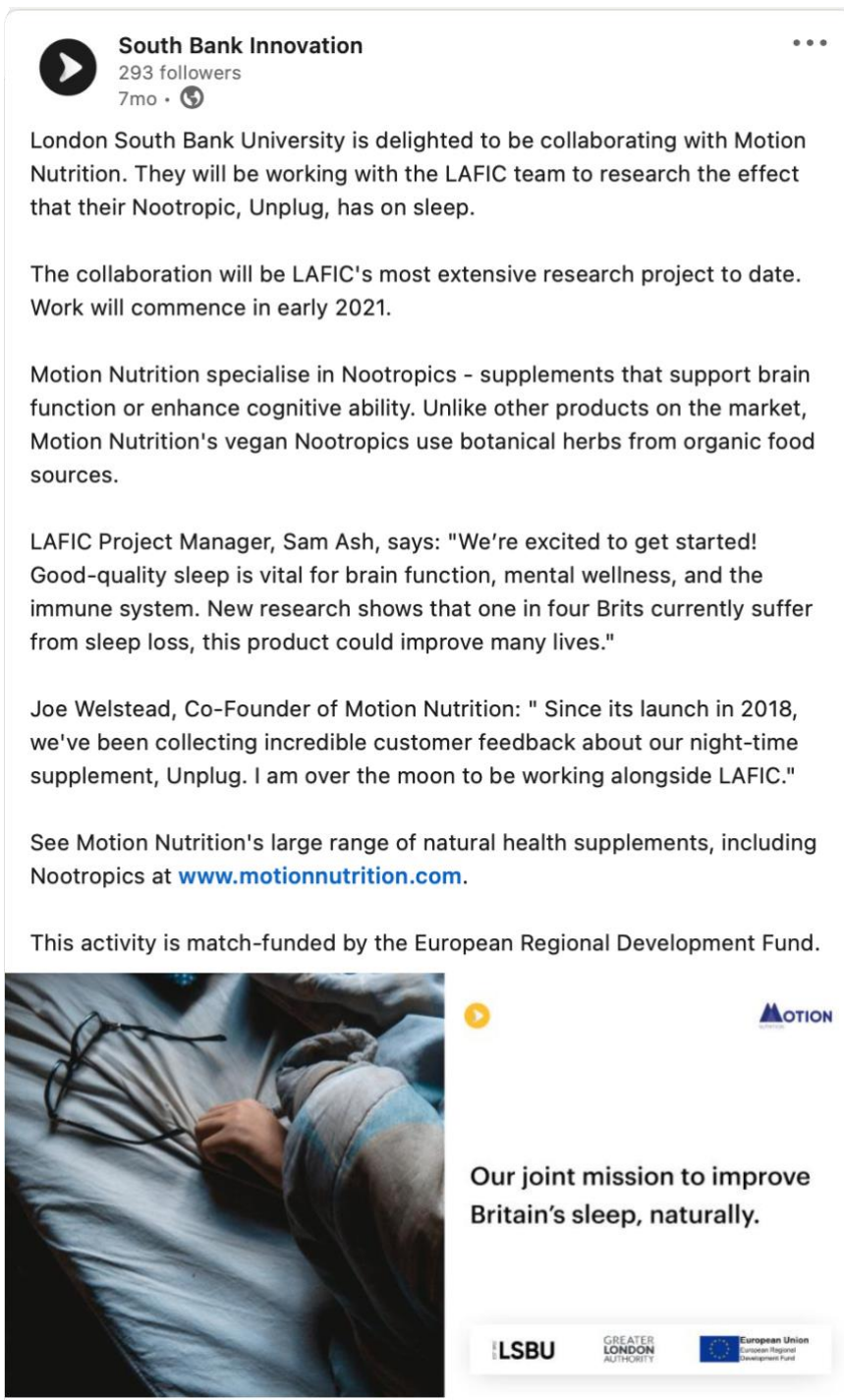


Figure 46. LAFIC research project announcement

A screenshot of the announcement of the research project on social media.

At the time of updating this chapter, June 2021, I had just finalised the scoring of the questionnaire algorithm. It took me much longer than I had anticipated to figure out how to do it in a way that was creative yet scientifically sound. I had to use a combination of heuristics and data normalisation to get the scores to fit within a 0 to 100 scale that made sense to most people. And the same day the Unplug / Motion Nutrition / Sleep study was submitted for ethical approval by the SASEC I was asked by MN to develop 2 new products for those whose brains have higher demands: “Power Up Pro” and “Unplug Pro”, which I have now formulated and are getting ready for production as early as late August 2021. The research project will likely start in September 2021 and will run until March 2022. The full questionnaires and their scoring, all my own work, are available from the “The Creative Scientist” website: <https://thecreativescientist.co/creations/stories#brainhealth>. Please remember to type the password **thesis2021** when prompted.

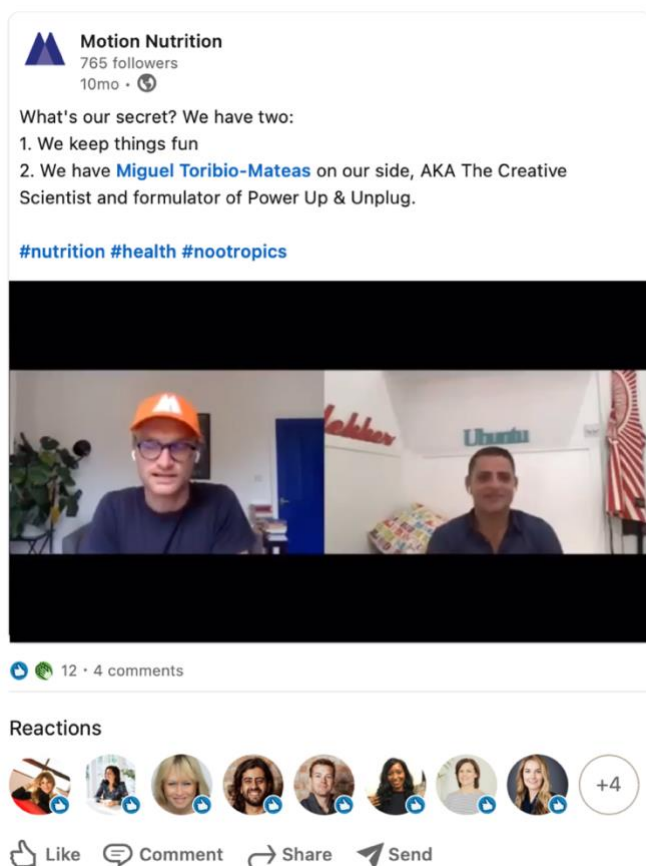


Figure 47. Feeling valued

A screenshot of a comment by Motion Nutrition’s CEO Joe Welstead during a video interview, where he said that my being their scientific advisor was one of their key assets. Feedback like that makes me want to continue doing things the way I do them, a little funky for some, but with positive intent. You can watch the video on <https://thecreativescientist.co>.

One of the biggest learning points from this story is that living life as inquiry and being immersed in my research work every day for years made me think of the quote that's often attributed to Ralph Waldo Emerson: "Life is a journey, not a destination". At one point during my DProf I was getting really stressed about having "tangible outputs", i.e., finished projects that I could showcase in my thesis, as if it were a display cabinet to put my trophies in. Monica Taylor, Professor of Feminist Social Justice at Montclair University, writes about how in co/autoethnographic inquiry approaches "we start from the assumption that our identities are in flux, dynamic, and always under construction" and how, on that basis, we mustn't worry too much about producing "a clean finished product" (Taylor and Coia, 2020, p. 575). It's taken me a while to feel comfortable about the fact that "the stories we tell are not finished" (Taylor and Coia, 2006, p. 274) and that "no [story] is ever complete, yet the findings of each [...] are still valid (Coia and Taylor, 2009, p. 15). That's a way of knowing that I now confident to assume epistemic responsibility for, even if that creates issues of power in the production of knowledge. As an example, I fell out with my colleague Adri because of something I said in a meeting with peers at the School of Applied Sciences. I mentioned my previous relationship with Motion Nutrition, and she thought that sharing that bit of information damaged the authority of my research. The value-neutrality, detachment and objectivity characteristic of postpositivist epistemologies perform what Donna Haraway calls the "God-trick" (Haraway, 1988a, p. 582), i.e., "an exercise of reason that seemingly escapes the constraints that social location, identity, and context impose on all human knowledge-seeking" (Foster and Glass, 2017, p. 513). I was seeing the world from a constructivist / interpretivist angle, and we clashed. We soon made up and laughed it up, but it my responsibility for my beliefs, the kind of moral responsibility for performing my inquiry in the way that I felt was most congruent with myself as a

researcher and as a person. It highlighted my need to be mindful of the overlap between my agency, my beliefs, my need to justify the ways I see the world (or not) and my practical and personal responsibility in situations that involve others whose values may be completely different to mine.

A final point of reflection was the fact that the participation of a company and a university in the co-creation of knowledge seems to lean Haas's concept of epistemic communities (Haas, 1992), consisting of diverse actors with converging goals and shared cognitive frameworks who understand their role in the system they are part of and driven by the production of knowledge with the potential to enhance societal impact (Pulkkinen and Hautamäki, 2019). Societal impact was one of the key requirements by LAFIC and knowing that everyone involved was thinking of the greater good, regardless of their own aspirations as academics or as businesspeople, made the experience feel rewarding.

Note: I continued to try and overcome one of the challenges highlighted by Marshall in first-person inquiry, namely my ability to engage in rich narrative that isn't bogged down with too much unnecessary detail (Marshall, 2004a, p. 310). With that purpose in mind, I had written three further stories, failing miserably at the attempt of making them much shorter than the previous two. On that basis, I rewrote them as a medley of stories that will hopefully provide an engaging enough experience of my professional activities without bogging you down in minutiae.

5.5. An entangled medley of stories

Subject disciplines: neuroscience, applied microbiology, mental health, nutrition

Validity parameters: sense making, theorising, research cycling

Qualities of being: participation, empowerment, neurodiverse perspective

Practices of presence: working with issues of power, systems thinking, develop capacities for working with multiple ways of knowing

Keywords: transdisciplinarity, entanglement, participation

At the beginning of 2020, whilst I was still working for Cytoplan as Clinical Education Consultant, I came up with the idea of creating a course on psychological resilience. This is a subject that I am really interested in from both a personal and a professional perspective. As an individual, I grew up in the shadow of my brother's terminal cancer, who was diagnosed 3 years before dying at the age of 13. I was 8 when he passed away. My mum and dad were quite obviously preoccupied with this tragic situation, and I had to learn how to cope in my own ways without them being around all the time. According to clinical psychologists Luthar and colleagues, "resilience involves dynamic processes that foster positive adaptation in the context of significant adversity" (Luthar et al., 2000, p. 543). The key coping mechanism I developed was bonding with my sister, who is 11 years older than me and became both a friend and a second mum. There is a growing body of evidence in neuroscience documenting how resilience is nurtured by "relational lifelines" provided by kinship networks. Older brothers and sisters, aunts, grandparents and informal kin can all help inspire a child's hopes and dreams, stand by them through difficult times and celebrate their successes (Walsh, 2012, p. 174). I can personally

relate to those facts at a deeply emotional level that made me want to explore resilience as one of my study topics during my master's degree in clinical neuroscience, which I did. As a result of my professional networking in this field, I connected with Mark Setton of the Pursuit of Happiness (Happiness, 2021), who shared a passion for resilience and learning, and I started managing their database of scientific studies on positive psychology, which featured resilience heavily. Around the same time, after each of my 9 practitioner education events for Cytoplan in 2019, I asked delegates to feed back on areas that they would like me to focus on at future workshops. The brain kept coming back right at the top of the list, so with the pandemic starting to take its toll in January / February 2020, I thought resilience would be the ideal topic.

