Book 1 of the **MAXIMISING BRAIN POTENTIAL** series

OUR LEARNING BRAIN

How to Engage Minds for Learning & Habit Change

Dr. Celine Mullins

OUR LEARNING BRAIN

Engaging Your Brain for Learning & Habit Change

Ebook 1 of the **MAXIMISING BRAIN POTENTIAL** series

Dr. Celine Mullins

OAK TREE PRESS

Published by Oak Tree Press, 33 Rochestown Rise, Rochestown, Cork, Ireland

www.oaktreepress.com / www.SuccessStore.com

ISBN: 978-1-78119-340-2 (ePub)

ISBN: 978-1-78119-341-9 (Kindle)

ISBN: 978-1-78119-342-6 (PDF)

Brain Images by Phillip Cullen

CONTENTS

FOREWORD 1

A NOTE FROM THE AUTHOR 2

ACKNOWLEDGEMENTS 3

WHY READ THIS EBOOK? 4

INTRODUCTION 6

1: THE IMPORTANT RELATIONSHIP BETWEEN ADULT LEARNING AND HABIT CHANGE 9

2: UNDERSTANDING THE POWER OF THE BRAIN AND THE BRAIN'S SELF PROTECTION MODE 16

3: OVERCOMING THE BRAINS SELF PROTECTION MODE AND CREATING SUPPORTIVE HABITS 23

KEY TAKE-AWAYS 34

NOTES 36

CELINE MULLINS 39

ADAPTAS 40

FOREWORD

As Professor of Psychology at Trinity College Dublin and the Founding Director of the Institute of Neuroscience Trinity College, Dublin, I co-supervised Celine while she was a PhD student. Celine was always an ambitious and independent thinker. Her work since then – and some of it now available to you, the reader, in the **MAXIMISING BRAIN POTENTIAL** series – is no different.

In this first ebook, Celine draws on newly-published knowledge about the brain's role in habit to explain the complexities of the brain in the learning and habit change process. Her ability to translate this complex science into easy-to-understand prose means that readers of all backgrounds will be able to grasp the brain's role in making changes and learn how to implement these changes for themselves. This ebook is also well-suited for those at management levels who want to make learning a priority for their staff.

I can think of no one more qualified to write this ebook, as Celine has been putting the theories in this ebook into practice in her work for many years with the company she founded: Adaptas, a learning and development business through which Celine has successfully coached and facilitated learning in thousands of leaders and teams worldwide – from Ireland and the UK, to North America, to Africa. Her form of training is unique and receives exceptional reviews, with many people saying they wished they had learned this information "10 years previously". Her clients deliver overwhelmingly positive reviews, expressing appreciation for Celine's ability to "create a safe space" and create "amazing outcomes".

With this ebook, Celine brings to the reader the science and theory that drives her successful training. Celine's insights should not be overlooked.

Professor Ian Robertson – Clinical Psychologist and Neuroscientist**,** Author of *The Stress Test: How Pressure Can Make You Stronger and Sharper*; *The Winner Effect: The Science of Success and How To Use It*; *Mind Sculpture: Your Brain's Untapped Potential*; *The Mind's Eye: An Essential Guide to Boosting Your Mental Power*

A NOTE FROM THE AUTHOR

> *The only skill that will be important in the 21st century is the skill of learning new skills. Everything else will become obsolete over time.*
>
> ***Peter Drucker***

As a psychologist and coach working in organisations worldwide and with individuals, groups and teams, I have noticed over the past 10 years that very few new discoveries from neuroscience are being integrated into education, learning and development or soft skills programmes. As someone who works to help people maximise their potential in a range of organisations and educational institutions, I believe that many eager and dedicated people are missing out on vital tools for life and leadership.

Reading this ebook will help you to see learning from a new perspective. Awareness of the concepts in this ebook will help you to open up to learning new things and enable you to maintain the elements that make long-term behavioural change possible.

How do I know this works?

With my clients over the years, I have learned by observing what is effective and what is not in creating change. People who have taken on this information have made long-term behavioural change, while those who have not taken it on board have not had the same success.

This ebook is the first in the **MAXIMISING BRAIN POTENTIAL** series. The **MAXIMISING BRAIN POTENTIAL** series is based on the most up-to-date scientific research of how our brain potential can be maximised for habit change, learning, productivity and health. This series of ebooks pulls this information together into digestible chunks. The others in the series include **DEVELOPING LEARNING ADDICTS: THE 7 STEPS TO LEARNING & HABIT CHANGE** and **CHANGE BEGINS HERE: BUILDING THE FOUNDATIONS FOR LEARNING & HABIT CHANGE**. These ebooks both introduce additional concepts and also probe deeper into some of the topics discussed in this ebook.

