

Research report
November 2014

Neuroscience in action

Applying insight to L&D practice



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To increase our impact, in service of our purpose, we're focusing our research agenda on three core themes: the future of **work**, the diverse and changing nature of the **workforce**, and the culture and organisation of the **workplace**.

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Our focus on work includes what work is and where, when and how work takes place, as well as trends and changes in skills and job needs, changing career patterns, global mobility, technological developments and new ways of working.



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Our focus on the workforce includes demographics, generational shifts, attitudes and expectations, the changing skills base and trends in learning and education.

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Our focus on the workplace includes how organisations are evolving and adapting, understanding of culture, trust and engagement, and how people are best organised, developed, managed, motivated and rewarded to perform at their best.

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The CIPD is the professional body for HR and people development. We have over 130,000 members internationally – working in HR, learning and development, people management and consulting across private businesses and organisations in the public and voluntary sectors. We are an independent and not-for-profit organisation, guided in our work by the evidence and the front-line experience of our members.

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Introduction

Background to the research

This report forms part of the CIPD's programme of research exploring how findings from behavioural science are influencing the HR and learning and development (L&D) profession. Here, we specifically review how insight from neuroscience is being used by organisations to inform L&D practice. The ideas discussed broadly connect to the use of neuroscience to:

- inform learning/change management design
- enhance learning/leadership development content.

The report is relevant for L&D and HR professionals who are interested in hearing how other practitioners have used neuroscience to improve L&D efficiency and effectiveness. In much existing research there is an absence of real-life examples of neuroscience in practice. Our hope is that this report begins to fill this gap to provide a starting point and a little inspiration for L&D practitioners.

We first started to explore this area in recognition of the widespread business need to drive more

efficient and effective L&D in organisations. The CIPD *Learning and Talent Development* annual survey report 2012 (CIPD 2012a) found that levels of awareness of new ideas and concepts from areas such as neuroscience, cognitive research and behavioural science were extremely limited. We subsequently published *From Steady State to Ready State: A need for fresh thinking in learning and talent development* (CIPD 2012b) to explore the benefits and drawbacks of traditional models, and highlight newer approaches. In February 2014 we then published *Fresh Thinking in Learning and Development* (CIPD 2014a), a series of three reports sharing expert analysis in:

- neuroscience and learning
- cognition, decision and expertise
- insight and intuition.

In 2014 we revisited this topic in the *Learning and Development* annual survey report (CIPD 2014b), finding that while awareness of insight from neuroscience and other behavioural sciences has increased since 2012, integration into practice remains low (Table 1).

To help address this challenge and support the transition between awareness and integration, we have now conducted case study research to explore how organisations have used neuroscience to inform L&D practice. The research was conducted between June and August 2014, with eight case study organisations (Table 2). Interviews were held with senior L&D and HR professionals, along with a range of independent practitioners with expertise in this field. We also held interviews with two employees who have attended leadership development programmes informed by neuroscience. In addition, we held a focus group with members of the Saltbox Trainers' Exchange Group.

Some of the organisations profiled are just at the beginning of their journey, while others are more advanced in their knowledge and application of neuroscience. However, they all share a common commitment to evidence-based practice and a willingness to share their experiences with others. In many cases practitioners have blended findings from neuroscience with other aspects of behavioural psychology and, where relevant, these examples have been highlighted.

What is neuroscience?

Neuroscience is the scientific study of the brain and nervous system. In the last 20 years there have been significant advances in the field because of technological developments, such as functional magnetic resonance imaging (fMRI) technology. This enables scientists to accurately depict brain activity through changes in blood flow. Many neuroscientists and practitioners have now started to explore how the key findings from cognitive and behavioural neuroscience translate to individual behaviour and learning within the workplace. This is an emerging, but rapidly growing, field.

Report overview

The report is organised into five sections. Following the introduction we explore views on why neuroscience is relevant and the level of awareness and interest among the L&D community. We then discuss how our interviewees have built up their knowledge. Section 3 provides an overview of the connection between neuroscience and L&D, and shares eight case study examples of how organisations have used neuroscience in practice. We then explore the impact of using insight

from neuroscience, including the benefits and challenges. Section 5 provides practical 'how-to' guidance, ranging from how to land new ideas in the business, to how to know what information to trust. Our findings are summarised in the concluding section.

It is important to note that the aim of this report is not to discuss key neuroscience concepts in depth, rather to highlight how others have used the findings to inform their practice. For those that are interested in expanding

their knowledge, our *Neuroscience and Learning* report (part of the *Fresh Thinking in Learning and Development* series (CIPD 2014a)) provides a key source of insight. We have also included three additional resources in the Appendix: a summary of five key neuroscience findings relevant to L&D practitioners, written by Dr Paul Howard-Jones; a list of books recommended by our interviewees; and a glossary of key terms used within the report.

Table 1: How aware are you of the following developments and do you integrate the knowledge associated with these into practice (% of L&D/OD professionals) (CIPD 2014b)

		Aware. I consider myself conversant and integrate into my practice	Aware but don't use in my practice	Aware but don't fully understand	Haven't heard of these	Don't see the relevance of these developments
Neurochemistry of learning (for example brain make-up, the role of the myelin sheath)	2012	0	10	17	69	3
	2014	6	23	35	32	4
Brain plasticity (the idea that brain circuitry changes through experience)	2012	3	18	30	46	2
	2014	12	19	34	31	3
Learning through 'deep practice' (for example the idea that 10,000 hours of learning and practice are needed to reach a stage of intuitive problem-solving)	2012	6	15	20	58	2
	2014	13	27	25	32	3
Generational changes in brain function which may affect learning (such as those occurring in younger and older learners)	2012	7	31	30	27	5
	2014	13	33	30	21	3
Cognitive issues around decision-making, such as type 1 and type 2 thinking	2012	8	31	41	20	1
	2014	16	25	37	21	1
Using a 'mentalising system' (how we process signals we receive from other people and how this can affect social learning)*	2012	–	–	–	–	–
	2014	16	22	25	34	3
Unconscious thought theory (problem-solving through our intuitive mind, when we're not actively trying)*	2012	–	–	–	–	–
	2014	18	22	31	28	3
Learning states during game-based learning	2012	16	25	26	32	2
	2014	24	23	23	27	3
The correlation between physical exercise and increased learning performance	2012	19	38	23	18	2
	2014	25	33	23	17	3
How human reasoning and logic affect how we learn (for example, cognitive thinking traps and illusions)	2012	13	22	27	36	2
	2014	25	23	29	21	2
Developing 'mirror neurons' to help embed learning (for example through role-modelling)*	2012	–	–	–	–	–
	2014	27	16	21	34	3

*Not included in 2012

Table 2: Case study organisations

Organisation	Who they are
Allens	Allens is an international law firm with offices throughout Australia and Asia, providing clients with access to leading lawyers and resources covering all commercial issues. The firm works with many of the world's leading organisations – including 55 of the world's top 100 companies and more than 75 of Australia's top 100 companies.
BT	BT is a major provider of telecommunications networks and services in the UK. It is also an established global communications company serving customers in more than 170 countries. BT provides services to corporate and public sector customers with operations across the world in a wide range of sectors.
Fitness First	Fitness First opened its first club in 1993 in Bournemouth. It now has 377 clubs in 16 different countries and is a leader in the global fitness industry. Its philosophy is to offer the best equipment, range of classes, knowledgeable staff and professional advice in a welcoming environment that helps keep members motivated.
Imperial College Healthcare NHS Trust	The trust is made up of Charing Cross, Hammersmith, Queen Charlotte's and Chelsea, St. Mary's and the Western Eye Hospital and is integrated with Imperial College to form the UK's first academic health science centre. Imperial is one of the UK's largest acute trusts, with an annual turnover of £800 million, 10,000 employees and 1 million patient contracts a year.
SABMiller	SABMiller is a British multinational brewing and beverage company headquartered in London. With a history stretching 120 years, SABMiller is now one of the world's largest beverage companies. It has 70,000 employees based in more than 80 countries, from Australia to Zambia, Colombia to the Czech Republic and South Africa to the USA.
Unum	Unum is one of the UK's leading financial protection insurers, selling income protection, critical illness cover and life insurance. It insures 47 of the FTSE 100 and at the end of 2013 Unum protected almost 1.6 million people in the UK. It has offices throughout the UK, with headquarters in Dorking, Surrey.
Volvo	The Volvo Group is one of the world's leading manufacturers of trucks, buses, construction equipment and marine and industrial engines. The group employs about 110,000 people, has production facilities in 19 countries and sells its products in more than 190 markets. The company is headquartered in Gothenburg, Sweden. In the UK it operates Volvo Trucks, Renault Trucks, Volvo Financial Services, Volvo Penta, BRS Ltd, Roadcrew and Volvo Business Services.
Welsh Ambulance Service NHS Trust	The Welsh Ambulance Service NHS Trust covers an area of 20,640 kilometres and serves a population of 2.9 million. They attend more than 250,000 emergency calls a year and transport over 1.3 million non-emergency patients to over 200 treatment centres throughout England and Wales. The trust employs over 3,000 people, predominantly working in the clinical contact centres and providing community and emergency mobile services.