From an action research point of view, I see emotions as both the source and the outcome of knowledge. In fact, the essence of constructivism is that the world unfolds on the basis of being in the world. Therefore, it follows that the full range of human sensibilities are appropriate to ways of finding out about fully being and acting in the world (Oates, 2004, p. 322). As such, I thought of them as a key factor to take into account when adopting plurality of knowing as a pillar of my inquiry. Lifelong learning scholars Ortrun Zuber-Skerritt and Margaret Fletcher share a vision of what they describe as “Participatory Action Learning and Action Research” where adult learning is “a consequence of the development of our emotional, social and cognitive [body, brain and mind]” (Fletcher, 2015, p. 142). With my Cytoplan course, which I entitled “Building Resilience: Clinical Strategies” I wanted to tap into these sources of inspiration and develop a series of 6 1-hour sessions where I would explore the neurobiology of resilience, as well as give practitioners tangible takeaway tools they could start using in their practices straight away. Reflecting on what had

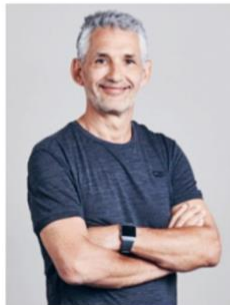
worked for me in other settings, such as my mental health work for Claimont Health, my PROMs work for WeCudos, or indeed my editorial work for the Pursuit of Happiness, I thought to introduce a couple of positive psychology measures that practitioners could use with their clients, alongside some practical nutrition guidelines on what foods to choose to support mood and emotional stability (Firth et al., 2020).

I created these sessions as live webinars with the ability for participants to ask questions and establish dialogue about the areas covered during that session. I then incorporated their input into the following week's session. I believe this was one of the most important elements of the sessions because they enabled practitioners to engage with the project, making it "centrally meaningful" to them (Marshall and Reason, 1993, p. 120). I also recorded interviews with people with an interesting story to tell that wasn't all about healthcare. I wanted an emotional connection with the subject, so I invited Mark Setton to talk about resilience and his story of studying philosophy at Oxford, but then living in the Far East and falling in love with Eastern cultural traditions. Once in the US, teaching at Bridgeport University, he got a letter from a student saying that his teachings, infused with Eastern philosophy, had stopped them from committing suicide. It was that letter that ignited him to create the Pursuit of Happiness. It was that kind of emotion in people's storytelling that I wanted to tap into through the interviews, of which there were 4, one with a breath work practitioner, another one with a Yoga teacher, and another one with an ex-journalist who became a nutrition practitioner. I wanted participants to experience embodiment as "a specific form of knowledge that exists in the telling of stories with emotional meaning" (Liguori, 2020, p. 473). I wanted them to value the embodiment of knowledge that is tacit knowing in Dewey's (Dewey and Bentley,

1960) and Polanyi's (Polanyi, 2009) terms. I was keen for them to see learning as a process that develops as they do, and that they are part of, as opposed to just as recipients of my "lectures".

The video series was a success with over 400 practitioners attending, so I created a second series entitled "Building Healthy Immunity". The test here was that I couldn't get hold of people who embodied the tacit and the emotional in similar ways to the previous course. Interestingly enough, the attendance to that course was around half. However, I had learned the value of co-creation and participation with an emotional connection. With that in mind, I embarked on a research project with Vanessa Kimbell of The Sourdough School from April to August 2020, involving 11 participants who would complete a set of questionnaires about their mental wellbeing along with a gut microbiome test before and after baking sourdough bread and other bakes using Vanessa's own blends of flours and botanicals, many of which she had harvested herself from the fields around her house. The idea was to support the study participants' gut microbiome diversity by feeding it a huge amount of different nutrients that we would struggle to eat in the 21st century, like chamomile flowers and fennel seeds, milled and blended with wheat, rye, oat, millet, etc. as sources of fibre. These nutrients are known to promote the health of gut bacteria (Kumar Singh et al., 2019) which, in turn, are supposed to help us lift our mood and keep us happy (Liang et al., 2018). I had the chance to meet the participants and to go through their health questionnaires. I also spent a considerable amount of time trying to identify what changes had taken place in their gut microbiomes by engaging with the sourdough baking of the botanical blends, comparing the before and after results of their microbiome tests.

Foreword by Professor Tim Spector



Just five years ago if someone said to you that they were writing a book about sourdough bread and mental health, you would have thought they needed psychiatric help. Today nobody is laughing as the latest science tells us that microbes are the key link between food and the health of our minds and bodies. The science of the microbiome is only a decade old – but it is probably the most exciting and fast-moving field of

medicine. Food as medicine was big at the time of the ancient Greeks and slowly lost its influence, but it is having a major renaissance. This is partly the result of the new scientific discoveries, but also a backlash against the influence of the pharmaceutical industry that has been pushing expensive drugs of reducing benefit and increasing side effects on us. As the pharmaceutical companies are now giving way to the increasing financial and political power of the dozen global food companies that supply 70 per cent of our food, many of us are rejecting the highly processed products on offer and want to find out more about traditional or artisan foods and how to make them ourselves.

There is now increasingly good evidence that switching to a healthy diet is as good as the average effect of an anti-depressant. Traditional breadmaking using whole grains and natural

yeast starters is at the heart of a good healthy diet, providing crucial amounts of fibre that most of us lack as well as other nutrients and gut-friendly chemicals. The microbes that create the gas that makes the bread die in the process of baking. Although some early research indicates dead microbes can provide some benefit to humans, this is still speculative. But just the act of preparing the dough and baking may itself confer unexpected health benefits. Every sourdough baker will carry healthy bacteria and yeast on their hands which will be unique to them, making every starter unique in the composition of microbes. There is anecdotal evidence that bakers are on average healthier than their peers and some of this may be due to the benefits of manual work as well as their regular contact with friendly microbes leading to a more diverse gut community.

As everyone has a unique set of gut microbes, and even identical twins only share around a third of them, it is hard to define the perfect healthy gut community known as the gut microbiome. Nevertheless, researchers around the world like myself, have consistently found that the number of different species or microbiome diversity is the common factor that separates people with health problems from those without. In a study of 11,000 samples from combining the British and American Gut projects we found that the most important factor determining high gut microbe diversity was not whether you were vegan or gluten free – but how many different plants you eat per week.

Afterword

Sharing a journey to better health

The word 'commensalism' is derived from the word 'commensal', meaning 'eating at the same table' in human social interaction, which in turn comes through French from the Medieval Latin commensalis, meaning 'sharing a table' or 'sharing a meal', which is exactly what we do when we eat: we share a meal with tens of trillions of microorganisms, including at least 1000 different species of known bacteria that inhabit our gut. As mind-blowing as that is, the relationship between you, your sourdough and your microbiome gets even more intimate. You may be following the same recipe and using the same ingredients as another baker in another country miles away from you, but the diversity of the microbes in that loaf, that pancake or that cultured butter will be unique to you, based on the microbial community that inhabits your kitchen and the skin in your hands. I hope this book is just the beginning of that realisation that whenever you're touching your sourdough, you are engaging in a beautiful dialogue with your microbes, who will be with you on your journey of discovery of new flavours and textures as well as, hopefully, in a journey to better health.

Miguel Toribio-Mateas, Nutritional Neuroscience Research Fellow at London South Bank University and The Sourdough School in-house Nutritionist

6 SWEET BAKING

Figure 48. My afterword / Tim Spector's foreword

My afterword in Vanessa Kimbell's best-selling book "Sweet Sourdough", which focuses on the gut-brain connection. I contributed to it during the time we were working together on the study.

I collaborated with another neuroscientist and a medical doctor in this project, and we filmed the interviews with those participants who agreed to share the learning they experienced out of the process. We still need to gather the data in a meaningful way so that we can publish it. It may well be that it'll be presented as a collection of individual case studies. But the ability to tap into people's emotions, to get to know them, to share the results with them, and to learn from their reactions was completely priceless. To borrow the words of David Adams in his chapter on first-person action research in the "The SAGE Encyclopaedia of Action Research", I would not have wanted to do this study in any other way because "in dwelling in the presence of the "other", [I connected emotionally and spiritually to the participants, thereby "seeing"] the extraordinary in the ordinary" (Adams, 2014, p. 351).

For as much as I was enjoying exploring a new model of "doing science" that was different to the rigid, detached postpositivist paradigm I had been used to, I still had to remind myself to check in with myself regularly, raising my awareness to whether the frames I was applying to my enquiry were appropriate, as discussed by Torbert in "The power of balance: transforming self, society, and scientific inquiry" (Torbert, 1992), a practice of presence that Marshall describes as "paying attention to framing and its pliability" (Marshall and Reason, 2007a, p. 352). So when I was invited to a meeting to discuss my involvement in a study through which I would engage with the board of directors of NatWest in a study to assess the impact of nutrition on their mental wellbeing via the gut-brain axis, I had to assess how a group of mainstream scientist would receive my turning up and saying something like "making sense of experience is not a separate process from living it" (Adams, 2014, p. 351). They may have agreed, but they wanted to know about biostatistics pipelines and models of analysis for the microbiome data that would result from analysis the participant's

microbiome samples. They were more interested in knowing that I'd be using the Omnigene Gut OM-200 kit (Panek et al., 2018, Park et al., 2020), provided by UK-based biotech company Atlas Biomed (Biomed, 2021), which I happened to work for at the time, so I was spanning boundaries and taking multiple roles in the process. They wanted to know whether the sample collection kit came in ISO-accredited packaging, which it did: ISO 13485:2016 (medical device packaging) to be precise (Iso, 2016). They also wanted to know about the stabilisation of the sample, longevity in transit, and a myriad of other details that are beyond the scope of this chapter. According to Coghlan, "human knowing is a dynamic three step process: experience, understanding and judgement" (Coghlan and Shani, 2020, p. 6). However, at that precise time, I couldn't judge. I had to keep an open mind and establish to which degree I introduce the value-laden type of inquiry that I now felt most comfortable being immersed in to an environment that was open minded to a degree, but where science was very much seen as "a particular form of knowledge articulated by positivist norms" (Coghlan and Shani, 2014, p. 526).

I was in the middle of that meeting with the head of research at The Insight Network, a really astute neurosurgeon lady who I really admire, plus The Insight Network's CEO, one of the UK's top consultant psychiatrists, and Professor Ted Dinan of University College Cork – a world-renowned scientist who has published extensively on the role of the gut microbiota as a regulator of brain health, from neurodevelopment to mood and neurodegeneration (Dinan and Cryan, 2017b, Dinan and Cryan, 2017c, Dinan and Cryan, 2017d) – and I was thinking to myself: "haven't I developed extensive practical knowledge of the use of the subjective happiness scale (SHS) by Lyubomirsky (Lyubomirsky and Lepper, 1999), the perceived stress scale (PSS) by Cohen and colleagues (Cohen et al., 1983), and the brief resilience scale

(BRS) by Smith and colleagues (Smith et al., 2008)?” “I may not be a top psychiatrist or a neurosurgeon, but I have actually seen these tools work in the real world. What would happen if I proposed that we use them?” I honestly didn’t know what to expect at all, then Ted Dinan said “I absolutely love the PSS, and I think it would be a fantastic tool to use. If you are interested in happiness and resilience, the 2 tools you suggest are also really good and I’d be happy for you to use them”. That was a magical moment where I felt that the phenomenon of tacit knowledge creation and reconstruction that Barad discusses in “Meeting the Universe Halfway” (Barad, 2007, pp. 73-94) was happening right in front of my eyes.

