extreme thinking

human synergistics®
A Human Synergistics initiative.

In Search of SuperMind.

HUMAN SYNERGISTICS AUSTRALIA WHITE PAPER

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Extrem³e Thinking® Abstract

Human Synergistics, wanted to scientifically test a new, practical technique called Extrem³e Thinking that is designed to optimise the cognitive functions of the brain that are linked to creative thinking and insight based problem solving. The study assessed the effectiveness of the technique, as measured by changes in brain waves and performance of 30 business leaders who participated in the study during a research period lasting 28 days.

In the digital economy the explosion of available information is intended to arm leaders with the data necessary to make sound business decisions. In reality, the opposite is happening. Information overload or 'infobesity' and the need for speed is forcing people to multi-task. Neuroscience has demonstrated that the part of our brain responsible for problem solving and decision making, the Pre Frontal Cortex (PFC), while requiring a certain level of arousal or alertness for optimal focus and performance, is hampered by too much stress, impeding our ability to think clearly and to creatively solve problems.

To respond to this, a profound shift in thinking is emerging. We are beginning to realise that our traditional tools of analytical thinking and linear problem solving are not enough to effectively respond to the constant flux of the digital era because these tools are essentially reductionist in nature. Traditional problem solving techniques require the ability to see or predict cause and effect, yet the deluge and speed of data we are receiving obscures this connection.

To scientifically test the impact of Extrem³e Thinking, the University of Technology's Neuroscience Research Unit (Sydney) was engaged to help Human Synergistics identify the neurological correlates of the aha moment. Tests included electroencephalography (EEG) of 6 sites (left and right hemisphere), blood pressure, skin conductance resonance, state trait anxiety, and heart rate tests to measure anxiety and arousal levels; LSI 1 tests to measure mindset, health and wellbeing tests delivered via a lifestyle appraisal questionnaire; Remotes Association Test to measure creativity convergence, Alternate Uses Test to measure creativity divergence. Additional post lab qualitative interviews were also conducted to assess compliance and experience. The tests were conducted at the commencement of the research study to gain baseline data, and again following learning and practice of the Extrem3e Thinking techniques, 28 days later.

Results were beyond expectation proving the positive impact on the brain of Extreme Thinking. Data results concluded, practicing Extrem³e Thinking techniques can dramatically improve creative thinking and insight based problem solving capability among business leaders. Specifically the study found;

- 33% improved cognitive functioning (clearer, improved thinking)
- 63% increase in generating multiple viable solutions to a problem
- 26% increase in accuracy
- 25% reduction in failed attempts

Extrem³e Thinking provides a simple and tangible way for business leaders to access whole brain thinking to solve complex problems. More than this, by reducing their stress levels business leaders are able to implement new ways of working creatively to develop more constructive working cultures that stimulate new thinking in their people and their teams.

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Acknowledgements

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The Need for New Thinking.

The Age of Digital Disruption, Infobesity and Brain Overload.

It's just passed 7 am when Simon rushes into his office, cursing the time his laptop will take to boot up. He'd barely left home, when he received a text message from his CEO asking him to submit a roadmap halving the development time of a product that was not scheduled for development until next year.

While waiting for the software to load, Simon drafts his initial thoughts on his tablet. Through force of habit, he switches to his emails as the sound alerts come thick and fast, reminding him to cancel a video conference later that day with the Singapore team. Deep in multitasking mode, thoughts racing, he searches Google for any information on similar products in their market. Staring intently at the page while his laptop thinks it over, his leg restlessly twitches up and down as his mind quickly jumps across disparate thoughts he has yet to properly consider. Just as the program and page synchronously finally load, he knows a moment of panic… time is ticking away and somehow he needs to find a creative solution to what, at this moment, seems an impossible task.

In that moment, Simon is not alone, there are thousands of leaders like him around the world, attempting to do their best thinking at lightning speed, under the heavy weight of high expectations for original ideas and creative problem solving. In the digital economy where the explosion of information blurs boundaries of time and space, shifting the balance of power from business to consumers; delivering today is great but yesterday is better! The impact of this explosion measured in the span of 60 seconds looks something like this:

- 204 million emails sent
- 4 million search queries on Google,
- 277,000 tweets,
- 48,000 "Apps" downloaded
- 2,460,000 pieces of content shared on Facebook

Source: Domo April 23. 2014

Where in 1995 only 1% of the world's population used the internet, twenty years later, 40% of the world's population are, which in raw numbers amounts to an estimated 3 billion 'screenagers'! [1] To put this in a commercial perspective, where radio took 38 years to attract 50 million listeners, Facebook took one year to attract 6 million users. [2] Technological progress has made it easier and faster to reach people.

The net result is that we live in a world where data reigns. Whether at home, at work, on public transport, or in our cars; our 'always on' hand held devices ensure that anything we want to know is a mere keystroke, mouse click or press of a button away. This, of course, is a two way street; as much as we are able to transmit, we are able to receive and be inundated with information whether we like it or not, as the sixty second snapshot above attests to.

In 2005 when the information super highway was considerably smaller and the word cloud still described a mass of watery vapour in the sky, Edward Hallowell psychiatrist writing in Harvard Business Review observed that,

> "..Never in history has the human brain been asked to track so many data points. Everywhere people rely on their cell phones, their email and digital assistants in the race to gather and transmit data, plans and ideas faster and faster." [3]

[1] Internetlivestats.com,. 'Internet Live Stats - Internet Usage & Social Media Statistics'. 2015. Web. 27 June 2015.
[2] McKinsey Insights The four global forces breaking all the trends 2015
[3] Edward Hallowell Harvard Business Review 2005 p.5

An insightful observation truer now than it was then. In 2007 humankind sent 1.9 zettabytes of information (that's 22 0's after 1.9!) Through broadcast and GPS technology. In plain English, that is the equivalent of every person in the world reading 174 newspapers every day.[4] (CISCO predicts that in 2015 we will reach the threshold of the zettabyte and will need to move to the next level)[5]

So what is the cumulative effect on business leaders of such high volumes of content delivered at speed across time zones every minute of each of the 24 hours in our day?