1 The value of neuroscience to the L&D community

'Many spoke about the ability of neuroscience to help guide, inform and validate L&D methodology.'

This section explores practitioner views on why neuroscience is useful, and the extent to which findings have been used in practice.

The value of neuroscience

Our interviewees have varied backgrounds, but they all share a common interest in neuroscience and are keen to highlight the value it can bring:

'I really believe it could transform the way that organisations perform, and how individuals are within those organisations in a more sustainable and fundamental way than we have seen in L&D before.'

Susan Grandfield

Catherine Cuffley feels that it will continue to grow in importance: *'I think everyone will need a basic understanding. This will almost be like a passport to learning and development.'*

Three main reasons were expressed by our interviewees for why neuroscience is relevant.

1 An evidence base for practice

Many spoke about the ability of neuroscience to help guide, inform and validate L&D methodology:

'Most L&D people that I know at the moment are very excited about neuroscience, because it gives them the evidence base for a lot of the things that we already know. Combining practical experience with science is very powerful.' **Jacqui Grey**

'I think the joy of neuroscience is that because it's very scientific

in its application, it's very easy to do two things. One is to make a business case for learning by using the science behind it and the second is that the human impact can be measured.'

Samantha Rockey

2 A tool for reflection

Some practitioners describe neuroscience as an effective tool for reflection. By comparing the findings with your own practice, this encourages deeper evaluation and questioning of existing practice. This can mean validating well-trodden paths, and therefore building a stronger evidence base, or for some organisations this might result in more fundamental change:

'If you are in an organisation that is excited and thinking about doing things differently, then this stuff probably isn't that revolutionary to you; it's just another thing for you to get your hands on. For us, it's the small stuff, "Have we thought about how people learn? No, we have only thought about how we train." That's big. That is culture-changing stuff in terms of thinking about how people learn.'

Karen Bailey

It can also help build confidence and help provide a 'licence' to try something new:

'I feel more confident now to explore things at a deeper level. ... To encourage people to really feel what they're feeling as well as what they're thinking, as I understand the impact feelings have on how our brains work.'

Susan Grandfield

3 A way to break down barriers

Some of the interviewees reflect on the power of neuroscience to help facilitate more effective cross-culture working:

'Neuroscience is really helpful because brains, to a degree, work in much the same way. It doesn't matter whether you're from Peru, Sweden or Italy, actually the whole way a brain functions, whether it is to do with training, learning or whether it is to do with leadership, it's much the same for most people across the world.' **Stella Collins**

Karen Bailey of Volvo explains how this helps in practice:

'We are a very multicultural business with many different brands with different histories and cultures. In the Volvo Group we have the Swedish culture, which is very inclusive and collaborative, but we also have the French culture, and trying to understand both cultures and how they interact is quite tricky. Actually looking at them from a brain level is quite helpful in

terms of, "Why do we have those patterns of behaviour in those organisations and how do we bring them together?"'

The awareness–application gap

Increasing awareness

Findings from neuroscience are increasingly referenced in the media in various forms, and many popular science books now provide simple explanations of complex concepts. But how much is this proliferation of material translating into increased awareness?

Many of our interviewees express concern that knowledge is still very limited or partially misunderstood:

'Most people know more about how their car works than they do about how their brain works. It's really odd that we could go through life, where people know every other component of business that they need to be on top of, but they haven't invested time on the whole into really understanding how their brain and their mind works.'

Amy Brann

'It always surprises me that people in a learning and development function don't spend more of their time working out how people learn. For me it's fundamental for our profession.' **Beverley Aylott**

Gary Luffman reflects on his knowledge of neuroscience to help explain this:

'If you haven't heard of neuroscience before, unless you are forced to perceive it, and how it can be of value, then you don't tend to think about it or seek out that kind of knowledge.'

However, some do feel that the tide is turning and this does reflect the findings of the CIPD *Learning and Development* annual survey report 2014 (see Table 1, page 4):

'We've seen a big shift this year. Suddenly people are more interested.' **Jan Hills**

Even in Peru, where, according to Nolly Cole, HR and L&D practice is still developing, *'people are eager to learn, eager to put it into practice and eager to use it.'*

Isn't it all just confirming what we've known all along?

A common critique is that the findings from neuroscience are simply confirming what practitioners knew all along. It is certainly true that many of the interviewees feel that neuroscience had helped to confirm their intuitions or validate their practical experiences. However, they also explain that this validation can be extremely helpful in increasing confidence and organisational credibility. Many also speak about neuroscience as a tool to open up new perspectives and facilitate different discussions within the organisation.

Others highlight that while on the surface some of the findings may not appear to present brand new information, many organisations would benefit from assessing their existing practice in more depth.

Some describe neuroscience as an evolution, rather than revolution, reflecting the value of existing knowledge gained through behavioural psychology.

In reality the impact of the findings will differ depending on your existing L&D practice, but they are relevant for all in encouraging greater evaluation and reflective practice, and facilitating increased professional credibility.

Ultimately we believe that a greater focus on quality evidence from a range of sources, including neuroscience, will inform and shape practice – both what you do and how you do it – to drive greater L&D efficiency and effectiveness. It has the potential to challenge accepted ways of operating, which may be outdated or irrelevant in today's modern workplace, and put new techniques, ideas and insight on your radar.

‘While there may be an increasing awareness of neuroscience, there is still a gap in practical application.’

Some put this down to advances in technology:

‘The difference is that there is fMRI technology now, so you can see what’s happening in the brain. So that’s what’s given it credence to the people who, maybe, wouldn’t have listened before.’

Focus group participant

Practical application

While there may be an increasing awareness of neuroscience, there is still a gap in practical application:

‘There is a gap between L&D practitioners being interested in neuroscience generally and understanding the really widespread application of the concepts into everyday leadership practice.’ **Jacqui Grey**

Jan Hills explains that in conducting her own research, she was shocked to find *‘how little organisations are using it, much less than we thought and they’re using it in a very narrow way. ... As a profession we need to be a bit more willing to keep our own skills up.’*

Some feel that knowledge and application differs across the profession:

‘In my experience there seems to be more awareness within the independent trainer and consultant community than there is within the in-house learning and development and HR communities.’

Nicki Davey

For those that have started to apply neuroscience to practice, many have taken a blended approach:

‘We believe that a full understanding of how the brain and how the mind works encompasses many disciplines of which for us neuroscience is a really central one. But we also draw upon psychology, behavioural sciences and so forth.’ **Amy Brann**

‘My job is not researching neuroscience or being a neuroscientist. My job is to help the organisation learn better. There are lots of things that are involved in that and lots of bits of the jigsaw that need to be in place for it to work. This is one strand of that you drop into place at the right time.’ **Karen Bailey**

This highlights an important point. Our interviewees have not tackled neuroscience in isolation. They’ve drawn insight from a range of disciplines to help inform their L&D practice and drive greater effectiveness.

2 Developing neuroscience expertise

In this section we share why our research participants first developed an interest in neuroscience, and how they have built up their knowledge. Our aim is that this may provide ideas or inspiration to others who are keen to learn more.

Sparking interest

Our interviewees all came to be aware of neuroscience through different routes. For many this was connected to a commitment to their own continuous learning and development:

'Learning new topics and understanding is one of the things that makes me tick.' **Linda Bradley**

'Part of what we do as a learning and development team, or what we should do, is to go out and find better practice.'

Beverley Aylott

Having an initial curiosity for the topic often meant coming across materials or events and developing a deeper interest. Many highlighted David Rock's work as influential:

'I came across brain research and it was David Rock's book Your Brain at Work that inspired me to explore this further.'

Catherine Cuffley

Others studied a related discipline at university, which sparked an interest:

'In my undergraduate psychology degree I chose to concentrate on biological psychology, which was all about brain physiology and how it all worked, which I loved.'

Gary Luffman

The interviewees frequently describe having a desire for a greater evidence base, often stemming from an early interest in areas such as mindfulness, positive psychology and neuro-linguistic programming:

'When I first began in training I came across a company that did accelerated learning – as soon as people started saying, "This is the way to do stuff," I suppose as I have a science background, I was asking, "Well, how do you know that? Where's the evidence for that?'" **Stella Collins**

In some cases exploring neuroscience was related to a clear business need:

'I was looking at how we supported the shift in mindsets and behaviours that our new career framework requires. Our traditional approach to development wouldn't have created the necessary results, and neuroscience gave me a clear framework for creating the change we needed.' **Jane Lewis**

Building up knowledge

Our interviewees took four main routes to build their knowledge of neuroscience.