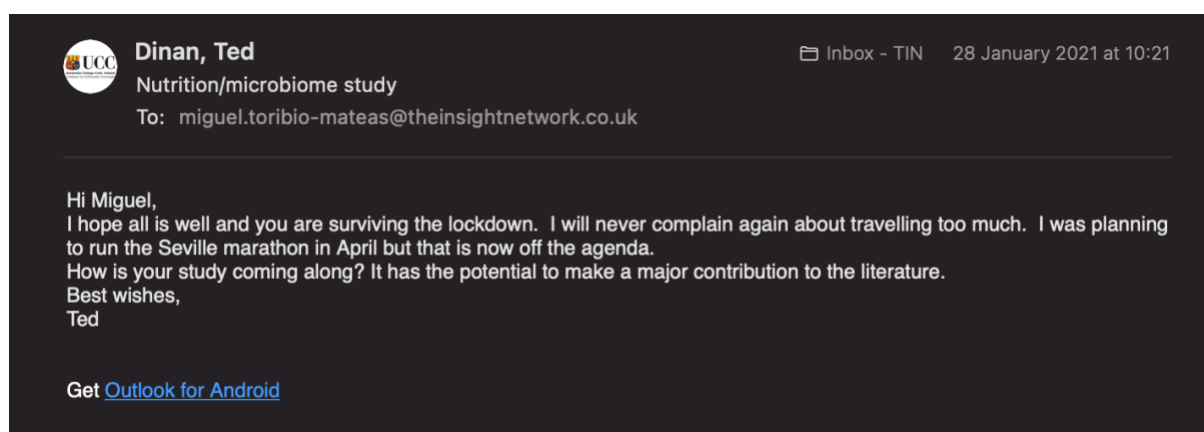


Figure 49. When compliments count

A screenshot of an email from Prof. Ted Dinan with some very kind words of support for my study with NatWest.

I was excited but I had questions. Was this my opportunity to “convert” that tacit knowledge into explicit knowledge, a la Nonaka and Takeuchi (Nonaka and Takeuchi, 1995)? Was this another opportunity to learn from the past, a new learning cycle as proposed by Lorino and colleagues (Lorino et al., 2011), which would enable me to interpret and apply what I knew in a different light (Küpers, 2007, Orlikowski,

2002)? What kind of knowledge would emerge from the process, which involved me interviewing the board members several times, collecting data from the SHS, PSS and BRS scales as part of those interviews, and talking about nutrition and lifestyle, as well as explaining the results of their microbiome tests to them in plain English so that they could understand them?

The project was given the go ahead and the microbiome data, along with all the nutrition and mental health outcomes data I collected, are being process by bioinformaticians at University College Cork (UCC). The data was originally going to be processed by a subsidiary of Atlas Biomed in Moscow, but when I left my job as Director of Research & Innovation at Atlas I didn't think it was appropriate to continue to liaise with them, particularly because I left due to the toxic organisational culture, which was suffocating me. Thinking that I could lose access to the microbiome data was a concern, and making the decision to get UCC to analyse it was a political decision with risks. For example, having to explain myself and my decision to leave a respected, well-paid job at Atlas may have been seen as peculiar by The Insight Network or UCC. What kind of business affairs could I discuss with them that helped me justify my position? Did I even need to do that? What about disclosing to them that the stress levels I was experiencing at Atlas were overwhelming and that stress affects people living with ADHD differently, in ways that neurotypical folk would find difficult to imagine, like feeling as if my brain was full of fog and not being able to operate to a 20% of my normal cognitive capacity (Pallanti and Salerno, 2020), which is how I felt at Atlas for months. Therefore, leaving that job was my way of coping.

Was everything at Atlas bad? No, it wasn't. But I was told that that I would work primarily on the development of a test for mental wellbeing that would help me put into practice the kind of knowledge I disseminated in "my Harnessing paper" (Toribio-Mateas, 2018a), and that never happened, so I felt frustrated because I really wanted to immerse myself in developing a tool that could help others who lived with health conditions where the gut-brain axis is a key regulator, such as depression, anxiety, neurodegenerative and neurodevelopmental conditions, such as Alzheimer's disease or ADHD, respectively. However, I was able to raise awareness of the importance of putting customers at the centre of the business model. I summarised my thoughts on the matter in an article I wrote for the professional journal "AgroFOOD Industry Hi Tech", entitled "Innovation vs Voice of Customer: The Need for Balance in Customer Healthcare" where I shared how "direct-to-consumer healthcare firms should be committed to the co-creation of knowledge with their customers" and how I was "leading a research project that [aimed to provide Atlas' customers with an opportunity to engage with R&D, contributing to product development with their lived experiences" (Toribio-Mateas, 2021, p. 34). Because of internal politics, the project took a lot longer to than I had anticipated to get going and I was able to start surveying customers only in March 2021. My plans were to engage more deeply with them in focus groups all throughout the year with the objective "to minimise the technology lag whilst promoting realistic expectations about what is possible with our R&D capability today, instead of what simply is "science fiction"" (Toribio-Mateas, 2021, p. 35). I did complete the only customer survey that Atlas had ever done, but never got to analyse the data, which I had planned to do by means of thematic analysis for the qualitative data and descriptive statistics for the quantitative data.

I was determined to see my time at Atlas as an action learning cycle (Argyris, 1991) that would enable me to have another go at the kind of things I had done before in other settings. In my R&D capacity at Atlas, I was a boundary spanner between industry and academia. Using the Atlas microbiome tests, I would put together a study proposal for an industry partner, e.g., a probiotics manufacturer that wanted to test the effects of their products on the guts of healthy participants, provide them with a pricing structure and then engage with my colleague Adri Bester at LSBU to apply for ethical approval.

The screenshot displays the 'Research and Enterprise Manager' interface for LSBU. The main content area shows the details of an 'Ethics application ETH2021-0125'. On the left, a sidebar contains navigation links: Home, London South Bank University, Committees, Professional Services, Calendar, Guides, and REF Units of Assessment. The application details are organized into a table with the following information:

Ethics application (Researcher)	
Title	Ethics application ETH2021-0125
Application ID	ETH2021-0125
Researcher	Ms Adri Bester Mr Miguel Toribio-Mateas
Project	Impact of a botanical formula on the gut microbiota of healthy people: an open label prospective study with embedded analysis of participant-reported outcomes.
Date	09 Mar 2021
Academic year	2020 - 2021
Ethics reviewers	Professor Ian Albery Applied Sciences Ethics Panel
Expiry date	30 Apr 2025
Committee meeting	Applied Sciences Ethics Panel meeting

On the right side of the application details, there are three summary boxes:

- STATUS:** Approved after revisions made
- MEDIUM RISK:** Includes options for 'Report adverse event', 'Significant amendment to original application', and 'Copy as a new application'.
- APPLICATION:** Ethics application
- NOTIFICATIONS:** Revisions, Decision

Figure 50. Ethics application

A screenshot of one of the ethics applications that I submitted to the School of Applied Sciences Ethics Committee (SASEC).

To the commercial partner and the SASEC, I was half-Atlas / half-LSBU. The last two proposals I put together contained an element of participant involvement with me as the researcher carrying out semi-structured interviews to gather rich insights from their experience of the two products that I was testing. One was a multi-strain probiotic, and the other one a botanical formula with several herbal ingredients. Participants would also carry out their stool sampling at home using the Atlas test, and the bioinformaticians in Moscow would test the hypotheses that Adri and I were formulating. The intention was for me to identify themes from the interviews and to have those tested against changes in Lactobacilli, Bifidobacterium, etc. Again, in my head, this was another opportunity to tackle the NatWest gut-brain study from another angle. I wanted to try and close the theory-practice gap by applying the learning on issues of power and knowledge that I had developed throughout my DProf journey, and I thought to myself, what best than do a couple of studies where I get to be fully immersed in a participatory type of inquiry with the individuals involved, getting to know what mattered to them, as opposed to just looking at their data. There was also a deeper concern that went further than pure curiosity or self-development. I was genuinely concerned about addressing issues of power and coercion in research practice, an issue that is core to the feminist take on systems thinking known as critical systems practice (Stephens et al., 2010). I could feel the pressure put on me by peers to submit ethics applications that were “watertight”, which normally meant they were randomised controlled trials. I wanted to fight that oppression by proposing alternative models of inquiry that challenged positivism’s claim as the only form of rational knowledge (Mingers, 1980, p. 42). At one point in the not-so-distant past this would have been unthinkable for me, for a number of reasons, the most important one being the fact that

I didn't have the ability to articulate my thoughts with the fluidity and grounding that I can do today.

In any event, depending on whom I was liaising with, I still had to be subtle about my research approaches. It is a well-known fact that “in certain academic circles, action research has been criticised as being unscientific and not research”. Those are the words of health services researcher Heather Waterman, who also thinks “that action research is anecdotal and subjective, and that it is inherently biased due to a lack of researcher independence or separation from the research process” (Waterman et al., 2001, p. 67). I didn't want to create a negative halo around my capabilities as a researcher with “lab-based scientists” whom I had just met. In a way it reminded me of the kind of figuring out that LGBTQ+ people need to do when talking to someone. Do we disclose our gender identity straight away, is it that important with that particular person? What are the risks of bringing that up?

Before I left Atlas, I got the chance to get my teeth into three projects that I did manage to finish. They all involved designing dealing with human participant data, and two of them were interventional studies that got me cycling of first-, second- and third-person research practices, including constantly checking in with my own assumptions about the context I was immersed in, co-inquiring, collaborating, and publishing and disseminating my work. They also involved the intense process of “implication and enculturation” that characterises practitioner inquiry (Loo and Sutton, 2020b, p. 172) and [that I illustrated in figure 37](#). One of the projects was my first randomised controlled trial as a principal investigator, looking into changes to the gut microbiome of

healthy people who had “a typical British diet”, asking them to feed back on their experience of the process as well as to complete a microbiome test before and after consuming a number of plant-based meals per week.



Figure 51. Rejection as an opportunity to reflect

A screenshot of the abstract of “my MEATLESS paper”.

I wanted to include some interview data in the process, but this was discouraged by peers at the time I was designing the study with my colleague Adri Bester, so in the end we decided not to go down that route, but we still asked participants to share how they felt throughout the process and if they experienced any effects, both physical and mental, from the substitution of animal meat-containing meals with plant-based meat alternatives. We collaborated with a biostatistician from the Center for Precision Genome Editing and Genetic Technologies for Biomedicine in Moscow who helped us with the analysis of the microbiome data, and I led the writing of the manuscript and liaising with the editors and reviewers until the paper was finally published. Although this involved hundreds of hours of work, it was a clear example of the kind of episode of the “long-lasting, highly focused attention” that’s referred to as “hyperfocus” in ADHD (Hupfeld et al., 2019, p. 191). I tend to see this as a positive feature or, as I mentioned in the foreword, as a “superpower” that allows me to do 3 or 4 times more than I would do (and more efficiently too!) at the same time when just sustaining regular attention. Over the 8 weeks that I was completely immersed in writing the paper, sending it to my colleagues for comments, implementing their feedback, rewriting, etc., and up to the day I submitted it, I was “in the zone”. I dare say that I learned more about certain aspects of microbiome science in that time than I had done in the previous 2 years. Sitting at the computer for 12 hours a day was tiring but I felt totally “on it”. I was reflecting on areas that I had taken for granted, such as the importance of the writing in a paper like this, which I was submitting to a prestigious (Q1) peer-reviewed journal. What were my assumptions? Would it be accepted or rejected? Was I writing with views to achieving the goal of acceptance, or was I writing in order to develop my own learning? What about my colleagues? What did they think of my writing and presentation style? What were their reactions and insights and how could I use those to transform my practice?