Similar to the current wave of just-in-time learning, where learning is available on-demand, and can be accessed when the learner needs it, the

MAXIMISING BRAIN POTENTIAL series of ebooks is just-what-you-need-to-know-to-make learning-easier in adulthood.

I know that this text will be useful for you, whether you want to make a change in your own life, or you are involved in helping others learn and make change.

If you would like more, we also have workshops and an online course available to help guide you through a process to maximise your brain potential. Contact **info@adaptastraining.com** for information.

Dr. Celine Mullins, Adaptas

ACKNOWLEDGEMENTS

This may be a short ebook but it takes a long time and a lot of people to create something that has real clarity and actually gets to the point of publication!

Without the assistance of Diana Friedman and Enda Hughes, this text would not make half as much sense as it does now. Their patient reading, editing, re-reading, and editing, as well as encouragement and advice, is hugely appreciated. The process has taught me much about how writing is re-writing and re-writing is writing!

Thank you to Eve Johnston, John Mulreid and Ciara Byrne for reading, suggestions and ongoing encouragement and belief.

Thank you to Brian at Oak Tree Press for seeing the potential, and for patience with each 'near final draft' email!

Thank you to Agne Vabamäe for pulling together so much of the information I had written over the course of a number of years and creating a beautiful first version of this ebook.

Thank you also to Camille Donegan, Claire Comerford, Alistair McBride, and Padraig and Angela Mullins for ongoing encouragement.

Thank you to Annie Keeney for patient checking of references and footnotes.

Thank you to Regina Heffernan, who read an early draft and expressed excitement that drove me forward. And to Dr. Richard Roche for painstakingly being my second pair of eyes with the neuroscience!

Thank you also to Sinead Kennedy, Eve Bulman and Niamh Ni Dhonaill, whose encouragement did not go unnoticed!

And a final thank you to my clients. I share some examples of clients I have worked with but have changed some names and small details to protect their anonymity.

WHY READ THIS EBOOK?

This ebook will:

- Help you to **use your brain more effectively** when learning new skills, by offering simple and practical tips.
- Support you in **breaking old habits and creating new ones**.
- Give you great insights into **organisational learning and development**-related topics that you can use in your organisation.

INTRODUCTION

> *The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn.*
>
> ***Alvin Toffler***

Are you a leader who recognises that learning is one of the main keys to business success? Are you working in a Learning & Development or Talent Management role? Are you trying to change habits to be more successful at work or to live a healthier life? If any of these traits or roles describe you, then you have come to the right place.

We all recognise the speed of change that is happening around us. Our working roles will look dramatically different in the very near future. For example, due to the elements of the working day that are being replaced by Artificial Intelligence, it is predicted that many of us will need to retrain perhaps many times in our lifetime. Keeping our brain functioning properly and performing efficiently is worth some serious thought. The period of accelerated change we are living through at the moment requires higher levels of learning agility than ever seen before. We will all have a lot of learning to do throughout our adult working lives.

Some of us are naturally motivated to learn and change how we do things. But for many of us, initial motivation is only short-lived. Children soak up learning from the people and environment they are surrounded by. You will probably have already recognised that learning doesn't feel quite as simple as when you were a child. Why? Because by the time you reach adulthood, much of your behaviour consists of habits. These habits allow your brain to conserve energy, but also make learning a challenge.

In recent years, scientists have made many exciting and ground-breaking discoveries on how the brain learns and changes throughout adulthood. However, much of this recent research from neuroscience, physiology, psychology and more is not being implemented into how we learn as adults. This ebook seeks to change that.

As you will see in this ebook, your brain changes throughout adulthood and must be consciously harnessed in the direction you wish. The perspective on how our brain functions covered in this ebook forms the very basis of how we can best learn and, in my opinion, needs to be at the foundation of all learning. The purpose of this ebook is to help support your learning journey and the learning journey of those around you.

Briefly, there are three main elements to consider:

- ➔ Adult learning is habit change.

- Understanding how our brain functions is a vital tool for learning.
- The brain is focused on energy saving.

Adult Learning is Habit Change

'Learning' and 'habit change' are inextricably linked. You have lots of habitual routines that block you from replacing older ways of operating. People seldom consider the connection between habit and learning when they wish to make a change in their own life or in helping others learn and make change. But when you are learning something new, you need to keep the brain focused and you need to repeat new actions to overcome old ways of doing things – habits. Otherwise, long-term behavioural change does not occur. **Chapter 1** explains this important relationship between learning and habit change.