Of all the flow on effects, there are two that are significant. The first of these is that the profusion of data and need for speed that accompanies it, leads to brain overload that increases tunnel vision and fragmented thinking. This 'survival mode' is defensive in nature and limits leaders' effectiveness. A recent analysis of the thinking patterns of over 47,000 leaders in our client base in 2014, revealed that 55% of leaders were operating at this defensive level of thinking.[6]

The second profound and little realized phenomenon is that our habitual way of thinking about issues and traditional linear problem solving techniques fall short in the digital era. Our traditional tools of analytical thinking and linear problem solving, while still critical, are not enough to effectively respond to the constant flux of this environment because these tools are essentially reductionist in nature. Our training is to isolate variables, seeking to break down issues into component parts but this environment makes it difficult to identify let alone reduce problems to simple variables. Traditional problem solving techniques require the ability to see or predict cause and effect, yet the deluge and speed of data obscures this. Moreover there is no single answer but rather an exponential array of possibilities that have to be weighed and assessed.

Paradoxically, at a time when leaders have never had more access to information, they are making decisions without ever feeling like they have the complete picture. New times need new thinking.

To effectively respond to the challenges of the digital age, leaders need to increase their ability to think flexibly and creatively while reducing their stress - literally enabling them to access new ideas with less effort. We call this state 'SuperMind' and it is the end result of practicing a technique we have developed known as Extrem^{3}e Thinking®.
The result of three years research and development, Extrem^{3}e Thinking® has been designed to help leaders boost their brain power by integrating the power of the conscious and unconscious mind to solve complex problems creatively.

The Impact of Brain Overload on leaders

The sheer quantity of information leaders feel they need to process is so pervasive it has a name - 'Infobesity'.[7]
In business, one of the ways it shows up is as the hundreds of emails that flood our inbox. Most leaders we work with feel compelled to weed through them all, even if it is only to decide what they can delete or disregard! Typically they scan through and speed read the 'subject' line to decide if it is worth reading. Like Simon though, the sound alert from texts, additional emails coming in and cell phones mean that their attention is distributed across many tasks, reducing the consideration needed to respond effectively. This act of switching is well practiced and known as 'multi-tasking', which science tells us does not work. Daniel Goleman, psychologist and science journalist explains it this way;

[4] Arthur, C : http://www.theguardian.com/technology/blog/2011/jun/29/zettabyte-data-internet-cisco
[5] Arthur, C : http://www.theguardian.com/technology/blog/2011/jun/29/zettabyte-data-internet-cisco
[6] Presentation by Shaun McCarthy at Human Synergistics Culture and Leadership Conference 2014
[7] Rogers, P Puryear, R and Roo, J: Infobesity The Enemy of Good Decisions Bain Brief 2011 p.1

> "Rather than having a stretchable balloon of attention to deploy in tandem, we have a narrow, fixed pipeline to allot. Instead of splitting it, we actually switch rapidly. Continual switching saps attention from full, concentrated engagement." [8]

So not only are we compromising our ability to attend to issues properly with 'multi-tasking', but neuroscience has also demonstrated that the part of our brain responsible for problem solving and decision making, the Pre Frontal Cortex (PFC), while requiring a certain level of arousal (alertness) for optimal focus and performance, is hampered by too much stress, impeding our ability to think clearly and to creatively solve problems. [9]

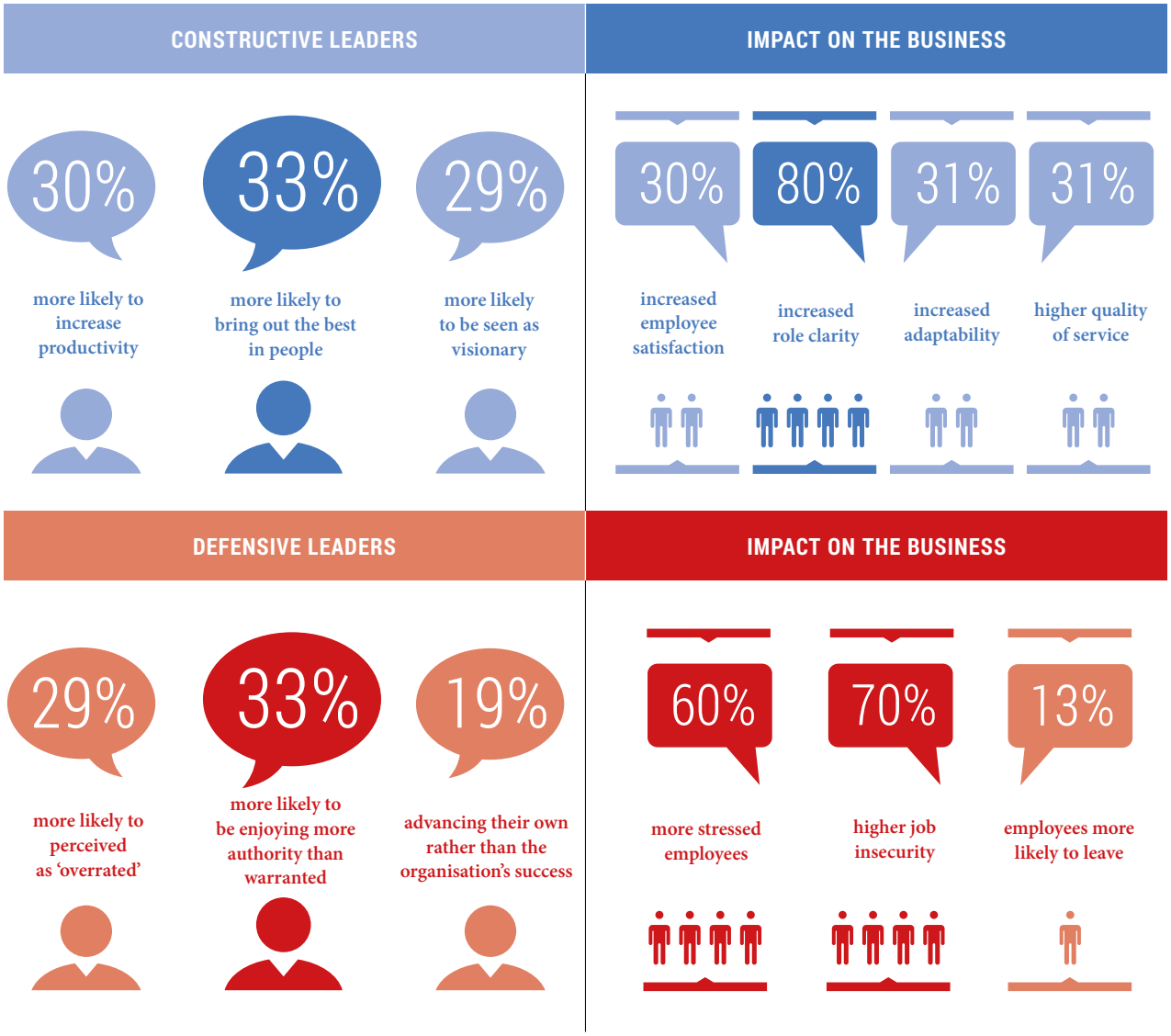
The longer the stress or 'busy-ness' lasts, the more leaders are likely to move into a defensive way of thinking we call 'fragmented mind' driven by reflex. Essentially reactive in nature it is where the lower half of our brain, the limbic system, takes over and our brain becomes ever ready to fight or fly in response to perceived threats. While we have been built for short spurts of fight and flight harking back to the days when we had to run from tigers, the level of stress leaders can experience now has turned short spurts of fight and flight into a chronic lifestyle, and as far as our brain is concerned, the tiger has moved in next door!