1 Reading material

Books, articles and journals were most frequently referenced as tools for igniting an interest in neuroscience and enabling continuous learning:

'I am reading every white paper I get my hands on.' **Karen Dunn**

'Books, articles and journals were most frequently referenced as tools for igniting an interest in neuroscience and enabling continuous learning'.

'Twitter and LinkedIn are cited as great tools for connecting with like-minded professionals and with experts in the field.'

2 Formal qualifications and training

Some feel that completing a qualification or attending a relevant training course is important:

'I think it gives you increased confidence in your knowledge. You can read books and articles and that is very helpful, but learning directly from a neuroscientist or someone very knowledgeable about the topic really deepens your understanding. One of the key aspects of any training is learning how to apply the knowledge.'

Catherine Cuffley

3 Face-to-face networking

Many of the interviewees also describe how helpful networking events and conference sessions are in helping them discuss neuroscience findings with others:

'I'm part of a university journal club, so each week we read [research from] neuroscientists, psychologists, and behavioural analysts.' **Amy Brann**

4 Social media and technology

Twitter and LinkedIn are cited as great tools for connecting with like-minded professionals and with experts in the field. TED Talks are also highlighted as very useful:

'On a day-to-day basis, I find Twitter incredibly helpful.'
Stella Collins

Access to information

There is now a plethora of material available about applied neuroscience, meaning that it's easier than ever to expand your knowledge.

In this report we provide two sources of information in the Appendix to help you get started:

- 1 an article exploring 'Five "no-brainers" from neuroscience research', by Dr Paul Howard-Jones
- 2 a list of books recommended by our research participants.

3 Using neuroscience in practice

In this section we provide an overview of how our research participants have connected neuroscience to L&D practice. We also share eight case study examples of how organisations have used findings from neuroscience to inform L&D interventions.

Building self-awareness and personal effectiveness through knowledge of brain physiology

Many of our research participants have found it helpful to understand how the brain is structured. Catherine Cuffley explains how knowledge of brain development can promote greater self-understanding:

'We have a reptilian brain (responsible for basic bodily functions such as breathing); a limbic brain (responsible for social behaviours, emotion and memory) and we have the newest and most advanced part of the brain, the neocortex (responsible for our cognitive functions). I think understanding the different functions and stages of brain development is useful because it explains how we can be such intelligent animals and yet we can get so emotional.'

Having an appreciation of brain physiology is also connected to enhancing brain effectiveness, for example through exercise and sleep (see Appendix 1).

Neuroplasticity (which explains how the brain's structure can alter throughout life) is also frequently cited as a great concept for sharing with learners. Susan Grandfield explains how this knowledge

altered her approach in a coaching situation with a client seeking to enhance his creativity:

'I talked to him a little about neuroplasticity and how it is like training a different muscle from the one you have been used to using, so that it becomes stronger. If you do it often enough, you create new neural connections. So in the last couple of sessions I've said to him, "Right, I want to completely flip your thinking on its head. Any time you hear a very logical, rational, question coming into your head, thank it and then park it. Then just go back to, "What could we do? How do I feel about it? What feels right?"' Getting him to ask himself questions that were very different from what he's used to was so powerful in terms of helping him generate new ideas, create insights that he hadn't seen before and as a result increasing his confidence. Now he is returning to each session saying, "Wow that's amazing. I came up with all this new stuff."

The following two case study examples, from Fitness First and the Welsh Ambulance Service NHS Trust, explore how neuroscience can be used to enhance brain functionality and self-awareness to increase personal effectiveness and business performance.

'Having an appreciation of brain physiology is also connected to enhancing brain effectiveness.'

Reinventing Fitness First

During the last two years Fitness First has undergone a significant business and brand transformation. As Niall Cluley, Global Head of Learning and Development, explains:

'We've been on an extensive mission to really understand what members want, why ex-members left. What would make them consider joining us again? That really prompted very scientific research into the attitudinal drivers, and the reasons that people join a gym.'

This new scientific focus also extended to people development, resulting in a specific focus on coaching to support the move *'from being a very sales-led culture to a service-led culture, and build the right skills, behaviours and a platform to grow globally'*.

Niall explains how his knowledge of 'brain-friendly' learning was critical to this process:

'I think for me the cornerstone moment was establishing some brain-friendly learning principles that were based in science. ... So shifting away from trainer-led to facilitator-led.'

This evolved into *'further work on understanding how the brain works, and how to be more effective at work'*.

The principles in *Brain Rules* by John Medina provided a great source of inspiration:

'We had sessions with our management teams around those principles. What do they mean to all aspects of work and our employees' experience, and how they were leading our teams? So that was for me where you could see a real fundamental shift, not just in the learning style which we'd started, but then suddenly actually the importance of changing the format of meetings and briefings, of eating better, promoting better sleep.'

Fitness First has also launched a programme called 'Raising the Bar', developed with Mind Gym and Loughborough University. The programme uses insight from behavioural psychology to help people explore *'how do we make sure we meet the right human motivational needs, in the experience that we deliver, the environment we deliver and then the coaching that we provide to our members? ... We're really trying to make the link in terms of helping our teams understand these concepts, and what they mean to them every day, in the context of a new set of values.'*

Niall explains how all these initiatives are impacting the business:

'We've been on a cultural change journey for the last three years, but really it's all coming together now that the rebranding is happening. It's great that the message that we're putting out on the rebrand is about psychology. It's about science. It's about understanding what our members want and that we are developing the expertise of our teams, and the employee experience, to make sure we can present and deliver an experience that people go, "There's something different about the energy in Fitness First, the support you get, the coaching that you get."'

There have also been tangible improvements in people metrics, with turnover reducing from over 100% to under 40% in some parts of the business. Engagement levels have also significantly increased (Fitness First has moved from being a Best Companies 'one to watch' to very close to a two star organisation in two years). Niall describes the impact this is having:

'Our net promoter score has gone up 15% through the rebrand. There are lots of factors involved with the customer perception, but we definitely have seen a link in all the key enablers for that, so more stable teams, better skills, with higher levels of engagement.'

And the journey hasn't ended yet:

'We have aspirations to really go up the ladder of expertise on motivation, coaching, psychology, because we think that's a cornerstone. That's what makes us different in how we can deliver service. So we've got to do more with our teams. For me actually I'm hungry to learn more about where we go next. How can we use neuroscience further to shape our direction?'

Focusing on movement at the Welsh Ambulance Service NHS Trust

The Welsh Ambulance Service is transitioning from being an A to B transport system to having a greater focus on quality and more decision-making capacity for clinicians. James Moore, Assistant Director of Organisational Design and Development, is responsible for initiatives which develop the culture that delivers this change.

James has used knowledge of how exercise and movement can improve brain functionality to inform his approach and support this cultural change:

'The neuroscience says if you do some exercise, if you don't just sit still in your meetings and in your work life, it will really help you be more effective.'

This perspective has influenced his executive development and meeting management techniques:

'In development sessions we encourage people to move around. Then in any meeting, especially where people want to get better results, we always encourage people to say, "Look, if you're getting the same results it's not working for you, move and try a different seat.'"

This approach extends to coaching:

'If you're doing a coaching meeting with someone, go for a walk together. The issue is out in front of you, it's not between you, it's not facing off, and it's not a barrier between you. A walk builds on the whole analogy of losing a problem and arriving at a solution.'

The trust has also used insight about attention to review how they share information:

'PowerPoint presentations have now lost most of their words and have just got pictures in, because we know that's a more effective way of connecting.'

James explains that these new techniques are having a direct impact on workplace effectiveness:

'People are reporting a far higher effectiveness by having a break in the afternoon and just going for a walk and meditating or sleeping. ... What's great is being able to say, actually because it makes us more effective and because it makes us more impactful in our learning and our relationships, it's a really critical part of our strategy.'

He's also frequently hearing examples of the practical benefits. One team reported having 'solved an intractable problem that hadn't been solved for 20 years' as a result of taking time out for a team walk and holding a meeting outdoors.

These results have convinced James of the need for change in L&D practice:

'I think there's a huge step up for HR and L&D people to be less controlling, less parental, less rescuing and far more about facilitating and coaching by really understanding and using evidence.'

James has also developed a programme called Explore and Walk, funded by the Welsh Government, which incorporates insight from neuroscience and mindfulness. It has been attended by over 150 delegates working in the Welsh Public Services in the past 18 months.

As James explains, the aim is to use exercise and movement to help people understand more about 'how they feel, but also how other people feel, and therefore be more impactful'. It is designed to support delegates to form sustainable, agile working practices, enhanced creativity, and self-awareness, while enabling others to do the same.