Understanding How our Brain Functions is a Vital Tool for Learning

Having an understanding and mental picture of how our brain is functioning is in itself a vital tool to allow you to make changes in the brain because it gives you a sense of perspective. It allows you to feel like you are stepping outside of yourself and seeing what is happening inside the 'control centres' of the brain. The very fact that you are now reading this ebook and embarking on seeing the brain in your mind's eye means you are already visualising learning differently. **Chapter 2** will assist you with this process.

The Brain is Focused on Energy Saving

The area of the brain that creates automatic behaviours is your greatest friend – but also your greatest foe. Our brain creates habits to let us go about our days, doing much of what we do automatically and with little thought. This saves brain energy and frees up your brain for other important tasks like logical analysis. The problem comes when we try to learn something new, as older information and habits are embedded. These habits take some effort to undo! Adults have less time and often less energy than children, and so adult learning requires a lot more conscious effort than childhood learning. **Chapter 2**, as well as helping you understand how your brain functions in learning and habit change, also explains how the biological drive for self-protection can hinder your learning.

The objective of this ebook is not just to give you an understanding of the brain, learning and habit change. The objective is to activate that understanding as a fundamental mechanism to learning. And therefore, **Chapter 3** provides you with strategies to help make learning happen in a much more effective way, by overcoming the brain's self-protection mode.

CHAPTER ONE: THE IMPORTANT RELATIONSHIP BETWEEN ADULT LEARNING AND HABIT CHANGE

What is Learning?

Learning is the acquisition of knowledge or skills through study, experience, or being taught.

On my last count, there were over 100 theories and models of how we learn. Three well-known ones include:

- Behaviourism, which suggests that a learner is essentially passive, responding to environmental stimuli (Skinner, Pavlov, Watson).
- Information processing theory, which suggests the human mind is like a computer or information processor (Miller, Atkinson & Shiffrin).
- Experiential learning, which states that learning is the process whereby knowledge is created through the transformation of experience (Kolb).

As we investigate the 'living' brain in ways that were not possible even two decades ago, we are now moving beyond and adding to these theories. Until recent advances in technology, investigation of the brain was only possible posthumously and in animals. Due to progress made in the fields of physiology, neuroscience and more, we have started getting a clearer picture of what is happening inside the brain. Researchers have been able to go inside the 'living' brain and observe how learning actually occurs at the molecular level. Additionally, more sophisticated experiments with the brains of laboratory animals are stretching the bounds of our understanding further. Of course, the human brain and the behaviour it supports is far more complex than that of other species. However, relevance of research is aided by considerable cross-species similarities in behaviour and biology between humans and other mammalian species. Until the past 5 or 10 years, it was not possible to measure all cells involved in even the smallest actions because so many cells were involved. But now, because of nanotechnology, computer technology, optical techniques and much more, it is possible to measure a number of cells at once and to create more extensive and richer animal models.

We now know that the brain acts as a dense network of fibre pathways consisting of approximately 80 billion neurons. A neuron is a nerve cell that receives and sends electrical signals over long distances within the body. A neuron receives electrical input signals from sensory cells (called sensory neurons) and from other neurons. Each neuron is connected to thousands

of others *via* links called synapses. These synapses can be strong or weak. A strong link indicates a significant influence between connecting neurons. A weak link could be thousands of times weaker than a strong one.

Neurons are important to understanding habit change and learning, because learning and memory formation occur by the strengthening and weakening of the synapses – that is, connections between these neurons. Researchers find that, when two neurons frequently interact, they form a bond that allows them to transmit signals more easily and accurately. This leads to more complete memories and easier recall. Conversely, when two neurons rarely interact, the transmission is often incomplete, leading to either a faulty memory or no memory at all.

Note: It's important to consider that our learning is also influenced by the feedback we receive, the sleep we get, the food we eat, and much more. More on these topics can be found in the two other ebooks in the **MAXIMISING BRAIN POTENTIAL** *series. Should you wish to expand your knowledge and to learn further strategies beyond this ebook, you know where to find it.*

What is a Habit?

Scientifically speaking, habits are a redundant set of automatic unconscious thoughts, behaviours, and emotions that are acquired through repetition and are acts we generally perform in the same way in the same situations. Or, to look at it in simpler terms, a habit can be defined as a settled or regular tendency, behaviour or practice.