'Fragmented mind' keeps leaders in survival mode and is more about getting through the day unscathed than it is about growth or excellence as is evident in our research. The impact of this mindset on their ability to be effective in their role and their relationships, compared to leaders with a more Constructive "focused mind', is significantly lower as shown below.

LSI Circumplex from Robert A. Cooke, Ph.D. and J. Clayton Lafferty, Ph.D., Life Styles Inventory™, Human Synergistics International.

[8] Daniel Goleman – 'Focus, The Hidden Driver of Excellence' 2013
[9] Arnsten, A :The Biology of being Frazzled *Science 12 June 1998: Vol. 280 no. 5370 pp. 1711-1712*

Additional research shows that this defensive mindset has a negative impact on leaders' teams and business. In another study which triggered the development of Extrem[3]e Thinking®, we reviewed the impact of 6,500 leaders. The study showed that 71% of leaders were perceived by their team and their peers as having a predominantly defensive impact. As a result they were seen as over rated, enjoying more authority than deserved and as having inhibited change while increasing stress in others. Contrast this with the 29% of leaders perceived as having a Constructive impact stemming from a more focused, mindset. These leaders were evaluated by their people and their peers as increasing productivity, motivation and organisational agility.



Of the 6, 5000 leaders whose results we analyzed, only 7% met the criteria for what we term as a 'total visionary'. A leader who is operating at this level demonstrates and stimulates original thinking, has an ability to assimilate and synthesize multiple perspectives as well as the ability to consciously chart the their own course while creating a healthy constructive culture in which their employees thrived.

It was the disturbing realization that such a high proportion of leaders were not perceived as visionary or stimulating creative problem solving that prompted us to explore new ways of thinking.

In Search of 'SuperMind'
When we think best

We started by asking leaders where they did their best thinking. Overwhelmingly we found that no one did their best thinking at work! In fact when we asked this question of over 500 people, most said that their best thinking happened most often when they were alone - walking, running, in the shower, during the early hours of the morning or involved in any number of routine or recreational activities. Furthermore it became apparent that the reason leaders felt it was their best thinking was because this is when they got most of their breakthrough ideas or aha! moments. [10]

In neuroscience research, the aha! is understood as a clear moment of insight, often unexpected, where a whole solution to a problem is received at once. It is often accompanied by a 'shot' of positive energy and a sense of certainty that the solution will work. [11] The unconscious mind is very involved in processing the information and helping to reorganize and make connections between data points that when recombined produce a solution or what we know as the 'light bulb' moment.

While there are many types of aha! moments such as when we have finally understood a piece of information or new concept, the type of aha moments we were interested in however and those characterizing SuperMind are the ones that emerge through insight based problem solving. These aha! moments are the game changers and paradigm busters. Stories of famous aha moments abound: Archimedes' Eureka moment in the bath, Isaac Newton under the apple tree; Molecular Scientist Kerkule all came up with significant scientific discoveries through a single moment of insight while they weren't consciously working on the problem.

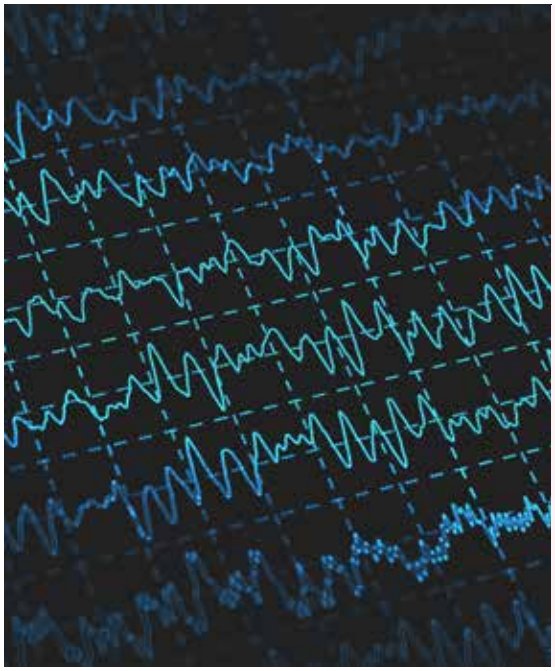
The key to finding SuperMind and helping leaders access more aha moments, was to understand more about how the unconscious mind operated. Since the aha moment almost always appears unexpectedly, it is likely the brain's "back office" (the unconscious) continues to work on the issue even if we are not attending to it or consciously thinking about it. In fact in 2013 researchers found that this is exactly what happens. When we consciously focus on a problem, we activate the neural networks required to work through the issue and they remain activated for a time even after we have stopped consciously attending to the problem.[12] In simple terms, It is a bit like baking a cake, once we have combined the ingredients and placed it in the oven, we walk away knowing that it is continuing to bake until the timer goes off alerting us that it is ready.