I must admit I really got a lot of what Marshall writes about when she refers to inner and outer arcs of attention (Marshall, 2001d) at this point. The paper got rejected by *Nutrients* (MDPI). According to the editor “it was strange that the authors didn’t think of using a crossover randomised approach for this clinical trial”, which made the findings inherently biased. They also mentioned that the microbiome sequencing database we had used was unsuitable for small-sized trials, and that some of the methods were unheard of. I had been working with microbiologist Professor Paul Cotter of University College Cork on another couple of LAFIC projects of late, so I asked him for his opinion on this. He advised to ignore the comments and to send it to another journal because crossover randomisation has its own disadvantages that are widely reported in literature when it comes to small sample sizes and real-world studies (Miranda et al., 2020). I should have been completely deflated by the rejection, but I wasn’t. I was just trying to understand why and I kept coming back to Coghlan’s words on “roles, politics and ethics” in action research, namely that “action research is an unfolding, emergent process which evolves through cycles of action and reflection” (Coghlan and Shani, 2005, p. 538), and this was an opportunity for me to pause, take stock and decide what the next steps were. And that’s exactly what I did. I wrote a letter to the Editor of *Food* (MDPI), saying that I felt the comments from *Nutrients* left “small fry” researchers such as my colleagues and I out of the game. *Nutrients* assumed that every research team looking to explore hypotheses around the impact of food on the microbiome would have tens of thousands of pounds at their disposal to use the most advanced testing techniques on hundreds of patient participants who wouldn’t mind enduring the difficulties of a crossover food trial over a long period of time. Ultimately I felt the position by *Nutrients* was not one of epistemic pluralism, and I made that clear

in my letter. I felt that science in an emerging field such as the human microbiome and its ramifications into health and wellbeing couldn't afford to have "protocols" that excluded perfectly valid ways of testing a hypothesis. I was pleasantly surprised to get an invitation to submit and my paper got accepted after a couple of review rounds, so I can now say I have led a randomised clinical trial as principal investigator working on an absolute shoestring of a budget, which is something I am really proud of.

This was not my first experience of rejection. The paper "Reference values for intake of 6 types of soluble and insoluble fibre in healthy UK inhabitants based on the UK Biobank data" that I co-authored with 3 colleagues from Atlas Biomed (Shevlyakov et al., 2021) got rejected 3 times before finally being accepted by Public Health Nutrition. I started thinking of rejection as an opportunity for diffraction rather than reflection. In Haraway's words, diffraction is about dynamic interference and rearrangement of the world (Haraway, 1997, p. 273), so why not rearrange things dramatically rather than just subtly, hoping that the next editor would be OK with the changes? I collaborated with a team of neuroscientists and psychologists from Goldsmith's and St Mary's universities in London in an ADHD pilot study to test the effects of the fermented drink kefir on the gut microbiome of children with ADHD. When the paper got rejected by Microorganisms, we regrouped. The feedback was incredibly technical, featuring comments about the settings in the sequencing machine and how it was "unbelievable" that we were trusting data from a sample that had been read by only 3,000 times by the sequencer instead of a minimum of 10,000. How can you argue with that? And how were we to mask those flaws – as perceived by the reviewers – so that the paper got accepted elsewhere? We also got intense critiques on the statistical analysis, mostly because the sample was too small to be significant.



Trialling a microbiome-targeted dietary intervention in children with ADHD – the rationale and a non-randomised feasibility study

Kate Lawrence ^{1,*}, Kyriaki Myrissa ², Miguel Toribio-Mateas ^{3,4}, Lori Minini ¹ and Alice M Gregory ⁵

¹ Department of Psychology & Pedagogic Science, Faculty of Sport, Allied Health and Performance Science, St Mary's University, Twickenham, London, UK; Kate.Lawrence@stmarys.ac.uk

² Department of Health Sciences, Faculty of Sport, Allied Health and Performance Science, St Mary's University, Twickenham, London, UK

³ School of Health and Education, Middlesex University, The Burroughs, London, UK

⁴ School of Applied Science, London South Bank University, 103 Borough Rd, London, UK

⁵ Department of Psychology, Goldsmiths, University of London, UK

* Correspondence: Kate.Lawrence@stmarys.ac.uk

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Abstract: Dietary interventions have been previously explored in children with ADHD. Elimination diets and supplementation can produce beneficial behaviour changes, but little is known about the mechanisms mediating change. It is proposed that these interventions may cause changes in the gut microbiota. Thus, a microbiome-targeted dietary intervention was developed, and its feasibility assessed in a non-randomised feasibility study of nine non-medicated children with ADHD aged 8–13 years (mean 10.39 years). This study used a prospective one-group pre-test/post-test design. Participants were recruited from ADHD support groups in London and took part in the six-week dietary intervention. Parents attended four group sessions and children were assessed pre- and post-intervention on measures of ADHD symptomatology, cognition, sleep, gut function and stool-sample microbiome analysis. The primary aim was to assess completion rate which was 100%. Exploration of secondary aims revealed that adherence to the dietary protocol was good, and better for some aspects of the diet; only two adverse events were reported, and parent rated treatment acceptability was good. Descriptive data for outcome measures is presented. Some recommendations are made for future studies. This study provides preliminary evidence for the feasibility of a microbiome-targeted diet in children with ADHD.

Trial registration: ClinicalTrials.gov Identifier: NCT03737877

Keywords: Actigraphy; Attention Deficit Hyperactivity Disorder; ADHD; children; diet; feasibility study; kefir; microbiome; microbiota; sleep

Figure 52. Persist or desist?

A screenshot of the abstract for this paper I co-authored with a fantastic team of neuroscientists and psychologists.

After much deliberation as a group, we decided that it may be best to reformulate the paper in such a way that it was valued for what it was, i.e., a pilot / feasibility study.

Without this kind of studies, which are proofs of concepts, science would be stagnant.

Recruiting 200+ children with ADHD and managing them as participants in a randomised crossover study would be a mammoth task requiring hundreds of thousands of pounds. Who would fund that kind of study? Not the Waterloo Foundation, the charity that was funding ours, who run on a shoestring. Had we exhausted that avenue of inquiry, to the point that the learning out of any further efforts to go down that route would be minimal? I would say that that was the case. In Marshall's words, we had reached a point of saturation in that inquiry (Marshall, 2004d, p. 318) and we needed to move on. We did, and planned to submit to "BMC Pilot and Feasibility Studies", so I had to rearrange my thinking regarding the statistical analysis I had performed on the data, seeking advice from my biostatistician colleagues at Atlas. I was about to leave Atlas, so this was delicate, but I had built strong enough relationships with some colleagues so I felt I could reach out to them for some support. I mentioned the duality of my role in these studies. I was invited to contribute because of my knowledge of the subject, but I had a role in R&D at Atlas Biomed, and I was also listed as an academic contributor in the paper, with my role at Atlas spelled out in the conflicts of interests section. Those are the straightforward ethical issues of role duality, but there are other more subtle aspects that played in my mind, such as my access privileges to the data as part of the organisation, e.g., I knew my colleagues in Moscow could speed things up for me if I asked them because I was an insider, but how would that look like from the outside? These were important considerations for me from a first-person inquiry point of view, but they undoubtedly have ramifications into the realms of second- and third-person inquiry. Holian and Coghlan articulate my concern beautifully, writing that "people have reactions to, perceptions about, and relationships with researchers and each other. These differences in personal and interpersonal characteristics can impact on research in profound ways" (Holian and Coghlan, 2013, p. 405).

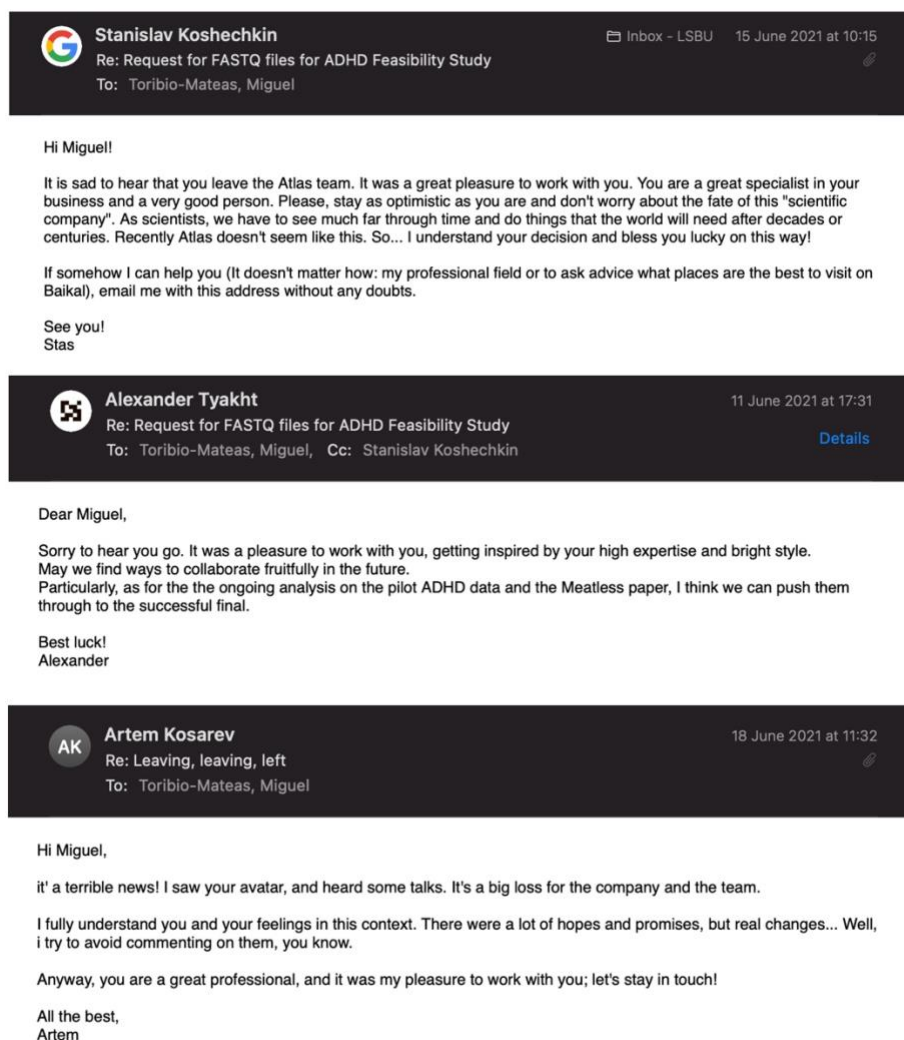


Figure 53. Relationships with colleagues at Atlas

Screenshots from my R&D colleagues at Atlas who valued me as a colleague and understood my reasons for leaving.