Feedback has been resoundingly positive, with one senior nurse stating that it was 'probably the most challenging – as in taking me out of my comfort zone – but probably the best course I have ever been on'.

'The more you know about the brain from a neuroscience point of view, as well as a psychology point of view, the more you can do to remove blockers.'

Developing a new lens for managing change by understanding the brain's threat response and the importance of habit formation

Many of our interviewees have explored how the brain responds to threatening situations to inform change programmes. Gary Luffman thinks that having an understanding of neuroscience is essential for leading change:

'The more you know about the brain from a neuroscience point of view, as well as a psychology point of view, the more you can do to remove blockers, and you can stop putting things in place that are going to cause threats.'

Linked to this threat response is habit formation. Our brain likes to work within established patterns and routines, firstly because this is less energy-intensive, and secondly because deviations from habit can

be perceived as threats to the brain's tried and tested modes of operating – modes which may have kept us 'safe'. As a result habits can be very hard to change. Jan Hills feels that habit formation is a critical concept for L&D practitioners to understand, particularly in the context of changing behaviours:

'I think some of it is people knowing or learning that they can change their habits or beliefs. ... Then how do you then give people the best chance of maintaining that when they go back to their normal job? So things like having a buddy, having reminders, knowing what the reward is they're going to get for the new behaviour. Those sorts of things are really important.'

The following three case studies, from Allens, BT and Unum, identify how insight from neuroscience can be used to inform change initiatives.

The SCARF Model

The SCARF Model (Rock 2008) is frequently referenced by our research participants as a helpful tool for applying insight from neuroscience to practice, particularly to support change management initiatives.

Developed by David Rock, SCARF is designed as a tool for gaining greater understanding of human behaviour, and is based on insight about how the brain responds to threat and reward. It stands for:

- Status
- Certainty
- Autonomy
- Relatedness
- Fairness.

Leading behavioural change in Allens

In 2012 Allens started to explore how they could transform their career proposition in response to changes in the marketplace and client needs. As Jane Lewis, People and Development Director at Allens, explains, *'this led to us embarking on a project where we are changing every element of our career progression and talent management processes.'*

The first step of the project was to review and agree a new career framework, resulting in a move to a competency-based model:

'We needed [lawyers] not only to be technical experts, but to engage with the client, the market and the business in a much more proactive way. In return we needed to deliver a clearer career path and be much more engaged in helping our lawyers to manage and progress their careers.'

Step two involved identifying key behavioural and cultural changes and the process needed to support this shift. Jane describes how insight into how the brain responds to change helped her consider questions such as, *'how might this change be triggering a threat response for people, and how do we mitigate that? Are there opportunities, for example, to involve people in a consultation process, for example, or give them a role in leading a particular aspect of the process, to increase the reward response?'*

Attention has now turned to learning and development methods, and the team are working with Jan Hills of Head Heart + Brain:

'Over the last few months we've been looking at how we need to change our approach to learning, in a way that takes account of the neuroscience principles in terms of how people learn, and applying that to everything that we do.'

Jane continues to explain why this is so important:

'About half of the competencies in our new career framework were either new areas of focus, or had much greater significance, compared with the previous framework. That change necessitated a very sharp focus on what we were doing from a learning and development perspective.'

This has resulted in increased focus on building core competences:

'All the neuroscience research indicates that if you focus on core skills and talk about things consistently, it's much more efficient from a learning perspective. You're not "distracting" the brain from learning new skills by constantly talking about things in different ways.'

The programme design has also been altered to incorporate more opportunities to practise applying new skills and provide more time for reflection. Jane shares how in upcoming sessions, *'we're going to be teaching lawyers about how they learn, and the deliberate process they need to go through in order to develop new habits. We want to empower them to be a much more active participant in the learning process.'*

There will also be a move from *'learning being an event, to learning being a process'*, with greater emphasis on pre-work and post-event reinforcement.

While it's too soon to share full results, Jane feels strongly that this new approach will create *'a much more powerful learning experience'*. She also reflects on the positive stakeholder response:

'In response to a recent development programme that incorporated neuroscience principles, one stakeholder said, "the impact on the participants was incredibly positive. ... It has driven the exact behaviour we have been looking for. I am also starting to see a shift in the lawyers they are working with.'"

Transforming leadership at BT

BT has embarked on a programme of work to transform the leadership style across the business. Hugh Hood, Director of Organisational Development at BT, explains why:

'The character of business has changed and the objectives of the business have changed with increasing rapidity in the last decade. ... We're changing from a more bureaucratic approach, which worked when the product didn't change for years at a time and there was, for much of our history, very little competition because it was publicly owned. In that environment a planned, procedural, bureaucratic culture of management and leadership may be quite effective, but that's not the environment that we're in now and it won't help us to achieve our goals as an organisation. We've set out to change that. We're looking at changing behaviour as well as knowledge and skills over a period of a number of years.'

BT initially focused on developing the executive committee and the top 300 leaders, using principles from neuroscience to inform the approach:

'Neuroscience was one of the things that we chose to expose our leaders to.'

One of the key concepts shared was the importance of social connection, and the relationship between seniority and perception of threat. Hugh shares an example:

'If you want people to influence or think through complex challenges, you need to pay attention to how you set up each interaction. You may need to play down being the boss, you need to be aware of your impact and be in enough self-control to decide how you can and want to react to get the right result.'

Aside from incorporating neuroscience into the content of leadership development programmes, BT has also used it to influence the design:

'We looked at neuroscience when we were structuring learning experiences, for example how much people will take on, creating an "aha" moment of inspiration, making it social, the amount of reflection that they need to consolidate learning and so on. ... Most of the time was dedicated to reflection in small groups, in planning and practising and turning what they'd heard into personal sense, skills, and plans.'

Hugh explains that this approach was based on *'learning about the conditions under which the brain makes new connections and how you reinforce those connections'*.

Hugh recognises that embedding behavioural change will take time:

'Leadership practice or a default behaviour is a habit, and habits happen unconsciously. They're very easy to do. So to change a habit requires a lot of cognitive thought and attention, which takes a lot of energy. So it's about giving people easy ways to do that, and having opportunities to practise over a period of time.'

There are also challenges, related to the brain's in-built threat response:

'If a pattern of behaviour has made you successful, has got you to a senior position in the organisation, then changing that is subconsciously very threatening.'

However, Hugh is already seeing tangible results, through closely measuring behaviour change and correlating this with business performance:

'We're seeing where it's working, what's working and where our hot spots are. ... Where behaviours have changed we've seen a difference in business results, which is really interesting.'

BT is now continuing to embed the new leadership style throughout the organisation through a range of interventions.

Transformational change at Unum

Karen Dunn, Interim Head of Talent and People Development, joined Unum in February 2014 to support a major change programme designed to re-engineer the business through a new operating model. The scale and importance of the new strategy meant that taking a new approach to change management was a necessity.

Working with an external consultancy, Karen developed a leadership programme designed to support people through the change, using concepts from neuroscience and mindfulness to encourage leaders to build greater self-awareness:

'The total effort and energy was based around understanding self and the physiology of self. Really getting in touch with our emotions; exploring the fight, flight, freeze for ourselves. ... We spent a lot of time talking, getting people to connect in with themselves around when they recognise their anxiety triggers and how that then manifests itself in behaviour.'

The concept of 'certainty' was also used in the programme as a frame for understanding resistance to change. Delegates were encouraged to explore questions such as:

'How are we responding to ourselves and others through that desire to require certainty? How does that anxiety button pulse up when we can't get certainty? And how do we reflect and turn that dial down? So how do we recognise that in others and how do we recognise it in ourselves?'

The programme also enables delegates to explore the impact of their behaviour on others. Karen shares an example of one of the concepts used:

'Just really simple stuff like how the brain can't differentiate between physical pain and emotional pain. We talk about that and say, "So actually the words that you use and the way that you speak with people can have as big an impact as if you trapped your hand in a car door."'

Karen is evaluating the impact of the programme using emerging change principles:

'What we are going to do is notice things in the moment that feel different and right, that are leading us towards the end goal. We have been collecting stories about what it used to be like and what it is like now. ... Therefore what's the swell in the organisation culturally?'

‘Neuroscience is powerful in considering how we structure learning.’

Using insight about how the brain learns, forms memories and responds to emotion to inform learning design and delivery

The use of neuroscience to encourage greater learner engagement and learning transfer, often in face-to-face scenarios, is a common theme among our interviewees.