The processing power of the unconscious mind is phenomenal, travelling at a speed and transmitting a quantity of information that we literally cannot grasp consciously. The bandwidth of information flow into the mind, through the unconscious and through our senses is about 11 million bits of information per second. Of this, we are conscious of only 40 bits of information per second! [13] The implication and the belief on which Extrem^{3}e Thinking® is predicated, is that our unconscious mind through its vast processing capacity and storehouse of information will deliver the ideas and answers we need if only we can learn how to unlock it.

[10] 2012 interviews Extreme Thinking Participant CEOs & Extreme Thinking Website Voter Poll www.extreme-thinking.com
[11] Jung-Beeman et al. 'How Insight Happens: Learning From The Brain'. Neuroleadership Journal One (2008): 1-5. Print.
[12] Creswell, D et al (2013) pp 863-869
[13] Coates.J – The Hour Between Dog and Wolf pp86-87 2012.

Our state of mind can be seen in brainwaves

Our state of mind can be seen in five different types of brainwaves; Delta, Theta, Alpha, Beta and Gamma. Each of these brainwaves operates at a different speed and frequency as shown in the boxed insert.



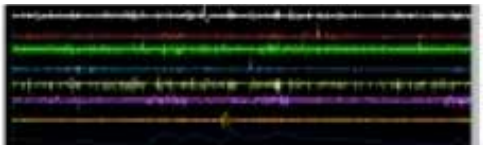
Brainwave Frequencies	Associated Mental Activity
Gamma +40 Hz	• Whole-brain activity • 'Super-learning' • Sudden Insight
Beta 13-40 Hz	• Cognition • Focus • Analytical Thinking
Alpha 8-12.9 Hz	• Relaxation • Creativity • Unconscious Mind
Theta 4-7.9 Hz	• Deep Meditation • Lucid Dreaming
Delta 0.2-3.9 Hz	• Sleep

Brainwaves are present all the time and influence our state of mind depending on which brainwaves are dominant and in which parts of the brain.

In 2010, Dr.Trisha Stratford, neuro-psychotherapist, lecturer and researcher with the University of Technology Sydney, identified three levels of mind when she investigated the impact of the relationship between therapist and client in supporting clients to gain insight into their issues. Fragmented mind, Focused mind and Super mind further explained in the figure below.

SUPER MIND
QUANTUM EFFECT
Small, subtle connections - big impact

Parietal ^B ^T ^A / Significant data



- SuperMind
- Imagination
- Free flow / Idea Space
- Visionary
- Inside Out Thinking

FOCUSED MIND
FLOW

Alert but relaxed / Limbic Chill - Alpha

- Not triggered
- Reasoned Problem Solving
- Open to adaption
- Good Relationships because more headspace to relate

FRAGMENTED MIND
FLUX

^Beta - Random Data, Limbic Rush

- Anxious/stress
- Triggered
- Survival mode
- Driven by

*Source: Human Synergistics' LI research responses from 6,500 leaders (senior and middle managers) in Australia and New Zealand

It was at the level of SuperMind that clients in Dr.Stratford's research experienced insight and had significant aha! moments. She was able to isolate these moments and investigate what was happening in their brains at this point and saw that their brainwaves changed and that the part of the brain known as the Parietal became particularly active. The Parietal cortex is responsible for a number of functions but is 'activated during novel activities, coding intentions, focused attention and calculating the probability of success.' Her research showed that the Parietal was 'the seat of imagination.' [14]

It turns out that all those times your parents told you to put your worry to the back of your mind… they were right, your parietal lobe was on the job of finding a solution!

We theorized that if it was possible to teach leaders how to alter their brainwaves and activate the parietal, they could create an optimal 'headspace' to increase insights and aha moments. We believed that in doing so they would struggle less, experience less stress and have increased access to the answers they needed and ultimately their performance would improve.

We invited Dr.Stratford to collaborate with us in exploring and developing this technique.

[14] Stratford, Lal 2015 The Neurological Correlates of Insight Problem Solving

From 'Umm to aha!' The Journey from Cycles to ARCS

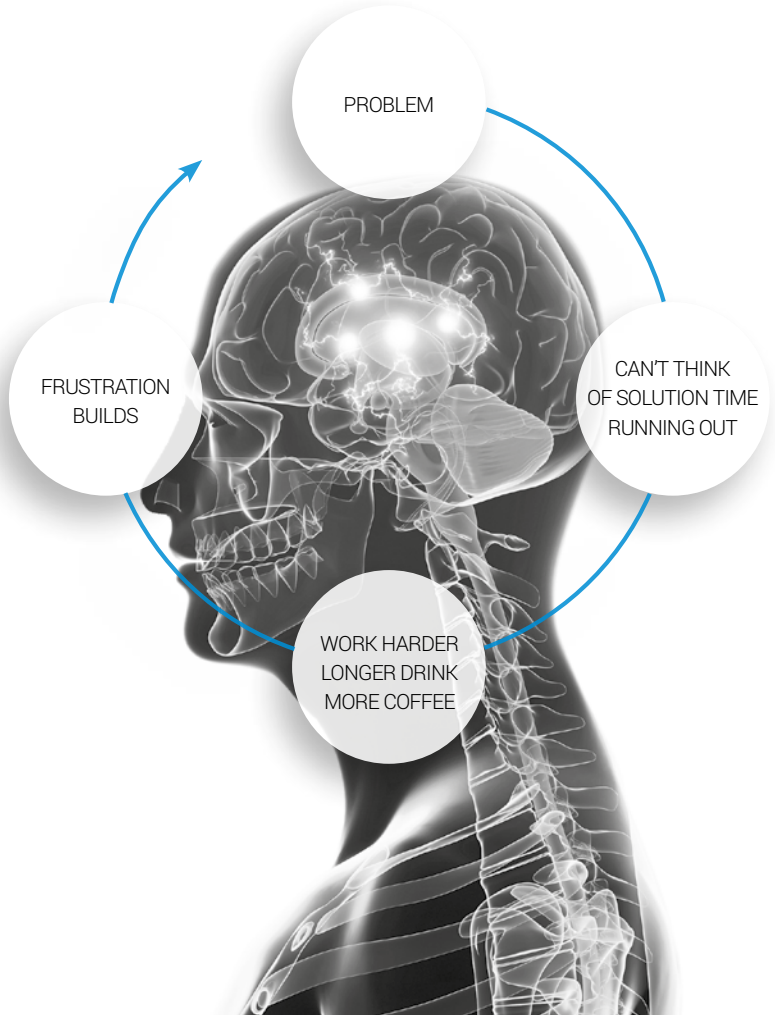
To find SuperMind we needed to map the journey of an aha! moment so that we could design practices that leaders could incorporate into their daily routine which would help them use their unconscious as a resource or a tool.