I could not deal with the incredibly hostile environment at Atlas, so I left in June 2021, only to start working for its main commercial partner in the UK, Chuckling Goat, the UK's leader in the production of kefir products (Goat, 2021). I forged a really good relationship with the founder and CEO, and she invited me to take the position of Head of R&D, with the immediate goal to develop a microbiome test that focused on a range

of areas, but with a strong focus on mental wellbeing. I have completed creating the algorithms for each of the sections the test, and I am currently working with bioinformaticians from Cambridge University, trying to figure out who we are going to display the microbiome data in an innovative way that they're happy with as mainstream scientists, and that I am happy with as a creative scientist. I am also developing customer questionnaires that allow Chuckling Goat to get to know the test users over time and building focus group interaction with customers as a key part of the product development process. I find myself once more in a knowledge broker / boundary spanner kind of setting where my "highly developed understanding and perception [of applied microbiology in the context of the wider health sciences] provides a [customised] bridge between knowledge [that's dry and often difficult to turn into something tangible] and those who could benefit from the innovations enabled by that knowledge"(Barjolle et al., 2018, p. 12).

At this point in my professional development, which is happening as I am getting to the end of my DProf journey, I am taking stock, pausing, and celebrating the current iteration of me as a person and as a practitioner, "wounds and all". I understand exactly Mary Brydon-Miller's argument that before engaging in any kind of research process, we should critically examine ourselves as individual researchers through the lens of first-person inquiry (Brydon-Miller, 2009). I feel I am a better version of myself as a result of doing that, and that makes me happy. Not only that, but I also feel more confident in saying no to research opportunities that might not quench my thirst for learning about aspects of inquiry that take me and the world around me into consideration. And I am delighted to say yes to opportunities such as being in a newly-formed steering

committee at the Primary Care and Community Neurology Society (P-CNS) made up of a range of practitioners – from consultant neurologists, neuroscientists, specialist nurses, psychiatrists, and clinical psychologists – who share living with a neurological / neurodegenerative / neurodevelopmental condition.

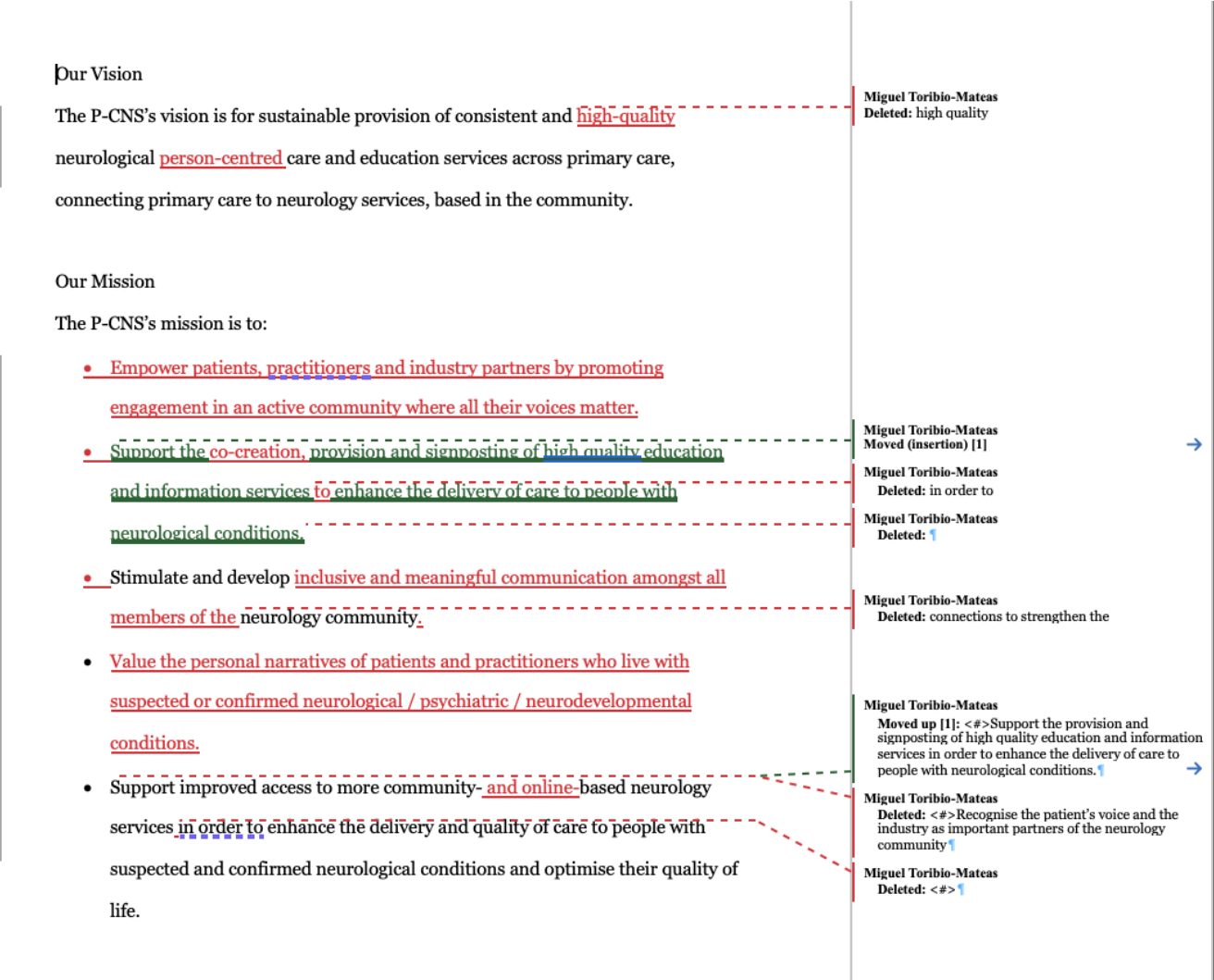


Figure 54. Mission and vision

My contribution to the revised mission and vision for the P-CNS

Brought together by Neil Bindemann, executive director of the P-CNS, this group includes people living with anxiety, Parkinson's, MS, ADHD, fibromyalgia, and a clinician whose child is on the autism spectrum, to name but a few.

Neurodigest Readership Survey

We're excited to announce that Neurodigest is relaunching at the end of this year.

Over the last 18 months, the Primary care and Community Neurology Society and the publisher of Neurodigest have been reviewing the focus of the journal, given the rapidly growing interest in Brain-Gut research.

The opportunity has arisen to redevelop Neurodigest into a peer-reviewed scientific journal focused on the gut-brain connection, to highlight ongoing research connecting the digestive system (including metabolic processes and the microbiome) with both neurological and psychiatric disorders.

With this in mind we invite you to participate in a short survey and answer a few questions about the future content of Neurodigest.

1. Please select your profession and/or whether you are a person living with a gut-brain related condition:
2. Which of the following topics would you like to read about in the next issue (select as many as you wish)?
 - a. The significance of the microbiome
 - b. The role of the gut-brain connection in neurological conditions (in general)
 - c. The role of the gut-brain connection in specific neurological conditions (epilepsy, Parkinson's, migraine, MND)
 - d. The role of the gut-brain connection in mental health conditions
 - e. The role of normal and disturbed digestive functions (resorption, secretion, transit) on brain functions
 - f. The role of central states (mood, anxiety/depression on gut, metabolic and microbiome functions).
3. If you could read about any topics within this area in the future, what would they be?
4. What types of articles would be of interest to you?
 - a. Review articles
 - b. Personal perspective
 - c. Case Studies
 - d. Clinical service developments
 - e. Other: Free text answer to find out what other types of papers they would like to see. Gives us an insight on the audience's needs.
5. Have you read any articles (from any source) recently about the gut-brain connection that you found to be interesting?

If you answered yes, please state why it was interesting to you and please provide links to any articles mentioned.
6. If you have read any of the following previous articles on Neurodigest.co.uk, please indicate on a scale of 0 to 5 how interesting you found them:

Figure 55. Co-creating content with NeuroDigest

A screenshot of a survey I've been collaborating on to send to the NeuroDigest readership.

The P-CNS “has become the leading voice for supporting the connecting up of neurology care between Primary Care and the wider neurology community” (Society and Community, 2021). The vision of the steering committee is for the society to involve the community it serves in the co-create the standards of care and the education that the community needs, i.e., creating these resources *with* them, not just *for* them. We are a group of people with neurological disorders brought together by a strong will to collaborate, co-producing content to drive the strategy of the Society, empowering patients to share their voice, setting a revised vision and mission that starts with our experiences as individuals. Tapping into our own experiences as a group of people with brains and nervous systems that are unique to us stretches and divides our attention to elements of our practice (Torbert, 2000, p. 83) that translate first-person inquiry into tangible outputs, i.e., the P-CNS’ upcoming educational materials, with ramifications across second- and third-person practices. In addition, the committee is linked to the editorial activities with NeuroDigest that I mentioned [in chapter 4](#). Apart from representing one of the most exciting opportunities I have had for a long time, I am also working with a team, this time made up of academics and clinicians focusing on the brain or the gut. There’s a consultant gastroenterologist, a psychiatrist, a biochemical chemist focusing on the gut mucosa, a neuroscientist, a dietitian, two medical doctors and me, the “gut-brain guy” as Neil Bindemann calls me. One of the objectives of this new iteration of NeuroDigest is to turn it into a peer-reviewed journal, so I will be dusting off my scientific publishing skills once more and engage in yet another cycle of professional development, bringing in the tacit knowledge from years ago and upcycling it / blending it with new learning in a new context with new people to bounce ideas off with.

In a paper entitled “Theories Reflecting My Personal Experience and Life Development”,

Clayton Alderfer – a student with Chris Argyris – writes about how he believes that “all those who study human systems, regardless of the level of analysis, put themselves into and in turn are affected by what they study” (Alderfer, 1989, p. 352). Life has been a perpetual cycle of learning and unlearning, with endless opportunities to grow and develop in unexpected ways. I get that same feeling when I review manuscripts for MDPI. I am on the reviewer board for the journals “Brain Sciences” and “Microorganisms” and have contributed with a total of 24 reviews to those and other MDPI in the last 3 years.