Habits are part of being human. It is believed that more than 40% of our daily behaviours are habits. Because they are automatic, many of these habits help us to get through our day without having to think and waste energy. For example, brushing our teeth, having a shower, or embarking on our daily commute to school or work are all beneficial habits. Other habits that might not serve us well or keep us healthy include eating a pastry every morning as we rush to the office or hogging the couch for an evening or avoiding exercise for the third week in a row.

As we go through our days, we generally believe we are making moment-to-moment decisions, but many more of our behaviours are habits, more automatic than you might realise. Think about it this way; a habit is when you've done something so many times that your body knows how to do it better than your mind. And in many ways, this does serve a useful purpose. If we had to make new decisions every day, we would probably be exhausted before 9am!

At the same time, habits can also make our behaviours quite rigid; for example, many managers I work with operate using learned habits such as micromanaging or not providing sufficient feedback. Usually these are habits that they have picked up during their career or from their own managers. Typically, these habits are not conducive to creating happy, motivated people and high-performing teams. Habitual behaviour can also be detrimental in the workplace – for example, when we approach a new project the same way we've approached every other similar project, even though our customer needs a very different solution.

There are many habits we could create that would help us operate more effectively in work and life, yet many of us do not realise better habits are ours to learn.

The award-winning *New York Times* business reporter Charles Duhigg (2013)[1] tells us in his book *The Power of Habit* that habits serve an incredibly important evolutionary and survival function:

> *Habits emerge because the brain is constantly looking for ways to save effort. Left to its own devices, the brain will try to make almost any routine into a habit because habits allow our minds to ramp down more often. This effort-saving instinct is a huge advantage – an efficient brain requires less room, which makes for a smaller head, which makes child birth easier, and therefore causes fewer infant and mother deaths. An efficient brain also allows us to stop thinking constantly about basic behaviours such as walking and choosing what to eat, so we can devote mental energy to inventing spears, irrigation systems and eventually airplanes and video games. But conserving mental effort is tricky because, if our brains power down at the wrong moment, we might fail to notice something important such as a predator hiding in the bushes or a speeding car as we pull on to the street, so our* ***basal ganglia*** *have devised a clever system to determine when to let habits take over.*

Later, we will take a closer look at the basal ganglia (a group of structures found deep within the cerebral hemisphere in the brain stem) because among its many purposes, it stores our habits. The brain converts the sequence of actions involved in performing an action, 'chunking' them to the primitive basal ganglia, reserving the cerebral cortex for higher or more intensive functions. Because of the great job the basal ganglia does of storing our habits and therefore making much of our behaviour automatic, we often fail to seek new ways of doing and seeing things. This is what often blocks our ability to learn new things.

While we might believe that we can't or don't need to change our habits (and it does often feel this way as we have developed many of them over a lifetime), much research shows that we can change if we want to. It just takes quite a bit more effort and conscious awareness as adults than it did when we were children.

So how do we go about changing some of our entrenched habits when it comes to learning and change? As we will discover, learning and habit change are inseparable.

The Relationship between Learning and Habit Change

> *Scientists in many different fields have been attracted to the study of habits because of the power habits have over behaviour and because they invoke a dichotomy between the conscious, voluntary control over behaviour, considered the essence of higher-order deliberative behavioural control, and lower-order behavioural control that is scarcely available to consciousness.*
>
> ***Ann Graybiel[2]***

Until recent decades, scientists believed that the brain was hard-wired by the time we hit adulthood. And this seemed to confirm why, as adults, we found it difficult to learn new things. Sayings like "you can't teach an old dog" became quite popular.

However, as mentioned, recent studies of the 'living' brain now show that the process of neurons forming bonds when new learning occurs continues throughout adulthood. Science shows us that regardless of age, it is possible for learning to occur and for us to change habits until the day we die.

In the act of learning, our brain solves problems and processes information. But it is not always obvious how our automatic behaviours that occur without conscious thought are controlling our actions when we are learning new ways to do things.

The difficulty for us as adult learners is that our habits are so engrained that they often get in the way of our learning.

For most of us, habit change is challenging. The reason for this is because we are often trying to change our habits 'in the dark'. We don't quite realise how so much of what we do is a whole lot of habits. For example, you have decided you are going to attend a leadership programme, which will take place over six months and consists of 6 modules on various topics, from strategic thinking to managing change to ethics and governance.

You arrive at the first day of the initial two-day module of the programme ready to learn and take it all back to work to apply. You are looking forward to hearing from the teachers and experts about the various topics. You enjoy the two days and you pick up some useful tips. After the two days, you return to the office with your notes in tow and some good intentions of a few things you are going to do differently. One month later, you arrive to Module 2, and you recall that you safely placed your notes in a tray at your desk but that you didn't get a chance to re-read your notes and you didn't really apply any of the take-aways from Module 1.