Most of the research suggested that aha moments usually followed a period of frustration.[15] The interviews we conducted with leaders confirmed this. After a certain period of time, we get tired of struggling with a problem so we breathe a hefty sigh, throw our hands up in the air and give up!

We refer to this as the Try Harder Cycle™ (THC). Typically we experience it when we are wrestling with a complex problem, our instinct is to throw more 'brain power' at it and just try harder and do more.

We believe that the Try Harder Cycle™ is an integral part of the insight generation process, because the 'aha'! Moment favours a well-stocked mind. Reflecting on what happens during this cycle it is clear that we are loading up on information before the frustration hits, much as we might load a car up with fuel. We read a lot, search the internet, have lots of meetings, drink more coffee than we should and stay up late and repeat it until our lack of progress or solution triggers our frustration.

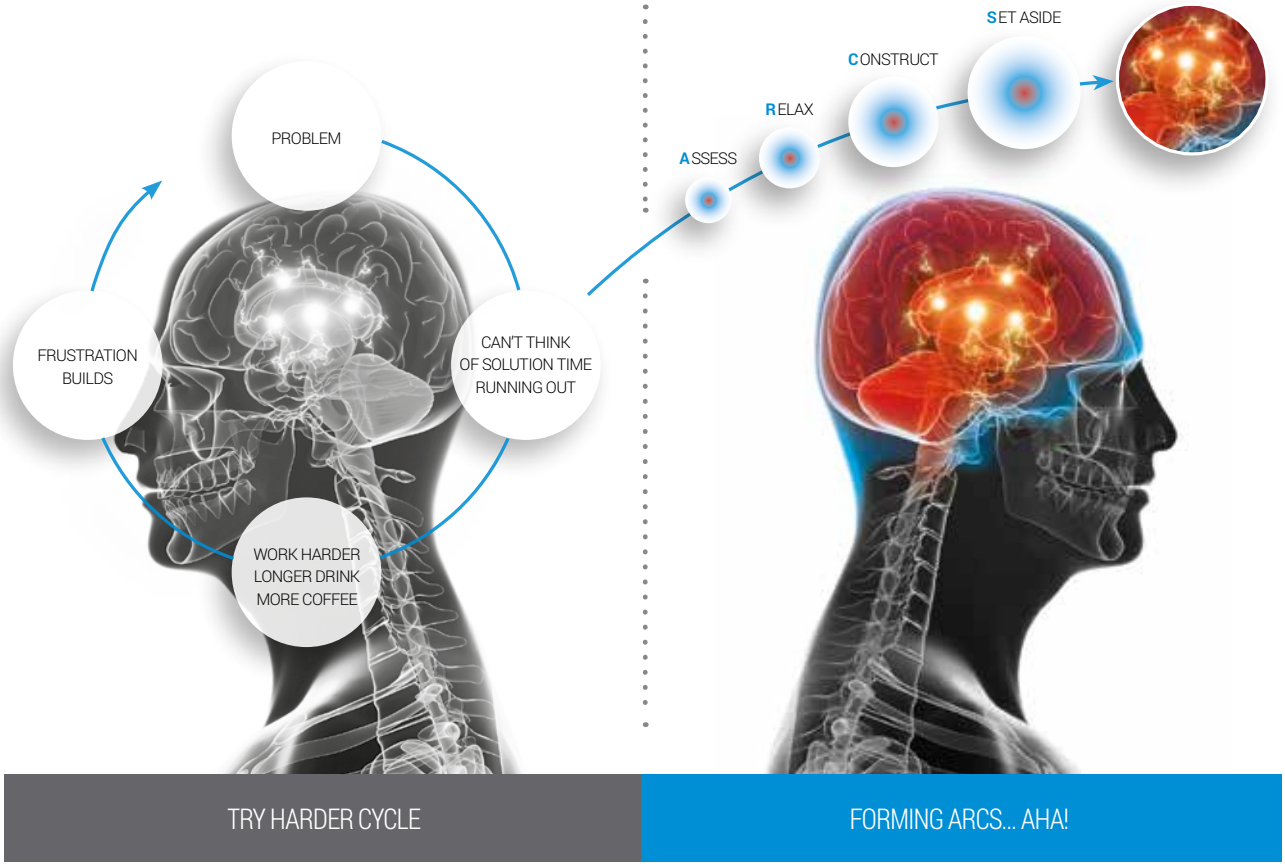
We cannot solve the problem from this state however and in fact lingering at this point puts us at risk of dropping into 'fragmented mind'. After a while our brains reach a point where it needs time to process the information and 'connect the dots'. It is this period what we know as **incubation**.



[15] Jung-Beeman et al. 2008p.1; Ritter et al 2014p.2;Dijksterhuis et al 2006,p.136;

To bypass fragmented mind, spend more time in focused mind so we can fast track through to Supermind, leaders need to interrupt this try harder cycle with ARCS.

ARCS is short hand for the four stages of the journey from Umm to Aha! And is explained in the table below.