Pending (0) | Finished (25) | Declined (0) Download Certificate 

Manuscript-ID	Journal	Title	Invited Date	Manuscript Status	
ijerph-1358340	ijerph	An exploratory study among intellectual disability physician ...	2021-09-03 08:21:01	Under review	 Depositing
ijerph-1343528	ijerph	Use of the Washington Group Questions in Non-government Prog ...	2021-08-12 11:02:22	Pending first decision	 Deposited
nursrep-1245967	nursrep	Survey of Skin-to-Skin Contact With Obstetrics and Pediatric ...	2021-07-28 12:30:20	Pending major revisions	 Deposited
ijerph-1284441	ijerph	Physical and Mental Health Factors Associated with Poor Nutr ...	2021-07-05 11:07:29	Website online	 Deposited
ijerph-1249673	ijerph	Implication of the sensory environment in children with Auti ...	2021-06-24 08:09:55	Website online	 Deposited
ijerph-1255894	ijerph	Music as a facilitator for skill development: Revisiting thr ...	2021-06-07 12:54:53	Rejected	 Deposited
psychiatryint-1232609	psychiatryint	A Systematic Review of the Efficacy of Repetitive Transcrani ...	2021-05-14 11:56:33	Website online	 Deposited
ijerph-1150683	ijerph	Association between dietary fibre intake and colorectal aden ...	2021-03-31 11:47:59	Website online	 Deposited
ijerph-1162664	ijerph	A systematic review to examine the evidence in developing so ...	2021-03-25 16:07:06	Website online	 Deposited
nutrients-1116769	nutrients	Universal School Meals and Associations with Student Partici ...	2021-02-15 04:45:06	Website online	 Deposited
ijerph-1122538	ijerph	Client- centered Breastfeeding Promotion Strategies: Q Metho ...	2021-02-14 11:15:38	Website online	 Deposited
ijerph-1076555	ijerph	Lessons Learned from a Q Methodology Study to Develop Client ...	2021-01-18 08:07:43	Manuscript withdrawn	 Deposited
brainsci-996180	brainsci	Network Analysis of Induced Neural Plasticity Post-Acceptanc ...	2020-11-11 03:05:10	Website online	 Deposited
nutrients-879170	nutrients	Effects of both pro- and synbiotics in liver surgery and tra ...	2020-07-22 05:30:31	Website online	 Deposited
brainsci-816990	brainsci	Mini-review on the possible interconnections between the gut ...	2020-06-01 03:04:32	Website online	 Deposited
ijerph-692726	ijerph	Metabolite profiling revealed that a gardening activity prog ...	2020-01-02 03:40:56	Website online	 Deposited
nutrients-669156	nutrients	The Kidney-Gut-Muscle Axis In End-Stage Renal Disease Is Sim ...	2019-12-04 02:14:04	Website online	 Deposited
nutrients-604541	nutrients	Urolithin metabolites determine the modulation of the gut mi ...	2019-09-25 02:48:21	Website online	 Deposited
microorganisms-607443	microorganisms	The human milk microbiota is modulated by maternal diet	2019-09-17 07:55:23	Website online	 Deposited
nutrients-547567	nutrients	Lactobacillus reuteri V3401 reduces inflammatory biomarkers ...	2019-07-08 04:41:24	Website online	 Deposited
nutrients-527148	nutrients	Mixed Spices at Culinary Doses Have Prebiotic Effects in Hea ...	2019-05-30 05:28:05	Website online	 Deposited
nutrients-486239	nutrients	Influence of vitamin D deficiency in inflammatory markers an ...	2019-04-08 04:32:35	Website online	 Deposited
nutrients-440203	nutrients	Autism spectrum disorders and the gut microbiota	2019-01-28 03:01:18	Website online	 Deposited
diseases-341560	diseases	Neuropsychiatric disorders: influence of gut microbe to brai ...	2018-08-01 12:07:46	Website online	 Deposited
brainsci-319034	brainsci	A review of traumatic brain injury and the gut microbiome: I ...	2018-06-06 07:48:12	Website online	 Deposited

Figure 56. Collaborative learning

A screenshot of the reviews I have completed for MDPI journals since 2018.

I have grown increasingly fond of papers that include some kind of qualitative data. I figured that there are hundreds of other potential reviewers with an interest in providing critiques on specific biostatistics methods and their application to neuroscience or microbiology, but I would rather accept review invitations for papers that provide me with an understanding of people's feelings, using the appropriate methodological tools. The kind of constructive feedback I can give then is based on a blend of my subject discipline matters, the methods I have developed knowledge of during my DProf, and my own tacit knowledge. With my contribution I am using my positions of privilege as a reviewer to increase the diversity of papers that is published in these journals, and thanks to the DProf journey of discovery I feel empowered to push the boundaries a little when it comes to the established grounds of authority (Richardson and Adams St. Pierre, 2008, p. 1419).

These are just some of the examples of my thought processes as I look at my practice through the lens of first-person research. I could have told another 100 stories, but I feel I have reached a point where my inquiry has been saturated, that I have learned enough – for now – about how I do things. That learning has enabled me to transform what I do so I can do it in different ways that keep challenging me to grow as a professional and as a person. In fact, as I approach the end of my DProf, I have a fuzzy feeling that tells me “things make sense” in a way that they didn't before. I like to think of it as the outcome of building my reality layer upon layer, constantly developing knowledge, that has contributed to creating the new reality that I inhabit today, a new reality that feels more comfortable than that I inhabited 5 years ago, and yet still has plenty of uncharted territory for me to explore. My job isn't done yet. I'm only starting!

5.6. Untold narratives

Finishing tasks is difficult for people with ADHD (Gawrilow et al., 2011), and the bigger the task, the more difficult this can be. This is due to the fact that dopamine is the key neurotransmitter in the maintenance of focus / attention, and it happens to be in short supply in ADHD brains (Klein et al., 2019). This means that adults with ADHD can get overwhelmed by mammoth-sized projects (Adamou et al., 2013, Brouwers et al., 2020), but we can also get very excited about specific aspects of the task in hand, all at the same time.

I did get overwhelmed last year, which is why I took much longer to finish writing than I had anticipated. But something else is worth mentioning here, notably the fact that when one lives life as inquiry, the beginning and the end of a research project isn't always clear cut. For example, I am currently at the conceptualization stage of a new study, a narrative review on the uses of the herb Ashwagandha for the management of stress, anxiety, and sleep issues. There are some good studies to support that therapeutic use (Chandrasekhar et al., 2012, Choudhary et al., 2017, Deshpande et al., 2020, Shah et al., 2015, Wadhwa et al., 2016, Zahiruddin et al., 2020), so this shouldn't be a difficult paper to write. However, I thought it would be good to apply some of the insights I've developed during my DProf and ask Chuckling Goat customers who are currently using Ashwagandha what they use it for and how they feel as a result. Having that consumer-generated data in a semi-structured format would give me the ability to do a thematic analysis on it, and to present it in a creative way alongside the more formal literature review.

Why am I writing about this, you may be wondering? The reason is simple. The moment I click on the “upload thesis” button on the University’s website will mark the end of this project. What that doesn’t mark, however, is the end of the many lines of inquiry that I have shared with you over the last 260 pages, a lot of which have long-term ramifications. Some of the new projects that I have started thinking about as I approached the end of my thesis writing will never be shared with you in this document, like the Ashwagandha review. Some may come to fruition, some may not, but they all play a role in how I continue to embrace diffractive thinking, radical creativity, and transdisciplinary imagination to delve deep into the complexity my professional practice. For that reason, I have created a page on the “The Creative Scientist” website where I provide a handful of examples that address the value of the narratives that will never make it to this thesis but that continue to unfold. Please go to <https://thecreativescientist.co/creations/untold>, and remember to type the password **thesis2021** if/when prompted.

Chapter 5 summary

In this chapter, I put transdisciplinary lived experiences through the critical lens of first-person action research. As a result, I was able to draw valuable insights that have helped me become more aware of the complex processes of interpretation, reflection, and action I engage in as part of my professional practice. The process of inquiry itself was enriching in very practical sense, in that I am now better able to theorise the kind of real-world problems I encounter as a transdisciplinary practitioner. I also feel I can verbalise these problems more eloquently and, ultimately, I feel better equipped to tackle them. Being the creator of my own bespoke methodological framework and applying it to the situations I am up against as part of my professional practice has allowed me to realise how valuable diffractive thinking, radical creativity and transdisciplinary imagination continue to be for me to delve deep into the messy nature of my professional practice.

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Chapter 6. Insights

***“A moment's insight is sometimes worth a life's
experience”***

Oliver Wendell Holmes' alternative title to “The Poet at the Breakfast Table”

6.1. What's chapter 6 about?

In this final chapter I reflect on my DProf journey as a practitioner-researcher looking into real world phenomena, and how my personality, my social/professional context, and various other different personal and practical challenges and conflicts – such as my own physical and mental health – have affected my research. In fact, the nature of this chapter is highly introspective, even intimate. I allow my vulnerability and the emotions I have felt throughout the DProf to surface as important parts of me. They help me close this thesis as *a researcher* who isn't disconnected from *the researched*, as a storyteller sharing evocative stories of inquiry that convey the complexity of my professional reality, sharing my lived experience as a way to find authentic meaning in what I do and how I do it.

6.2. The Emergence of Authentic Meaning

Given that I have written the whole of this thesis in a reflective narrative style, I should try and overcome one of the challenges highlighted by Marshall when engaging in first-person inquiry, namely “[writing] accounts that are alive, rich and multi-faceted but also succinct” (Marshall, 2004a, p. 310), and conclude with a much shorter chapter that highlights the key insights I get by looking back at the last 5 years of my life, which I have illustrated with a colourful patchwork of sources inspire the theorisation of my professional doctorate journey. Using writing as inquiry, I have drawn from an eclectic range of sources that reflect the multiplicity of fronts I am embedded in as part of my professional activities. Citing neuroscience or microbiology papers in the context of my

inquiry, I gone deep enough into the subject discipline to help me reconfigure how I make sense of work situations from an action research perspective, diffracting ideas as points of difference that help me launch a conversation from those points of departure (Niesche and Gowlett, 2019, p. 113), but without getting lost in the ins and outs of those particular fields. Writing from a position that's above, between and beyond disciplines helps me embrace the coexistence of the dissimilar in my own approach to science, research and practice, enabling me to trust my creativity as the ever-present sense of authentic meaning and purpose that has guided me throughout both my personal and professional development by "unifying bridging concepts – knowing and bridging gaps, informational waves, resonance and shared understanding" (Miller, 2020a).

I never actually thought I'd approach my thesis as narrative inquiry. I remember reading about autoethnography and feminist theory in 2016 and thinking "I love Donna Haraway. She sounds like a cool woman" and "I wish I understood what Karen Barad is going on about. I think I get it, but she is a bit abstract". Fast forward 5 years and not only have I managed to complete this mammoth task in a style that I didn't even know one could write in as a neuroscientist, the writing itself has changed me. That's the most astonishing thing. As I mentioned in [my methodology chapter](#), I must have written, edited, deleted, and rewritten every section about 10 times. Some probably even more. As I've been writing, I've been reading and absorbing the learning by authors that I knew and I got the chance to reacquaint myself with, as well as that by authors that I didn't and that I've had the pleasure to get to know. I have got lost, in fact, completely lost, several times, but every one of them I managed to find a new version of myself. Sometimes I really liked that version, sometimes I didn't, but I was able to change it by

moulding the words on the Word document as if I was playing with clay. And all throughout the process, I've looked within and checked in with myself. How was I going to write a thesis looking at my professional practice through the critical lens of first-person action research? What did that have to do with being a neuroscientist? Why did that bother me so much to start with and it's ended up not bothering me at all? It is all down to self-reflective practice which I have been absorbed in for the last year and a half.

Borrowing from Gillie Bolton's insights in "Write to Learn: Reflective Practice Writing" (Bolton, 2009), "Reflection is an attitude which makes the difference between 20 years of experience or only 1 year of experience repeated 20 times", and when I started to navigate through the vast amount of knowledge I had accumulated during the last five years of my life, faced with the task of organising and summarising it into the very piece of work you are reading right now, Bolton's words suddenly made sense. I was finally at peace myself because I had learned to trust my own work instead of falling into the trap of my own toxic expectations, particularly during the first lockdown, when my inability to see how reflexive practice was compatible with neuroscience or microbiology developed into destructive imposter syndrome, a behavioural health condition known to impair professional performance and to contributing to stress and anxiety (Bravata et al., 2020) ultimately causing me to burn out. I am convinced that all of that happened because I was trying shut down my innate creativity, instead of embracing it, and a really stressful situation at work, surrounded by colleagues who I couldn't trust, didn't help much either. That was around April 2020. I thought I had got over my neuroscientist fixation with achieving quantifiable effectiveness, how being creative was

at odds with being scientific and rigorous, and how I would be “biasing” my practitioner-researcher work by being slightly unorthodox in my choice of methods and their underlining epistemology. But obviously the years of indoctrination into viewing knowledge from a positivist angle as “static and unchanging” (Kuhn, 2012), instead of accepting the natural, non-linear “messy” dynamics of the real world had had a strong effect on my brain, and the internal conflict made me fall ill. I ended up being bed-bound for nearly a month. Following weeks of medical tests trying to get to the bottom of intense pain all over my body, a consultant rheumatologist diagnosed me with fibromyalgia, “a chronic condition characterized by widespread musculoskeletal pain of at least 3 months’ duration [characterised by] fatigue, non-restorative sleep, cognitive dysfunction, and other physical symptoms (Peterman and Myers, 2017, p. 1). This prompted me to book an appointment with a psychiatrist for an ADHD assessment because I was aware of a strong evidence of overlap between the two conditions (Bou Khalil et al., 2018, Stefano et al., 2020, Van Rensburg et al., 2018).