What happened? You attended two days of learning. Once you left, your habits took over. It wasn't enough that you attended the module and heard about some new concepts and approaches and had some good intentions. You didn't actually convert this new information to your brain and your actions. In effect you attended a learning event, but it did not impact on your behaviour. Remember, a habit is when you've done something so many times that your body knows how to do it better than your mind. When we attend a course, our engrained habits will get in the way of implementing new learning.

As an adult, you need to approach learning with a conscious plan for applying the new 'learning'. To apply the new knowledge will involve breaking the old habits and making a clear plan for holding yourself accountable to embedding the new ways of operating (or getting someone else to hold you accountable if you respond to that better). Creating the new habits to get the new learning to stick takes focus and repetition.

In adulthood, it is challenging to achieve all of this as the busy-ness of life gets in the way. And few of us view changing our habits as 'fun'. In the workplace, many people see learning and change as cause for frustration. We often see such activity as a struggle, boring, or too much effort and time-wasting. In particular, as we'll see later, our unconscious beliefs and our brain's automatic focus on protecting us from danger means that, if the brain could speak, it would tell us that it doesn't see changing our habits as fun or even as an option!

One of the challenging things with habits, and with operating as effectively as we might, is that everyone is different. All habits are different too. It would be great if we had a magic pill that could help us change the habits we wish to and clear space for the new learning, but it's not that simple. There is not just one single or simple way to change a habit. All of our habits are driven by different beliefs, by different cravings, by different emotions and require different strategies to address them. This is why the effort has to become more conscious. Changing how you operate involves getting to know yourself better!

For example, when I decided I wanted to feel more confident and impactful at making speeches or presentations, I needed different actions to change my habits, compared to when I decided I wanted to build healthier morning eating habits.

To become better at making speeches, I had to change how I did things in a number of ways, including how I prepared and delivered my presentation, and how I conquered my emotional reaction (fear) to public speaking. I had to study how to create content that was more interesting to my audience, which involved me really putting myself in their shoes, rather than just telling them what I thought they needed to hear. I had to say "Yes" every time I was asked to speak in public, even though it was terrifying for me and my mind screamed "NO". I had to retrain the limiting voices in my head. I had to stand up and practice, practice, practice, even though it was much more appealing to spend my time doing other things – falling into old habits of just rehearsing a script in my head. You see? I had to learn new approaches, and I had to replace old habits with new habits.

To build better eating habits didn't require necessarily learning any new information but I had to change certain routines and get into the rhythm of performing a number of actions. These included:

- Planning ahead regarding what to purchase and what to make for meals.
- Avoiding going grocery shopping on an empty stomach!
- Making a vegetable juice or smoothie first thing in the morning to start my day a healthy way.
- Getting out of bed 15 minutes earlier every morning to make the juice.
- Not giving in to the 'snooze' button on my alarm, because this would get in the way of me having time to make the juice.

While these two approaches were different, there were a number of things these changes had in common as well. Both required changes to create the mindset and environment for the discipline to embed, to both learn new information, and to change old habits.

To start, I had to get clear on what I wanted to do differently and why. I had to learn some new concepts and approaches. In the case of the public speaking, I had to learn and apply daily mental exercises to change my habitual negative thought patterns. In the case of the morning juicing, I had to change both my morning and shopping routines.

In another example, when I decided to get better at having difficult conversations, I had to take yet another approach. First, I had to understand the stress response and learn a few difficult conversation structures. I then forced myself to have low-risk difficult conversations as often as possible. For example, I practiced with everyone from a bus driver (who was driving dangerously), to a gym instructor (who spent the whole class looking at himself in the mirror instead of checking if we were doing the exercises properly to avoid injury).

Changing our habitual routines starts with motivation to change. However, once the novelty and initial motivation disappears, the real key to change is ongoing discipline to ensure the repetition required to create the new habit. This discipline requires a plan, conscious effort and a lot of small actions on a daily basis to change the habits and embed the new approach.

Although embedding learning and habit change can be challenging in adulthood and can sometimes feel exhausting, putting a plan together to overcome the old ways and habits and then to embed the new learning and habits requires deciding on a number of small daily actions and then repeating them. In the next chapter, you will learn a little more about why conscious planning, action and repetition is so important, from the perspective of how the brain takes on new learning and in effect, how it changes as you learn.

> *Great things are not done by impulse, but by a series of small things brought together.*
>
> ***Vincent Van Gogh***