ASSESS	Assess your state of mind, at which level are you at? Are you in the Try Harder Cycle and struggling? Reframe the stress by understanding that you are on track to a breakthrough.
RELAX	Relax your mind, breathe and centre. This step is about rising above the 'noise' of the stress of the Try Harder Cycle. Something as simple as as changing your breathing will help to take the edge off the struggle and prepares you for the next step.
CONSTRUCT	Construct the problem. Focus the struggle. Rather than the THC driving you, you are now in the driver's seat and from this position you can begin to work with the problem in a way that is more concrete using the more creative parts of our brain more. We developed a technique called "Thandling" which involves leaders actually building the problem (thinking with their hands). Interestingly 70% of leaders experienced a shift in perspective at this point in the workshop.
SET ASIDE	Set the problem aside, let it go and focus on something else. This requires a complete mental divorce from thinking about the idea for at least 10-15 minutes This is perhaps the most controversial and difficult stage which challenges everything we believe... Beware leaders, you cannot fake this stage, your brain will know!

ARCS is designed to help leaders do two things:

I. Manage their stress levels, both in the moment, when they feel they are running out of time to solve a problem and also on-going.
II. Refocus on the problem in a more creative way to enable a more creative solution.

For every step in the process there is a simple practice leaders can easily incorporate into their daily routines which our research has proven increases cognitive functioning as well as creative thinking.

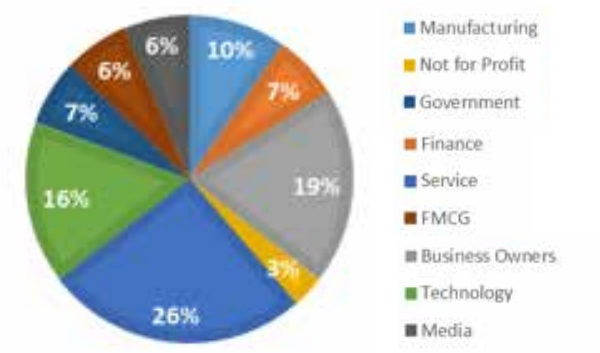
The results of the experimental study testing Extrem³e Thinking® and ARCS showed that Leaders who committed to the process and practices experienced the benefits fairly quickly, often within a week with significant performance outcomes achieved after three weeks.

Finding Super Mind.... Putting Extrem³e Thinking® to the Test

We wanted to put our theory to the test. Did Extrem³e Thinking® actually increase leaders' ability to think better, more originally and creatively, while simultaneously lowering stress? We decided to conduct an experiment in which 31 executive leaders and business owners from a range of sectors agreed to participate. We engaged the University of Technology Neuroscience Research Unit to make the assessment using electroencephalography (EEG), and a range of other tests shown in the table below.

RESEARCH SUBJECTS PROFILE

PARTICIPANTS BY SECTOR



GENDER

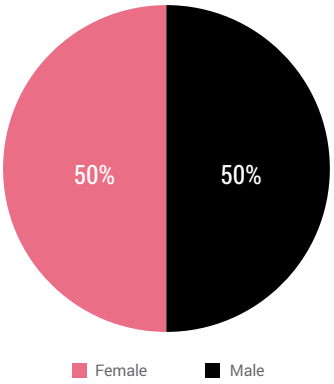
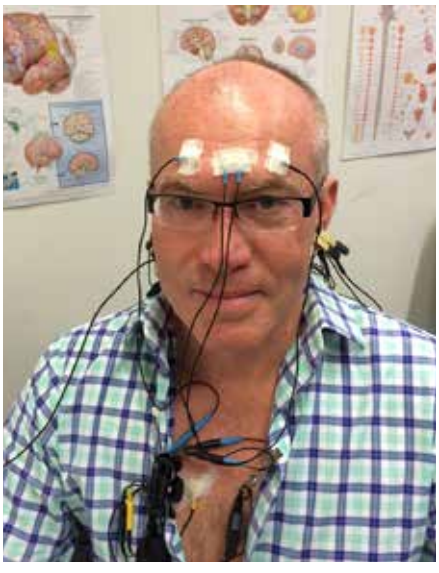


Table 2: Assessment Instruments

Brain Activity	EEG 6 sites left & right hemisphere
Anxiety/Arousal	Blood Pressure (BP) / Skin Conductance Resonance (SCR) / State Trait Anxiety (Floating & Post session) / Heart Rate (ECG)
Mindset	Life Styles Inventory™ (LSI1)
Health and Well being	Lifestyle Appraisal Questionaire
Creativity Convergence	Remotes Associates Test (A single well established answer to a problem)
Creativity Divergence	Alternate Uses Test (Multiple alternative solutions to a problem)
Compliance & Experience	Post Lab Test Qualitative Interview



Adam McCrory gets wired up for the Extrem³e Thinking Lab session

Extrem^{3}e Thinking: Research Experiment Protocol

The experiment followed a specific and detailed protocol summarized in the figure above. Prior to the baseline test, leaders completed a variety of questionnaires that assessed such things as thinking patterns, anxiety and other lifestyle factors. Leaders then attended the neuroscience lab in a first session designed to get a baseline assessment. During the session leaders were wired up to an EEG machine (which would give us a picture of what was happening in their brains) as they set about two types of creative problem solving tasks. These tests have long been recognized and accepted by Neuroscientists as being a reliable and valid way of assessing two types of thinking involved in creativity: Convergent thinking (single solution- aha) and divergent thinking (multiple plausible solutions to one problem).

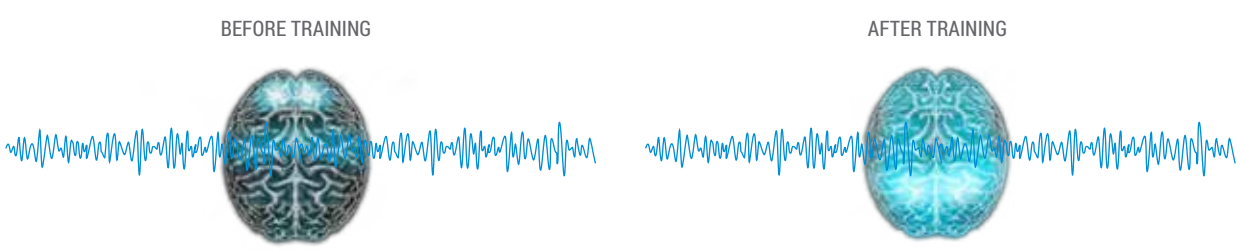
As part of this first session we also measured their blood pressure, anxiety levels pre and post session (to identify the degree to which the actual lab session and testing impacted their anxiety levels) and their heart rate. These measures, along with the Skin Conductance Resonance (a little clip placed on index finger which monitors arousal), would together tell the story of whether Extrem^{3}e Thinking® impacted leaders' level of anxiety or stress. The EEG results would also show this in a different way but more particularly it was going to show us what brainwaves were prevalent in which part of the brain (in both left and right hemispheres) and which part of the brain was most active. One of the things we hoped to see was an increase in Gamma waves. These are the fastest brainwaves capable of processing vast amounts of information and have been present when people have experienced an aha! moment. We also hoped to see this accompanied by a decrease in Beta waves which would indicate a reduction in stress.