I received my ADHD diagnosis from a very sweet female psychiatrist who told me I was a typical undiagnosed male adult who had lived with the condition all my life. So, perversely, the tension that had made me burn out had actually enabled me to get to the bottom of why my brain has always worked in creative ways, but only when I was really motivated by something. Interestingly, it has been suggested that ADHD is associated with enhanced creativity (Hoogman et al., 2020) but that this only holds true when people with ADHD are engaged with a domain that fits their skills and preferences (Boot et al., 2020). When people with ADHD get bored with something, that boredom is overpowering because it is not a behavioural trait, it is purely biological. Dopamine fails to ignite the prefrontal cortex, and it makes you feel like you want to fall asleep

(Arnsten, 2009). Perfectionism, anxiety, and a fear of failure, are well known to negatively affect mental wellbeing, but in the academic world they are the are largely “the elephant in the room” or, as brain sciences researchers Jaremka and colleagues put it recently, they are “academic experiences no one talks about” (Jaremka et al., 2020). It also turns out that all of those cognitive distortions are characteristic traits in ADHD (Strohmeier et al., 2016). While I was feeling I had no physical energy, and I was in agonising pain, but I had astounding clarity of mind with regards to the “big things” that were important in my life, which meant that I reflected a lot on “what really mattered” to me during this dark time. Knowledge creation is embedded in personal and social history (Hamilton and Pinnegar, 1998), both of which contribute to professional situatedness.

The Japanese concept of *wabi-sabi* represents the balance between symmetry and unevenness (Saito, 2017). It “captures the desolate beauty of aged or imperfect phenomena” (Lomas et al., 2017, p. 1731). I now see my ADHD diagnosis as part of the epistemic *wabi-sabi* of this thesis because it’s helped me understand myself better, as a person and as a professional, allowing me to focus on aspects of my practice that lift me up, rather than on those that fill me with dread. In Judi Marshall’s words, the personal events I lived during 2020 made me want to be “dancing in beauty rather than fighting ugliness” (Marshall and Reason, 2008b, p. 64). The Miguel that was emerging out of this process of transformation was concerned with answering questions like for whom?, how?, and why? The kind of questions that tend to get demoted by subliminally binary positivist approaches to science. I was always a social character, but the social element of my personality only became an important element in my inquiry as a result of the

DProf. Now co-creating and co-involving are now priorities for me, and they influence the way I see knowledge as a journey through which it evolves, thereby acquiring its full significance.

As I wrote recently in my contribution to one of the 11 case studies featured in Professor Brian Sutton's book "Informal Learning, Practitioner Inquiry and Occupational Education: An Epistemological Perspective":

"Knowledge can be seen as competence or ability (Lehrer, 2018), as acquaintance (direct knowledge of certain things or people thanks to his previous experiences with them) (Martens, 1992, Viale, 2013b), or as propositional (recognition of information to be correct) (Shope, 1992), I believe it needs to be translated in order to find its true meaning in context. "
(Loo and Sutton, 2020a)

As I mentioned earlier, the context I've written this thesis in has had a major influence in the tone of my narrative. Being the kind of social person who likes giving friends a hug, I was really affected by the isolation brought about by COVID-19 which, together with the fibromyalgia and the ADHD diagnoses (all of which are part of the big messy tangle that was 2020), managed to totally derail my original submission date by a whole year. Jasper Hunt, a Neuroscience PhD student at Oxford University, captures my sentiments about the turbulent coronavirus times exactly. Writing for *eLife* about being an early career researcher in a blossoming yet competitive field, Hunt (Hunt, 2020) tells us how "it is easy for the latent feelings of inadequacy associated with impostor syndrome to compound with the challenges of life during the COVID-19 pandemic" and

how when he wasn't as productive as he expected, these feelings quickly snowballed into self-doubt. "Why wasn't I working harder?", Hunt tells us he kept asking himself.

Perhaps he would have been comforted by the fact that I was asking myself exactly the same question several times a day for the best part of a year, often after 14 hours in front of the computer getting lost in a maze of potential different endings for every section in this manuscript, feeling as though I was Stefan Butler in Black Mirror's *Bandersnatch* (2020).

In retrospect, despite the duress, last year was most productive time of the whole DProf. Not because it allowed me to write material I was happy with, but because it provided me with the headspace to be more discerning and to pause, read it all several times, ditch most of what I had written, and either rewrite it or find ways to learn from it that would enable me to reuse it for papers or lectures in the future. I grew up in a humble household where we never wasted any food, and I tend to be the same with my writing. I keep every single scrap in files with names and versions that I scavenge ideas from every now and then when I'm in need of inspiration. Writing this thesis has been stressful because of the looming deadlines, but it's also been therapeutic. According to researchers from the Department of Clinical Psychology at the National Institute of Mental Health and Neurosciences in Bangalore, "therapeutic writing shows promise as an adjunct to psychotherapy in addressing emotion regulation", particularly in people with conditions that make it difficult to regulate their emotions (Sargunaraj et al., 2021). That's the case of people with ADHD. We don't walk around crying or laughing hysterically, but we are more affected by stress than neurotypical folk. Calling up Gillie Bolton's work again, in her wonderful book "The Therapeutic Potential of Creative Writing: Writing Myself" (Bolton, 1999b), she uses the expression "a page full of tears"

(Bolton, 1999b, p. 174) which I could really relate when I was engaging in reflexive writing process as a way to heal myself from the toxicity I was experiencing at work, which was completely overwhelming at one point. Tony Gillam, a Senior Lecturer in Mental Health Nursing at the University of Wolverhampton believes that “writing offers us a way of speaking without being interrupted” (Gillam, 2018, p. 113) and explains its value of storytelling in mental health practice. As I let myself go and gave into radical creativity, I remembered Adrienne Rich’s words in her “Notebooks on Poetry and Politics”: “every poem breaks a silence that had to be overcome” (Rich, 1995, p. 84). Writing has definitely helped me embrace uncertainty, and as I’ve navigated through uncharted waters I’ve been learning how to manage the dynamic relationship between my self-esteem and my anxiety about what others would think of my work.

6.3. The art of the incomplete

American artist Leonard Koren describes wabi-sabi as “the art of [the impermanent, the imperfect,] the incomplete (Koren, 2008, p. 7). *Kintsugi*, the Japanese art of “ceramic repair using gold lacquer, meaning that the fault lines are not hidden, nor merely accepted as blemishes, but rather are accentuated and made beautiful” (Lomas et al., 2017, p. 1735) revels in the splendour in the incomplete. I thought it pertinent to bring this up here because the beauty of a pot mended by *kintsugi* emerges from the chaos that was its breakage. Judi Marshall talks about representation as an important quality parameter in first-person inquiry. Am I presenting all the data that I want to present, or am I choosing to hide some of the narrative because of fear of criticism of sharing too much personal detail, or due to political implications that might leave me feeling exposed? (Marshall, 2004e, p. 321) Perhaps

yes. But if I try to hide the cracks in the pot so that it looks like new, am I not missing out on the emerging properties of those event that brought about the transformation? The aim of kintsugi is to integrate the imperfections, not to reject them, it's "a philosophy of life, rather than merely a craft; the process of healing, of being made whole, is encouraged, accentuated and celebrated" (Ben-Shahar, 2021, p. 12). Psychologists Tedeschi and Calhoun call "positive change that occurs as a result of the struggle with highly challenging life crises" (Tedeschi and Calhoun, 2004), a concept resonant with post-traumatic growth in neuropsychology (Garnefski et al., 2008, Ruini et al., 2014, Schievelde, 2009) which I believe helps to understand my transformation as a person and as a practitioner over the last 5 years.

Writing about person-centred healthcare in the Journal of Medical Humanities, Stephen Buetow and Katherine Wallis, researchers at the University of Auckland also reflect on how the *wabi-sabi* metaphor "*can motivate and equip people to embrace authenticity including flaws*", letting "*emotions of joy and sorrow intermingle, and using "advances in technology to flourish in accord with, rather than opposition to [their own] human nature"* (Buetow and Wallis, 2019), which is exactly what I've learned to allow to happen in my life, embracing discourses about equality rooted in constructivism and social feminist theory, influenced by what Canadian philosopher Charles Taylor describes as "ethics of authenticity". In a book by the same title, he shared his thoughts about how individuals arise within the context supplied by societies and how being authentic is not about discovering your true inner essence, but about discovering oneself through "languages" that are already there (Taylor, 1992). Much along the lines of Lévi-Strauss' *bricoleur* (Lévi-Strauss, 1968), adopting an attitude to research that sees living and writing as inquiry, I've discovered aspects of my true self that were there before but that I didn't know how to verbalise.

6.4. Did I answer my questions?

In order to answer that all-important question, it is worth my embedding my research question here. It's a long question, but I hope you'll feel I've answered it properly after reading this concluding section.

How can I become more aware of the complex processes of interpretation, reflection, and action I engage in as part of my professional practice so that I am able to theorise them, verbalise them, and, ultimately, transform them?

I started the DProf with the premise that, as a neuroscientist, I knew only too well how difficult it was researching the human brain. It is not easy or practical to take a sample of brain tissue to put it under the microscope. However, the ongoing bidirectional communication that goes on between the gut and that brain, which I discussed in detail in [“my Harnessing paper”](#) (Toribio-Mateas, 2018a), allow us to use gut microbes as proxy access to brain structure and function. This provides a paradigm shift in neuroscience (Mayer et al., 2014b), establishing the ground rules for a new field called “health neuroscience” that crosses the disciplinary boundaries of psychology, neuroscience, nutrition, behavioural and environmental science, to name but a few (Erickson et al., 2014).

I embarked my DProf journey focusing on the basic processes whereby bacteria and neurones go about their respective functions. With health neuroscience being “a hard science” I didn’t think there would be much room for interpretation in a DProf project based on that subject, but I was mistaken. And for all the wrong reasons. Of course, there’s no room for interpretation in reading the results of microbiome sequencing. If someone has 0.22% Lactobacillus as part of their microbial composition, that means exactly that. Not 0.21% or 0.23%. That’s why I thought it would be good to include some participant input in my original project proposal. In fact, I thought I was being pretty radical by doing that, but I was still deeply rooted in positivism and was only paying lip service to qualitative inquiry by considering using “a mixed methods approach”. The lens through which I was looking at science hadn’t yet accounted for the complex nature of professional practice, and my preconception of what constituted “rigorous scientific inquiry” was preventing me from thinking out of the box. It took me nearly 3 years to come to terms with the fact that core and the thesis projects were two separate but complementary pieces of work, and that they both contributed to demonstrating my doctorateness. That was an eye-opener to me to start with, but an even bigger surprise was to find myself looking directly into my own brain, taking a first-person approach to my inquiry.