‘Neuroscience is powerful in considering how we structure learning. There are lessons in how long you can make it (especially if you’re looking for behaviour change), what the reinforcement has to look like and how you set people up to be receptive. Some of it feels like common sense, but some of it’s a bit surprising. I think it reinforces a lot of good practice.’ **Hugh Hood**

‘I definitely feel that it has changed the way that I approach designing, as well as delivering, my training courses. So I’m more aware of understanding things like people’s energy levels and willpower, and that influences what I do during different points in the day.’ **Susan Grandfield**

For some this means using insight from neuroscience to enhance the learning environment:

‘One of the most important things is an environment that creates positive emotions, that makes people feel open to learning, where their senses are stimulated, where they feel relaxed and not under threat.’
Nicki Davey

For others this translates to specific techniques:

‘There’s a lot of evidence to show that, actually, if you’re teaching something new, it’s best to attach it to something somebody’s already learned in some way. If you were teaching electricians, you might want to use the metaphor of a circuit board. I’m really conscious of using relevant metaphors and to build on the existing scaffold of knowledge that they already have.’

Focus group participant

‘There should be some experimentation. There should be some questions. There should be some motivation. Yes, I’ve got to tap into their memories. I have to understand where they are at, I’ve got to give them some problems to solve and extend it beyond the classroom and give them some challenges.’ **Karen Bailey**

The following three case studies, from Imperial College Healthcare NHS Trust, SABMiller and Volvo, outline how neuroscience can be used to inform learning design and delivery and leadership development programmes.

Improving learning design and delivery at Imperial College Healthcare NHS Trust

Beverley Aylott, Head of Leadership for the Trust, and her team took the brave step of removing all leadership course content and starting again from scratch to create new in-house programmes informed by neuroscience and based on 70/20/10 principles.

Four new programmes have been launched, aligned to the strategic priorities of the organisation and reflecting the needs of key management populations. The programmes have been designed to maximise learner engagement and retention, with practical exercises and open, interactive environments.

Beverley Aylott explains how her knowledge of neuroscience has helped to inform this approach:

'The one thing for me that's important is about understanding how little capacity we have for taking in knowledge. Just being realistic about what's possible, and actually just giving people more and more and more information doesn't work.'

Beverley has also explored neuroscience to understand the barriers to learning retention and behaviour change:

'We're designed to protect ourselves by following our habits because our habits have kept us safe. So there's a real pull for people to keep going back to the status quo. In order to disrupt that behaviour you have to be quite deliberate about it, and getting people to commit to doing something differently is a real undertaking because they're constantly being sucked back into the safety zone. ... To get people to act in a different way is going to take a lot of time, a lot of effort on their part, on your part and a lot of coming back to it again and again and again and again. You can't send someone off to do a leadership course or a management course and then expect them to come back and be a completely different person.'

This realisation has resulted in much greater focus on encouraging effective learning:

'I'm constantly thinking about, how can I get them to process the information for themselves rather than it just going in, then going out? How can I actually get them to work with it, analyse it, categorise it, sort it and make judgements about it? ... When people walk out of the end of the whole of the programme, they know how to learn. They've got a network of people that they can learn with; they've got skills around reflection.'

Beverley links the use of the neuroscience to wider changes in leadership development methodology:

'I think particularly with management and leadership development in the twenty-first century, there isn't a right answer; it's very much about authenticity and about being adaptive and I think that there isn't a mould, there isn't a one size fits all. I think brain-friendly learning fits quite well with new thinking around leadership and management development. ... It's actually about stimulating thoughts and ideas and creating space for reflection and discussion.'

Using research to inform practice at SABMiller

SABMiller has used the latest research from a range of disciplines, including neuroscience, to inform its leadership development approach.

It has specifically partnered with Ashridge Business School to incorporate recent research on learning transfer and neuroscience into a leadership development programme. Samantha Rockey, Head of Group Leadership Development, shares how:

'To reinforce the learning during and after the programme, the principles that they had researched were used as an underpinning learning design component.'

This included elements such as habit formation and learning reinforcement through coaching support. For example, simulations were used in development sessions, which were then filmed and played back to the delegates to see how they operated under stress (based on Ashridge research into the optimum stress level for learning transfer). On return to the workplace they had follow-up coaching and a development conversation with their line manager.

SABMiller has seen high levels of delegate promotion and retention rates. Many action learning projects, developed through the programme, have also been implemented in the workplace.

This approach now applies across the leadership development portfolio:

'All of our programmes are designed now for reinforcement of key messages and opportunities to practise behaviour.'

This also extends to team effectiveness:

'We are deliberately taking neuroscience as a concept and we are using it to help our teams become more effective. That is everything ranging from stress moderation, understanding our motivators, to introducing some elements of mindfulness.'

Samantha is keen to stress that while neuroscience is helpful, it represents an evolution of existing knowledge, rather than a revolution:

'There are a lot of very valuable insights and we've used all of those insights in designing our learning programmes for our line managers to apply back at work. Neuroscience brings a range of very positive benefits, but in some cases it is more of a reinforcement of what we have known before about good learning design and the neuroscience is a build on that.'

Engaging learners at Volvo

Volvo identified a need to evolve its approach to learning and development. Karen Bailey, Head of Competence Development for Volvo Group UK and Ireland, describes how this started:

'We decided as a team that we needed to step back and start looking at how could we do this better and how do we ensure that people really do learn?'

Learning effectiveness was frequently measured on the number of days of training completed, rather than the quality of the experience, and most courses were heavily PowerPoint based. Louise Stevens, Learning and Development Manager, explains why that was problematic: *'we didn't have the follow-up and embedding. We were just constantly delivering sessions.'*

Working with Stella Collins, of Stella Learning, they used brain-friendly principles to transform their approach to classroom training, starting with the training population:

'The trainers have been our starting point because they need to understand what the difference between training and learning is and what their role in the classroom is.' **Stella**

Greater focus is now placed on understanding how people learn and using tools and techniques to make learning as engaging as possible, for example using pictures, videos and grounding training in the relevant context. Stella describes how a number of the internal trainers really embraced the new techniques:

'They've been going around saying to everybody, "Look, this is what we should all be doing. We should be changing. We should be getting away from PowerPoint. We need to use some of these ideas about how people really learn, some of the ideas from neuroscience and how we can actually apply them in the real world. We need to change.'"

Stella thinks that this approach worked particularly well because of the sector:

'Neuroscience can be really helpful, especially with the engineering designers and technicians, because effectively, you're saying, "This is how a brain is engineered." If you understand how a brain is engineered, you will understand how people learn better.'

Volvo is seeing greater engagement with learning as a result of the changes:

'We've had 9,000 hits on our new short "YouTube"-like technical videos. That's 9,000 additional learning touch points that we didn't have before. That means that our technicians can access just-in-time learning at the point where it matters most and our vehicles are likely to be better fixed.' **Karen**

Simple ideas, emerging as a result of this new approach, are also bringing clear return on investment. Karen shares an example which resulted in the business saving approximately £3 million. A problem was identified that previously would have meant retraining 1,400 technicians on a one-day programme. *'It turned out to be something that could be resolved by a small video.'*

Karen thinks this new approach is effective because it reflects how we learn on a day-to-day basis:

'If you want to know something outside of work, if you want to know something, what do you do? You can research. You can talk to somebody or you read something. You don't sit and wait for somebody to tell you how to do it. You find a way of doing it if you're interested.'

4 Benefits and challenges

'Our interviewees also highlight a secondary benefit: enhanced credibility, both personally and for the wider reputation of the L&D profession.'

This section explores the key benefits and challenges associated with incorporating neuroscience principles into L&D practice.

Benefits

Our case study organisations have highlighted a number of key benefits, ranging from enhanced learner engagement, cost savings, reduction in turnover and improved customer perception. Undoubtedly these tangible benefits have clear business impact.

Alongside these specific examples, our interviewees also highlight a secondary benefit: enhanced credibility, both personally and for the wider reputation of the L&D profession:

'It's given us more kudos. ... It's science. It's fact based, and so it's really, really helpful from an L&D and OD practitioner's perspective to have something like that, that you can absolutely hang your hat on.' **Karen Dunn**

Jan Hills has also experienced this benefit: *'It does give you an evidence base so sceptical people seem to accept it much more. ... I think it's not the panacea for everything, but it could take us an awful lot further in the credibility stakes.'*

Demonstrating business credibility is something even the most senior L&D and HR professionals still struggle with. While many recognise this, we are perhaps underestimating the challenge we face. Thirty-four per cent of business leaders say that HR leaders are not perceived to be of the same calibre as other senior

leaders (CIPD 2013). Forty per cent think that HR struggles to debate and challenge organisation issues with sound reasoning (compared with just 18% of HR leaders who think this is the case). Often, we try to meet this challenge by building business acumen. However, perhaps we need to place more focus on demonstrating strategic functional expertise and evidence-based practice. An appreciation of neuroscience blended with insight from a range of disciplines could really help us increase our credibility.