Results and Discussion

The results showed that across the group of leaders a number of changes occurred in the brain.
(note images are representative creations not actual data)

GAMMA WAVES INCREASED ACROSS THE ENTIRE BRAIN

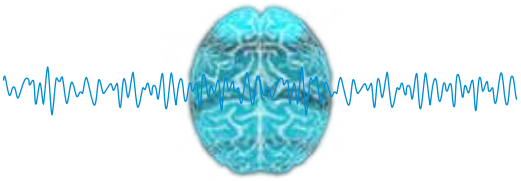
Implied that leaders were becoming more creative and solving problems through insight. They were also turning their attention internally, visualizing their answers. Also suggested that they showed the capacity to be creative even when in test conditions in competition with others and themselves.



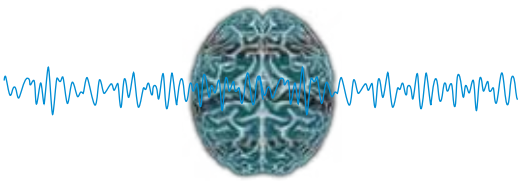
BETA WAVES DECREASED ACROSS ENTIRE BRAIN

Leaders were more relaxed and using different bandwidths to do convergent and divergent thinking. Confirmed leaders were internalizing their thinking and visualizing answers. Further evidence suggesting that leaders were engaging in more risk taking.

BEFORE TRAINING



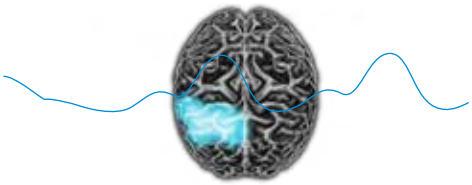
AFTER TRAINING



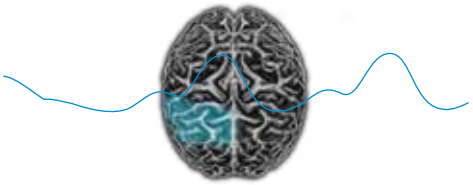
DELTA WAVES DECREASED ACROSS ENTIRE BRAIN ESPECIALLY IN PARIETAL CORTEX

Leader's brains became more alert and 'woke up' especially in relation to the Parietal.

BEFORE TRAINING



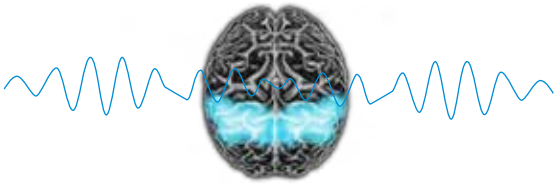
AFTER TRAINING



ALPHA WAVES DECREASED ACROSS ENTIRE BRAIN

This suggested leader's brains were in a state of relaxed wakefulness. Parietal became more alert and as it is at a cross roads of neural networks, between conceptual thinking and perception through senses, this data suggests that brain was relaxed but pulling together all the elements at a very significant level, contributing to the production of the aha moment

BEFORE TRAINING



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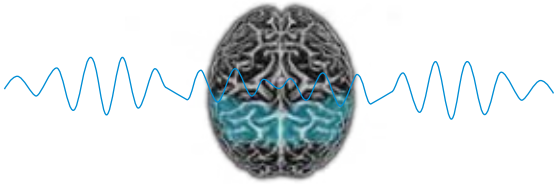


Change in Brainwaves Changes Performance

The performance of leaders on the creative problem solving tasks improved with 80% of leaders showing improved scores after practicing Extrem³e Thinking® for 21 days in one of the tests (known as the Remotes Associates Test) with 83% improving their scores on the second test (Unusual Uses Test). In addition their scores post training revealed:

- 33% improved cognitive functioning (clearer, improved thinking)
- 63% increase in generating plausible multiple solutions to a problem
- 26% increase in accuracy
- 25% reduction in failed attempts

There was also a statistically significant reduction in both blood pressure and heart rate shown in the tables below. T-test for Dependent Samples (hr and bp data.sta) Marked differences are significant at p < .05000

	Mean	Std.Dv.	N	Diff.	Std.Dv. - Diff.	t	df	p
pre sbp 2	123.7000	12.43230						
post sbp 2	118.2333	14.61620	30	5.466667	9.985277	2.998632	29	0.005518

SBP reduced significantly after session 2 (p=0.006).

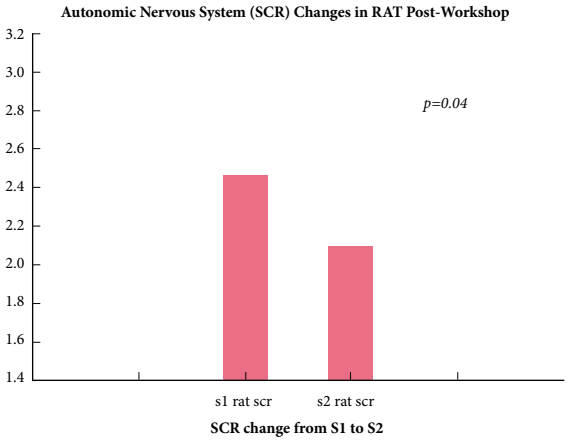
T-test for Dependent Samples (hr and bp data.sta) Marked differences are significant at p < .05000