This felt like a brave move that required me to have the guts to ignore my inner saboteur. I could hear the voices of peers in my head saying: “what is first-person action research?”. “Why are you doing qualitative research if we’re looking at the microbiome of people with anxiety?”. “Who is Laurel Richardson?”. It was scary at first, but just as when you dive into cold sea water, the shock feels much worse at first, then you start

acclimatising to the temperature to the point that you actually enjoy. Taking a deep dive into my own thought processes, assumptions, beliefs, and emotions, has made me realise of how much these pieces contribute to the success of my professional practice as a transdisciplinary practitioner surfing across the neuroscience and microbiology as subject disciplines. Looking back, I feel like saying to myself: “See? It wasn’t as bad as you thought!”. Not only that, I feel rather silly for not having taken the plunge before, but the DProf gave me the opportunity to explore research interests beyond those that my research colleagues would have expected me to be attracted to. Those who know me well would have probably seen me getting into Python programming to solve microbiome mysteries using bioinformatics. That’s probably the idea of Miguel that many out there have. And they’re actually not wrong because I do love that interface of science and technology. However, what the DProf journey has done to me at a personal level is to stop me from needing disembodied objectivity. It has put me in touch with my innate creativity as an individual, acknowledging that “reality is always someone’s reality, constructed in and through particular intentions and interests, and from particular locations on multiple networks of power relations” (Ellsworth, 1997, p. 179). The reason my move to first-person action research and narrative inquiry was scary was the fact that it took me a couple of years to stop seeing the hard and the soft sciences, the quantitative and the qualitative, the objective and the constructed as completely opposite ends of a spectrum that I couldn’t figure out how to reconcile. Immersing myself in the words of Donna Haraway or reading Polanyi’s works I could see *Mā* in action, enabling the coexistence of the dissimilar, harmoniously incorporating polar opposites as a vessel containing a mix of oil and water. And though the ongoing process of enculturation that I illustrated in [figure 37](#), I have learned to embrace being split

rather than torn. In Donna Haraway's own words, "the split and contradictory self is the one who can interrogate positionings and be accountable, the one who can construct and join rational conversations and fantastic imaginings that change history" (Haraway, 1988b, p. 586). And that's exactly what I have done, even though I set out to do something completely different. Now, what I would like to do with that newly acquired quality of being is to bring about change that goes beyond personal growth, translating it into making a difference for those around me in the real world.

I have been immersed in a number of collaborative, participatory research projects "in the field", which I have discussed extensively in previous chapters, whilst being completely absorbed in first-person inquiry "aimed at making an original contribution to knowledge" (Zuber-Skerritt and Perry, 2002, p. 171) by using writing as inquiry, the product of which is my thesis. I have created, absorbed and recycled knowledge by applying it to different settings in what Liu, Chai, & Nebus call "knowledge reuse" (Liu et al., 2013) whilst undertaking first-, second- and third-person action research across a wide range of organisational and professional activities. I have tried my best to demonstrate knowledge of the relevant academic contexts where I've developed my research by means of a wide range of projects, always striving to be rigorous and self-reflective (Pasmore et al., 2008). All of these are aspects of what Coghlan, Trafford & Leshem, Wellington, and other call "doctorateness" (Coghlan et al., 2019, Denicolo and Park, 2013, Trafford and Leshem, 2009, Wellington, 2013).

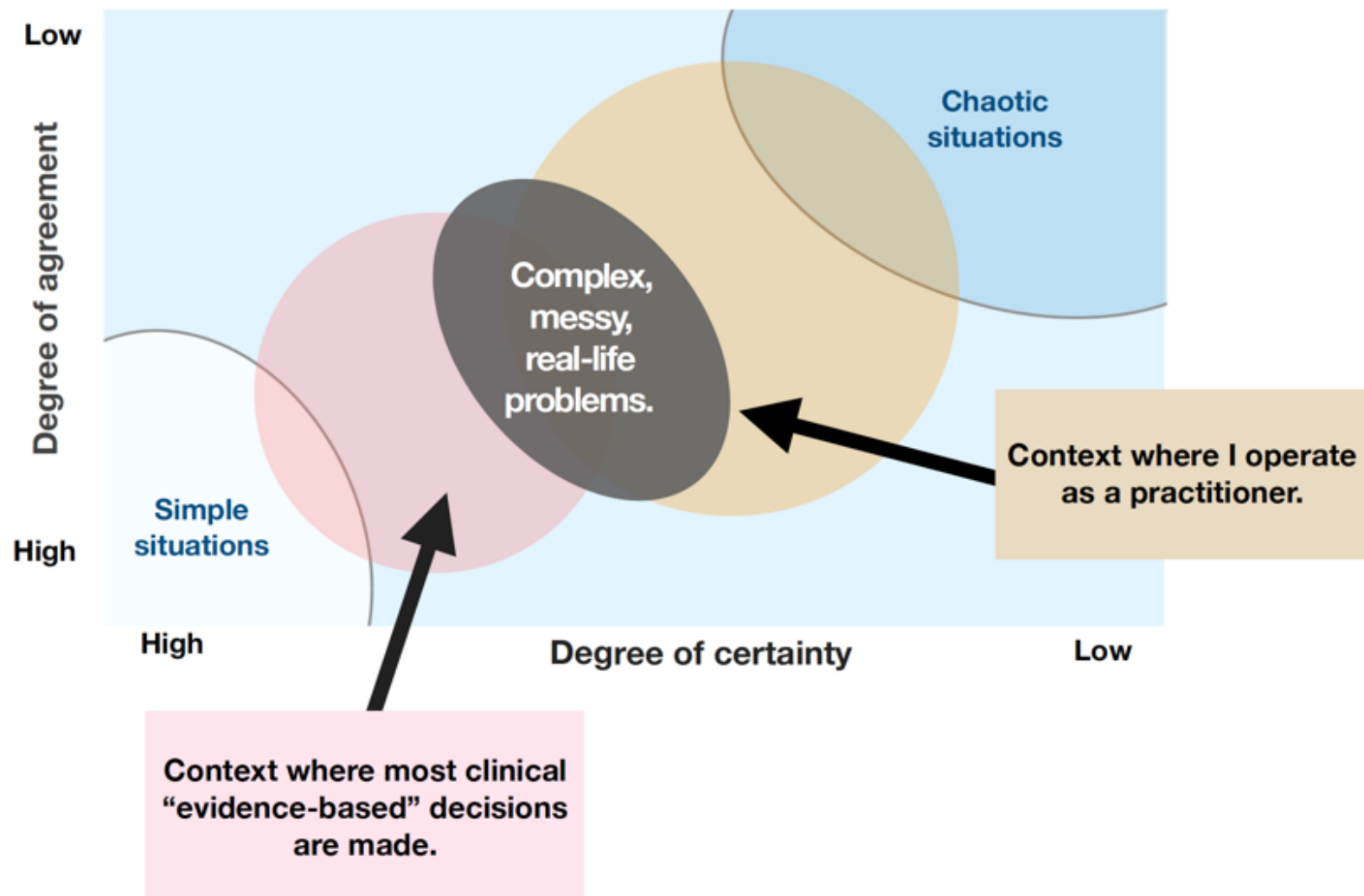


Figure 57. Agreement / Certainty diagram

A version of the agreement / certainty diagram I created in 2020 for my contribution to Lai and Sutton's book "Informal Learning, Practitioner Inquiry and Occupational Education" (Toribio-Mateas, 2020a) cf. (Stacey, 1999).

However, looking at the world through my own methodological lens has meant that I had shifted my focus from the core action research projects to my thesis action research project and, in doing that, have experienced the emergent property of developing a unique approach to transdisciplinary practice that I couldn't have imagined when I started my DProf. It is as if I had given myself permission to grow along two different paths that cross as often as they depart from each other. And that's OK, in a *Mā* kind of way.

As I mentioned in [chapter 1](#), real-world problems are messy and complex. Throughout my DProf journey, I have had plenty of opportunities to navigate entanglement and multiplicity, embracing non-dualism and non-linearity, and adopting my version of a Deleuze-Guattarian worldview, where *“all concepts are connected to problems without which they would have no meaning and which can themselves only be isolated or understood as their solution emerges (Deleuze and Guattari, 1994) (Deleuze & Guattari, 1994, p. 16), and “new concepts must relate to our problems, to our history, and, above all, to our becomings” (Deleuze and Guattari, 1994, 27).*

Getting lost in that entangled space between my field activities and my thesis writing, I have realised that I operate in a professional context where judgement / wisdom matters a great deal because the levels of agreement and certainty are not high enough for all stakeholders involved to be absolutely happy with just one single solution. I illustrate that in [figure 57](#). As a result of the DProf I have realised that my style of learning is organic, decentralised, and adaptive. I have still been able to capture the essence of the elements that I had set out to explore in my research proposal from 5 years ago, but I

have allowed for the new and the unexpected to emerge without shutting it down simply because I hadn't accounted for it. This has provided me with an equal amount of joy and hurdles that have made me reflect on the pros and cons of my own approach to research and practice. In the words of, Australian cultural theorist Claire Colebrook, I see myself as someone who's eager to make "random, proliferating and decentred connections" (Colebrook, 2020) across disciplines. Another contemporary researcher, art historian Felicity Colman, would probably describe my practice as rhizomic on the basis that it is characterised by making "connections that occur between the most disparate and the most similar of objects, place and people" (Colman, 2005).

Ultimately these reflections make me think about the nature of knowledge and how it acquires its true meaning through context, just as Nicolini's "practice-based approach" of knowledge is an essential ingredient to professional life that may be "enacted and reproduced in practice" (Nicolini et al., 2003). Recycling Hegel's words, "the ideas that we possess individually are utterly shaped by the ideas that other people possess" (Hegel, 1831). Just like plant rhizomes are shaped by their environment and are driven to find the best possible conditions in the surrounding soil for the whole plant to thrive, knowledge is embedded in social context and practitioners create and preserve knowledge through interaction within communities with shared practice interests, or communities of practice (Agrifoglio, 2015).

I have not gone about reconstructing experiences from times gone by so that I could uncover their past meaning. I have done it to build their current significance into my current professional practice, recognising “knowledge as that which is embodied and embedded” (Gibbs and Maguire, 2016) and “[*giving*] room for creative and innovative ideas to grow, [*allowing*] new values to emerge” (Gonokami and Nakanishi, 2020).

In the process, I have “[given] in to synchronicity, asking for what [I wanted], not flinching from where the writing [has taken me] emotionally or spiritually, and honouring the embodiedness and spatiality of my labours. [As a result, I feel transformed. I feel empowered to] challenge the grounds of authority, [which makes me experience [the intense intellectual pleasure, delight, or ecstasy that French call] *jouissance*” (Richardson and Adams St. Pierre, 2008, p. 1419).

So, have I become more aware of the complex processes of interpretation, reflection, and action I engage in as part of my professional practice, so that I am able to theorise them, verbalise them and, ultimately, transform them?

I would say my thesis is testament to the fact I have, yes. And it is the lens that I have constructed in order to transform my practice, as well as the narrative about my own transformation that constitute my contribution to knowledge and to practice. An additional outcome with high impact potential is my development of a refined creative edge in presentational knowledge that enables me to translate complex concepts into practical applications with use in real-world settings.

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