Connected to this benefit is the potential for neuroscience to enhance learning engagement. Many of our interviewees describe how neuroscience has enabled them to engage sceptical or resistant stakeholders:

'There are some people who are naturally drawn to this kind of stuff and who are really delighted by trying new things. Then there are other people who need further convincing that actually it's worth embarking energy and effort into. Having the facts has been enormously helpful.' **Karen Dunn**

'At BT, we're dealing with a predominantly engineering, very functionally driven group of people. ... We thought that if we talked about the plumbing of the brain and the real estate and what it's used for and the lessons about the wiring in the brain, we were kind of talking the language of engineering and it might connect with them better. It may actually give them some good reasons to think, "Okay, this is real and it's a real reason

for me to want to change my behaviour”, which is the first step.’ **Hugh Hood**

It’s apparent that while neuroscience has clear application in helping to improve the design and delivery of a range of initiatives, it also has the potential to ‘open doors’, to increase learner engagement and build greater recognition of the importance of learning in improving individual and business performance.

Challenges

Despite these benefits, our interviewees have experienced a number of challenges along the way.

Engaging L&D and HR in neuroscience

An unexpected challenge for some has been the high level of scepticism among the HR and L&D population:

‘I think HR are more sceptical than the business people. That’s a dangerous position for HR to be in because they will start getting business people finding neuroscience. ... So you’re in danger of your business colleagues coming to you and saying, “Why aren’t you using this?”’ **Jan Hills**

Jan explains why there might be reluctance to engage:

‘You can understand that if you understand how the brain responds: it is creating a threat response for people to have to let go of stuff that they’ve built their careers on.’

Perhaps this is related to a lack of recognition of the importance of keeping L&D knowledge up to date. In the 2014 *Learning and Development* annual survey report (CIPD 2014b), we asked L&D practitioners what they considered to be key skills for success in the profession. Understanding and practical application of new learning theories and insights was rated last, far behind skills such as commercial awareness,

Learner perspectives: Chris Po-Ba

Chris is a compliance officer at Chaucer Syndicates. He attended coaching sessions informed by neuroscience as part of his leadership development programme.

Chris explains that the sessions have helped him understand how his team respond to change and how he can help them to build resilience:

‘I find myself reflecting on what the brain is thinking depending on the individual and trying to map what their [change] chart would look like, and then literally intervening early or allowing them to go at their own pace.’

He reflects on the value of this approach:

‘I would say a lot of people would be amazed to be exposed more to the neuro side of coaching and development. I’ve done other courses in management, but this is the first time that the brain element has been really brought to the fore.’

Learner perspectives: Raymond Crawford

Raymond is the development manager at Hastings Borough Council. He attended a training session which explored key neuroscience principles as part of a leadership development programme.

Raymond reflects on the positive impact this has had:

‘I have a much greater understanding of how relationships in an office work, how relationships with our customers work and why people react the way they do.’

He shares one of his key insights from the programme:

‘One of the things that came out was what people really strive for in life is certainty and control. That’s what makes people happy. If you’ve got some certainty and some control, you can deal with all sorts of things as long as you’ve got those elements in place.’

As a result Raymond is reviewing the way he and his team interact with customers, in recognition of the high degree of uncertainty associated with planning applications.

'L&D is a rapidly changing field, and if we aren't keeping up, we risk being left behind.'

collaboration, influencing and training design/delivery experience. While these are undoubtedly important skills, this does cause concern. L&D is a rapidly changing field, and if we aren't keeping up, we risk being left behind, to the detriment of organisational learning and business performance.

Gaining team buy-in

Many have experienced difficulties initially engaging their team. Jane Lewis reflects on the challenge she and her team faced when they first started exploring neuroscience:

'Any professional can get into an established routine where it's hard to imagine there is a better way of doing things. Allowing the team to buy in to the change and see the opportunities presented by doing things differently was definitely a key part of the process. Now they are highly engaged and doing amazing work that's getting tremendous feedback from the business.'

For some this has also meant a specific change in focus. Niall Cluley shares an example:

'I think there's been a bit of letting go from some of our teams on concepts we maybe used to use. ... NLP has perhaps been one of them, as we introduced and shifted towards emotional intelligence as an underlying focus. This has enabled us to transform a workforce which predominantly "followed set processes" to an organisation of people that think for themselves, proudly take ownership and act in our members' best interests through everything they do. Our learning approach has provided a core foundation for this as we've moved from a trainer/expert-led style to a facilitating and learning-led approach.'

Some do also note that resistance to new learning delivery methods has meant that they have lost facilitators and trainers along the way.

Lack of knowledge as a barrier

For some the wider lack of awareness of neuroscience has been difficult:

'One of the challenges for me and one of the things that I find quite surprising is the number of people who aren't aware of it. When you say, "brain-friendly learning", they'll go, "What?" That is a real surprise for me. That's one of the barriers.' **Beverley Aylott**

Susan Grandfield thinks that confidence has a role to play:

'I think one of the main barriers is people's confidence that what they're saying is accurate. So I think there is that thing of, "Oh what if I go out and say the wrong thing?" because when you talk about the brain there's so much to it. I think people perhaps are concerned that they don't want to get it wrong. So they perhaps are not integrating it as much as they could.'

Time investment

Building in-depth knowledge can mean investing a significant amount of time:

'Much of my time is invested in distilling the most relevant components of neuroscience research and methodologies that can then in turn be relayed in layman's terms to organisations for inclusion in business strategies.' **Nolly Cole**

For smaller organisations this is even more of a challenge:

'L&D practitioners are generally so busy. In many smaller organisations there is often not a dedicated L&D resource. There is an HR professional who has to undertake the myriad of HR functions – such as payroll and employee relations issues and so on – as well as learning and development.' **Catherine Cuffley**

This lack of time or resource can also result in sustainability challenges, meaning that post-course follow-up is limited.

Interpreting neuroscience

Many of our research participants felt that interpreting neuroscience can be challenging:

'A lot of neuroscience is done in incredibly unrealistic situations or it's done on snails or fish. A piece of neuroscience can come up in the paper that says, "Scientists have discovered...". Then you go and find it and it's fish or in a totally controlled environment. Well, that's fine but it's not necessarily going to be valid in a training room or in a learning situation.' **Stella Collins**

Some are worried that this could lead to over-simplification and bias:

'Neuroscience papers and neuroscientists are very good at knowing what they know, and often not translating it into layman's terms, I feel. They are writing it for the neuroscience community. Then you need someone to translate that into, "So what? Now what?" for the other parts of the world. That's where there is a risk of people cherry-picking what they want to hear.' **Gary Luffman**

For James Moore, recognising the limitations of neuroscience is important:

'John Medina himself said I'm pulling together some themes, we need tonnes more research on this, but what the themes seem to point to is 12 principles that help you get better use of your brain. He doesn't say, "These are all the answers," but what he does say is, "This should really help."'

The nature of these challenges perhaps begins to explain the gap between awareness and application identified in Section 1.

'Many of our research participants felt that interpreting neuroscience can be challenging.'

Neuromyths

In our *Fresh Thinking in Learning and Development* series we identified a challenge with the prevalence of 'neuromyths': falsehoods about the brain that are saturated in the media. For example, the idea that we only use 10% of our brain is the premise of a recently released Hollywood blockbuster – a widely discredited, yet frequently repeated, concept.

Many fear that heightened interest in neuroscience could increase the prevalence of such myths. There is also concern that neuroscience could be used as a badge by those who have little knowledge or understanding.

With this in mind it is important for L&D and HR professionals to think critically about neuroscience, particularly information published in sensationalised headlines. Explore it for yourself and draw your own conclusions.

5 Advice for practitioners

'There are many methods of exploring neuroscience and building up your knowledge, from reading or completing qualifications through to connecting with neuroscientists on Twitter.'

Our interviewees feel that neuroscience has the potential to be enormously beneficial, but as discussed there are still many challenges with implementation. This section seeks to address this problem with practical guidance.

Where do you start?

The first step is thinking about your business priorities:

'What are the opportunities and challenges that your business is facing? How do your talent and learning development strategies support these? Then, how might neuroscience play a part in contributing to these strategies?'

Catherine Cuffley

'We needed to be very specific about what are BT's issues? What's the world's best thinking around that and how can we apply that to our particular issues? So we were very focused on trying to identify the changes that we needed and then how we addressed those changes.'

Hugh Hood

This may mean taking a critical approach when reviewing neuroscience findings:

'I think as HR professionals or as learning professionals, we need to take a step back and actually look at the usefulness of it. The fact that, yes, this is all very interesting for us and it's great stuff for us to know. But it needs to have a business purpose for it to be useful.' **Karen Bailey**

Then you can take a targeted approach:

'If you're looking to explore with a view to using it, I'd take quite a strategic approach. I'd maybe read a book that gives an introduction to some of the concepts and make a note of the core concepts that are coming up for me that pique my interest and that might be able to be used within the organisation.'

Amy Brann

From there, think about what resonates with you:

'Find the evidence that actually gives you stories that you can authentically share with others, that mean something to you. ... Take an idea, something you're interested in, and just test it, just try it. What's the worst that can happen? Don't dismiss stuff just because you're scared of it. Try things because the evidence keeps pointing to it, and you want to be more effective as an individual, you want other people to be more effective.'

James Moore

Most importantly, take action:

'Stop thinking about it; just start doing it. Just try some stuff. Pick something that you think, "That interests me, I can kind of get that, I am passionate about that, what can I stand up behind? What do I believe in?" And just give it a go.' **Karen Dunn**

As discussed in Section 2, there are many methods of exploring neuroscience and building up your knowledge, from reading or completing qualifications through to connecting with neuroscientists on Twitter (see Figure 1).

Figure 1: Recommended methods for building up your knowledge



How much knowledge do you need?

One of the challenges expressed is a lack of knowledge and available time. Our research participants have mixed views on the depth of knowledge needed.

Most feel that enhancing your basic knowledge is important:

'Anyone that's been using this stuff and sharing it with other people from a teaching perspective I believe needs to have a couple of levels above the knowledge that they're sharing.'

Amy Brann

But there does need to be an element of balance:

'I think you need enough to convince someone that you genuinely know what you're talking about, so you can change your approach, but I think that you don't need to tell everybody all the details.'

Louise Stevens

However, in some cases it may depend on your organisational influence:

'I think it depends on how credible you are. ... Whether you can just go, "Look guys, I know this works and that's okay." Or whether you have to go, "Actually there's a lot of evidence behind this now and here's some research, if you want to read it you can read it and I'm going to show you the science behind it."'

Beverley Aylott

There is also recognition that because of the vast nature of neuroscience and the fact that new discoveries are continually being made, it's impossible to know everything, and this tends to mean specialising:

'Generally each of us finds an area with which we are more comfortable, or which is more applicable to our field of work. Then we can develop expertise in that area. The key point is not to be put off by feeling you need to know everything.'

Catherine Cuffley

Our interviewees also cautioned against viewing neuroscience as the answer to everything, as it is still an emerging field:

'If you've done something and it really works, you've implemented some kind of piece of learning, piece of training, you've helped people in some way and it works and you can't find the piece of neuroscience that backs it up, that might not matter. I don't think everything has to be backed up by neuroscience because they just may not have discovered it yet.'

Stella Collins

This may mean blending new insight with your existing knowledge and experience.

How do you know what information to trust?

In Section 4 we discussed the challenges of interpreting neuroscience. Here our research participants share their hints and tips for avoiding 'neuromyths'.

Check the source or the credentials of those you're working with:

'My advice to people is to go back to the science; go back to the peer-reviewed article. ... That can be quite hard for people because they haven't got a lot of time. So if you're going to go

‘Often taking a chance, and utilising an existing opportunity, can be critical to gaining organisational buy-in.’

to someone who’s interpreting the neuroscience for you, at least understand what their credentials are to be able to do that. Not just from a neuroscience point of view, but do they actually understand business and HR and are they willing to have some view about how far you can stretch some of the interpretation?’ **Jan Hills**

Common sense also has a role to play:

‘Work on the principles of intuition and hunch, experience and checking out and always be willing to challenge and ask more questions.’ **Karen Dunn**

As Karen continues to explain, there can also be value in opening up new ideas from neuroscience for debate within the organisation:

‘If we believe that it’s new research, it’s not validated, we will throw that out there as a debating point, and say, “Well, what do you think?” ... It doesn’t really matter whether it is true or not; if it actually works for people to debate and think about and interrogate their own perceptions and standpoints, that has got to be good.’

For Susan Grandfield, recognising that neuroscience is not black and white is important:

‘Often, and this is possibly what frustrates some people, when you read something and if you get to the end and the conclusion is, “So we still have some way to go to reach a firm conclusion,” I tend to believe what the person has written, because actually most of the time we don’t always 100% know the answer and that is one of the really exciting things about neuroscience!’

How do you land it in the business?

Initial business buy-in is critical:

‘You’ve got to get that strategic engagement with the leadership of the organisation.’ **Hugh Hood**

Often taking a chance, and utilising an existing opportunity, can be critical to gaining organisational buy-in.

Jane Lewis explains that developing an entire career framework from scratch opened the door for taking a new approach and introducing neuroscience:

‘I had the gift of the perfect point in time, which is partly why we needed to make our changes so quickly. We couldn’t afford to let the opportunity pass.’

Likewise, Niall Cluley experienced a similar situation:

‘I think by having the CEO on board from the start with that type of approach, the fact that we did so much research in science to develop our brand, made it just part of how we should develop and lead our teams. I think I was lucky to have had access to this huge amount of research, on the way we’d scientifically looked at the brand. I could say, “Well, we must do that for our team and our culture as well.”’

Many of the research participants speak about introducing neuroscience in two ways: covertly and overtly. Both approaches have value, and are not mutually exclusive, but the decision may depend on your audience:

'I'm very mindful about what is the level of the audience? Actually, mostly I'm training to fairly pragmatic middle/senior managers. They probably don't want too much theory. A little bit of theory is fine to set the context, but actually they want, "So what? What am I going to do with this? How is it going to help me do all that I've got to do?"'

Linda Bradley

'The nature of neuroscience is that it's looking at the very small. So when we're thinking about how we change someone's behaviour, if we're consulting with an organisation, they don't need to know all of the neurochemicals, the areas of the brain. They don't need to know the results of the MRI studies in order to get a better result. They need to know, "What do we have to do?" So it's entirely up to the organisation as to how much they want to understand.' **Amy Brann**

'I think a lot of organisations miss the connectivity. If you bring in something like brain-friendly learning, it has to be part of something and connected. It has to be implemented into the everyday or you end up with isolated things going on that don't work.' **Karen Bailey**

Most importantly when introducing neuroscience, let people explore the concepts and find their own meaning:

'Don't try to force something on people. Ask people to bring it to life in context, in that environment. What does this mean for us, our members or for the way that we work? I think too often HR people particularly are so keen to put a theory and a science in, almost off the shelf, and just don't let people debate it and play with it and make it their own.' **Niall Cluley**

'when introducing neuroscience, let people explore the concepts and find their own meaning.'

Whether introducing neuroscience openly or not, our interviewees speak about the importance of connecting activities across the organisation:

Five brain-friendly learning techniques shared by our research participants

- 1 Introduce activities which help delegates process information themselves, for example sorting information or storytelling.
- 2 Find time for active reflection and regular breaks.
- 3 Provide information in short bursts, no more than ten minutes in length.
- 4 Introduce movement and exercise into face-to-face learning situations.
- 5 Think about how you can bring emotion into learning, for example laughter and happiness or shock/disgust, to create stronger memories.

Conclusion

‘Some think that a working knowledge of neuroscience will be an essential part of L&D professional knowledge in future.’

This report explores the use of neuroscience in practice. Our case study organisations and independent practitioners have shared their experiences in building up their knowledge and integrating key findings into practice. For some, neuroscience is a transformative subject; for others, it represents an evolution of existing knowledge.

Building effectiveness and credibility

There is one common theme, however: a sense that those who don't engage with neuroscience are missing out, both in enhancing L&D effectiveness and their own credibility. Indeed, some think that a working knowledge of neuroscience will be an essential part of L&D professional knowledge in future. This may mean working with greater ambiguity as the field evolves, and abandoning or updating some older models and concepts.

Connecting to business need

The potential for change also represents a need for bravery. For stepping up and using new ideas and techniques in a sceptical environment requires courage. It also necessitates having confidence in the subject matter and the analytical ability to determine the value of neuroscience – a value which should be firmly grounded in business need. Used effectively, neuroscience is a very helpful tool to enhance learning transfer and facilitate sustainable change. But it is important to remember that it is only one frame of understanding human behaviour, not the only method. It is therefore a tool to be blended with existing knowledge

and other aspects of behavioural psychology. And a key part of this blend should always be organisational context and the wider business strategy.

Mind the technology gap

Interestingly our interviewees did not often speak about the connection between neuroscience and technology. Application to learning was mostly connected to face-to-face learning, rather than e-learning, gaming or social technologies. Given the rise of these methods, this is perhaps a gap in practice, and a limitation of existing interpretations of neuroscience.

This is especially relevant, as the use of neuroscience in practice is most effective when it is applied in a consistent way across the organisation. Aside from learning technologies, neuroscience also has application to reward, performance management, and even marketing and customer strategy. While these areas are beyond the scope of this report, they should not be beyond the scope of L&D and HR practitioners.

Investing your own development

Many of our case study interviewees recognise that they are not neuroscience experts, but that they have developed an interest, and then spotted an opportunity to take action. Sometimes this meant taking a pragmatic approach and reaching a balance between knowledge required and time available. The lesson for practitioners is ‘find your level’; recognise that you don't need to be an expert to still make

use of neuroscience – and this does not necessarily mean compromising the quality of the original scientific findings if you choose the right source of information.

Restrictions of time and perceived competence are genuine challenges. However, as many of our interviewees highlight, there are now many methods of building up knowledge, and often simple activities such as reading a blog on the train or engaging in a discussion on Twitter can help bring neuroscience to life.

Avoiding neuromyths

There is, however, a real danger of information being misinterpreted as interest in neuroscience grows. This means that as L&D professionals, we need to take a critical eye to reports of the latest findings and be

particularly diligent when applying neuroscience to practice. Building up knowledge over time can help with this process, alongside working with experts with sound credentials. It is also important to recognise that, as with any scientific discipline, knowledge is evolving as technology advances and new discoveries are made. As a result we need to continually stay abreast of new developments and evaluate our approach.

The future of the profession?

Despite the great case study examples featured in this report, we have found that there are very few organisations openly using neuroscience in practice. There are two explanations for this. Firstly, perhaps it is simply too early for widespread adoption, and there is a knowledge–application gap. Or

secondly, that many of the overall principles of neuroscience are finding their way into L&D practice, without being labelled as such.

Indeed, for many, neuroscience’s greatest value lies in its ability to offer an evidence base for existing practice and provide opportunities for reflective evaluation. Whether this is the case or not, given that skill development and landing change remains a challenge in most organisations, having greater knowledge of how people learn and how they respond to change must have value. For now it remains to be seen how much of a grip neuroscience will hold for L&D practitioners. What is clear is that, for some, it represents the future of the profession. Whatever your views, it’s worth joining the conversation.

Five key questions to consider

- 1 How useful do you think neuroscience is for L&D practitioners?
- 2 Does neuroscience represent a revolution or evolution of L&D practice?
- 3 Can neuroscience principles help you solve any particular business challenges?
- 4 How would you start to introduce neuroscience into your organisation?
- 5 Can you use neuroscience to prompt discussion/debate within your organisation?

Appendix 1: Five 'no-brainers' from neuroscience research

by Dr Paul Howard-Jones, Reader in Neuroscience and Education, University of Bristol

Your brain is plastic. That means learning can change the function, connectivity and even the structure of your brain. For example, in a sample of London taxi drivers, the size of a brain region critical for navigation could be predicted by how experienced the drivers were. In another study, attendees at a juggling course showed changes in the size of some parts of their brain over just three months of training. This idea of plasticity contrasts with the popular idea that your brain limits what you can achieve. Instead, neuroscience indicates that each of us has an important role to play in constructing our own brain. Here are some tools to get constructing with:

The creative brain: find a team and find a challenge

When we work independently to create new ideas, we reduce activity in the brain region we use for automatic thinking processes. Suppressing an automatic response to a challenge can require effort but it's important for creativity. Otherwise, we tend to focus on the same obvious solution and this can lead to fixation, for example being mentally trapped in a creative dead end. Interestingly, fixation is less of a problem when we work as a team and share ideas. Collaboration means less effort spent deactivating this region and we can produce more creative ideas more easily.

We can also become more creative when challenged by tasks that force us to make unusual mental connections. When adults were

asked to produce stories that were as creative as possible, they performed better when they also had to include a given set of unrelated words. This strategy automatically increased activity in brain regions associated with creative effort.

The learning brain: space out your learning sessions

Scientists have long known that spacing out learning sessions over time improves learning compared with massing sessions together, but the underlying explanation for this effect has been a mystery. Neuroscience is now revealing why spaced learning is so effective, with a recent brain imaging study showing extra activity in a part of the brain we use for verbal rehearsal. This suggests we do more unconscious practising of what we are learning when the learning is spaced out over time. This so-called spacing effect is not just about recalling facts, but also works for learning grammar, mathematics and many other topics.

The dreaming brain: sleep is important for memory (so don't forget it)

A good night's sleep helps us start the next day fresh, but it also helps us remember what happened the day before. Our sleeping brain reproduces activities at night that reflect whatever daytime experiences we encountered, helping us to lay down these experiences in memory. That means regular and sufficient sleep is essential for the brain to learn efficiently.

We often use coffee to keep us going in the evening, but caffeine is known to disrupt subsequent sleep. Additionally, although caffeine is classed as a stimulant, it tends to suppress cognitive function when used habitually. Caffeine blocks the action of adenosine, a neurotransmitter that increases in our brain with each hour of wakefulness until bedtime, decreasing neural firing rates in readiness for a restful night. Caffeine interrupts this action but, with regular consumption of caffeine, counter-regulatory changes occur. This results in coffee drinkers being generally less alert than non-caffeine users, and needing their usual dose just to match performance.

The wired brain: technology can enhance or diminish brain function – use wisely

Like caffeine, technology can also disrupt sleep. Close bright screens have the potential to delay the brain's production of the sleep hormone melatonin more than watching TV. However, the key issue here is what you're using the technology for. Playing late-night computer games has a particularly strong effect on sleep quality and memory.

More positively, technology also has the potential to enhance brain function. While the science of 'brain training' is still exploratory, off-the-shelf action video games already seem effective at developing some cognitive skills. Research shows they can improve your ability to switch visual attention, to suppress

visual distraction and can even enhance contrast sensitivity (which is the primary factor limiting sight). Some studies are now reporting professional benefits with, for example, evidence that laparoscopic surgeons who play video games make significantly fewer errors.

The aerobic brain: take regular exercise – it enhances and protects brain function

One of the best known ways to improve your brain function is physical exercise. Regular aerobic exercise improves the efficiency of networks important for learning, including those brain systems that help guide our attention. Physical exercise also increases

blood flow and connectivity in the hippocampus – an important region for memory. Physical fitness can predict the size of this brain structure and exercise has been shown to increase it, with corresponding improvements in memory. Some studies have recorded almost immediate effects of exercise on learning. For example, compared with more gentle exercise, adults in one study showed a 20% increase in memory performance for words they learned immediately after two three-minute sprints.

Find out more in the CIPD *Neuroscience and Learning: Fresh thinking in learning and development* report (CIPD 2014a).

Appendix 2: Additional reading

Our research participants recommend a number of books which have helped them develop their knowledge of neuroscience. Here are ten of the key titles mentioned:

BLAKEMORE, S. and FRITH, U. (2005) *The learning brain: lessons for education*. London: Wiley-Blackwell.

CHASKALSON, M. (2011) *The mindful workplace: developing resilient individuals and resonant organizations with MBSR*. Chichester: John Wiley & Sons.

KAHNEMAN, D. (2011) *Thinking fast and slow*. New York: Farrar, Straus and Giroux.

LIEBERMAN, M. (2013) *Social: why our brains are wired to connect*. Oxford: Oxford University Press.

MEDINA, J. (2008) *Brain rules: 12 principles for surviving and thriving at work, home and school*. Seattle, WA: Pear Press.

PILLAY, S. (2011) *Your brain and business: the neuroscience of great leaders*. London: Financial Times/Prentice Hall.

RATEY, J. (2009) *Spark!: the revolutionary new science of exercise and the brain*. Great Britain: Quercus.

ROCK, D. (2006) *Quiet leadership: six steps to transforming performance at work*. New York: HarperCollins.

ROCK, D. (2009) *Your brain at work: strategies for overcoming distraction, regaining focus, and working smarter all day long*. New York: HarperBusiness.

ROCK, D. and PAGE, L. (2009) *Coaching with the brain in mind: foundations for practice*. Hoboken, NJ: John Wiley & Sons.

Appendix 3: Glossary of key terms

Accelerated learning	Accelerated learning is concerned with enhancing and speeding up the learning process, through use of particular learning design techniques.
Functional magnetic resonance imaging (fMRI)	fMRI is a technique which enables neuroscientists to accurately depict brain activity through changes in blood flow.
Mindfulness	Mindfulness is a technique (or state of mind) which encourages people to focus their awareness on the present moment, and acknowledge their feelings, thoughts and bodily sensations.
Neuro-linguistic programming (NLP)	NLP was developed in the 1970s and explores the connections between how we think, communicate and behave. Sometimes wrongly referred to as an aspect of neuroscience, it has received criticism for questionable scientific validity.
Neuroplasticity	Neuroplasticity refers to the brain's ability to make new neural connections throughout life (and so continue to change and develop over time).
Neuroscience	Neuroscience is the multi-disciplinary scientific study of the brain and nervous system.
Positive psychology	Positive psychology is a discipline focused on using scientific evidence to enable people to prosper and use their strengths to lead happier, healthier, more fulfilled lives.
70/20/10	The 70/20/10 model refers to an approach to learning and development which advises that 70% of learning is on the job, 20% is through coaching, mentoring and other interactions, and 10% is from courses and reading.

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