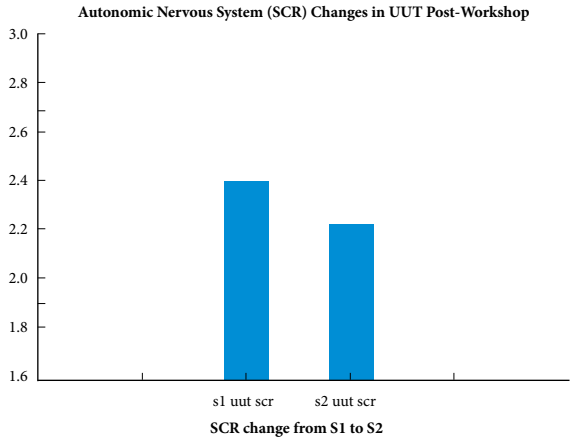
	Mean	Std.Dv.	N	Diff.	Std.Dv. - Diff.	t	df	p
pre sbp 2	72.03333	10.46994						
post sbp 2	66.36667	8.91525	30	5.666667	7.288788	4.258268	29	0.000198

HR reduced significantly after session 2 (p=0.0002).

This data shows that not only does Extreme Thinking increase cognitive functioning and creativity but it also significantly reduces stress as measured by blood pressure and heart rate.

This finding is further reinforced by the data emerging from the Skin Conductance Resonance(SCR) measuring the physiological impact of the Autonomic Nervous System (ANS).The results showed that the sympathetic or arousal part of the flight/fight response decreased during session 2, indicating that the participants were in a less aroused or more relaxed state compared to session 1. The reduction for one of the tests was greater and statistically significant (Remotes Associates Test) post training. Results are shown in the bar graphs below. (Where S1 and S2 represent the baseline session pre training and the lab re-measure post training respectively.)





What it means for leaders and organisations

In terms of translating these results into the potential benefits that we believe would flow to the organisation:

- Improved cognitive flexibility (shift from narrow focus on detail to big picture).
- Reduction in false starts and rework.
- Multiple solutions to problems providing choice regarding how to tackle complex business challenges.
- Increased clarity in decision making effectiveness whilst helping to maintain composure. The important flow on effect is that the leaders are more effective in their role when they are able to keep calm in the face of pressure. Composure increases responsiveness to environmental challenges and strengthens the leaders' ability to create a high performing Constructive culture allowing people to bring their best thinking to work.
- Increased capacity to deal with stress and pressure, and improved health outcomes which equals sustainable performance.

Conclusion Extrem^{3}e Thinking®: Radical Problem Solving in Action

Extrem^{3}e Thinking is so called because it challenges convention about how we think at work and how we solve complex problems. The underlying reference to 'extreme sports' highlights that this technique is a step change in how to approach problem solving. It is not intended to replace the traditional more linear analytical approach but rather to add it to the problem solving 'toolkit'

Leaders are vulnerable to stress and panic when they do not have any real sense of how to solve the complex problems they face. Their stress levels escalate in proportion to the length of time the solution eludes them versus the amount of time they have to deliver the solution. While some stress is useful and indeed some leaders may think they 'thrive' on stress, it is not a sustainable approach to achieving long term performance or motivating teams. As most extreme sports officiandos know, panic and potential are two sides of the same coin, so Extrem^{3}e Thinking® teaches leaders how to hold a point of tension with the panic through a process known as ARCS. This in turn increases the leader's access to creative thinking and problem solving while reducing their stress levels.

Creative thinking is quite possibly the last real competitive advantage companies have. Technologies, processes and information can all eventually be copied yet creativity has been something that business has traditionally outsourced to agencies and innovation specialists. In the digital age this approach severely restricts the ability of organisations to realize their potential.

Organisations need all their people to do their best thinking within their daily work context, not just when they go on holiday or have a break from the demands of their workplace. Extrem^{3}e Thinking® provides a simple and tangible way in which business leaders can access whole brain thinking to solve complex problems. Extrem^{3}e Thinking® provides a tangible way to build creativity and innovation within organisations. More than this, by reducing the stress levels of leaders Extrem^{3}e Thinking® leads to new ways of working, allowing leaders to stimulate creative thinking amongst their people – a key contribution towards building a Constructive culture.

Stories of change.

The Entrepreneur finds a way to get to market quicker

Cindy Luken, CEO of Luk Beautifood, had plans to develop over 40 cosmetic products from organic food ingredients to position her brand as a global innovator and to realize aggressive growth plans, but was concerned by the size of the investment - both in terms of time and finances. Her main concern was the product development process would take too long to bring an extensive collection to market and she would miss the best moment to launch. She wanted to be ahead of the curve.

As she began the Extrem^{3}e Thinking® experiment, she had an aha moment and concluded she should start with Beauty Juice Powders - made to consume instead of apply - to cement her brand's positioning 'be delicious inside & out". The clarity of thinking she developed helped her develop those products in a much shorter lead time than she previously imagined possible - bringing them to market in six months, rather than 18. Cindy says that the breathing exercise part of the technique has radically changed her ability to think clearly and make decisions. By practising the technique on a daily basis she is able to sieve through all the cluttered thoughts in her mind and land on the one gem that is worth pursuing.

Solving a complex logistics problem

Andrew Purkiss, from an international Express Freight carrier, was responsible for implementing automation and technology in a new $200 million facility in Western Sydney. This operation was designed to automatically process freight from a number of other facilities. The whole company was watching the facility to see if it could be a blueprint for similar upcoming operations in Melbourne and Brisbane. Although more than 90% of the freight was being processed efficiently, a small percentage still had to be handled manually, because the information required to automate the sorting was not available in a timely manner. Although it was a small percentage of the total freight, the costs associated with continuing to process it manually became a big focus for the company - and so a problem weighing on Andrew's mind.

The managing director insisted on a solution being found immediately and actually asked Andrew to go and sit in a room for 3-4 hours to solve it. With the knowledge he had acquired from the Extrem^{3}e Thinking® experiment Andrew believed that the solution would require a better way of thinking, it couldn't be solved by "brute force". He followed the technique and a short while later, while shaving, the solution – which was a multi-party technology solution - came to him and has subsequently been a spectacular success.

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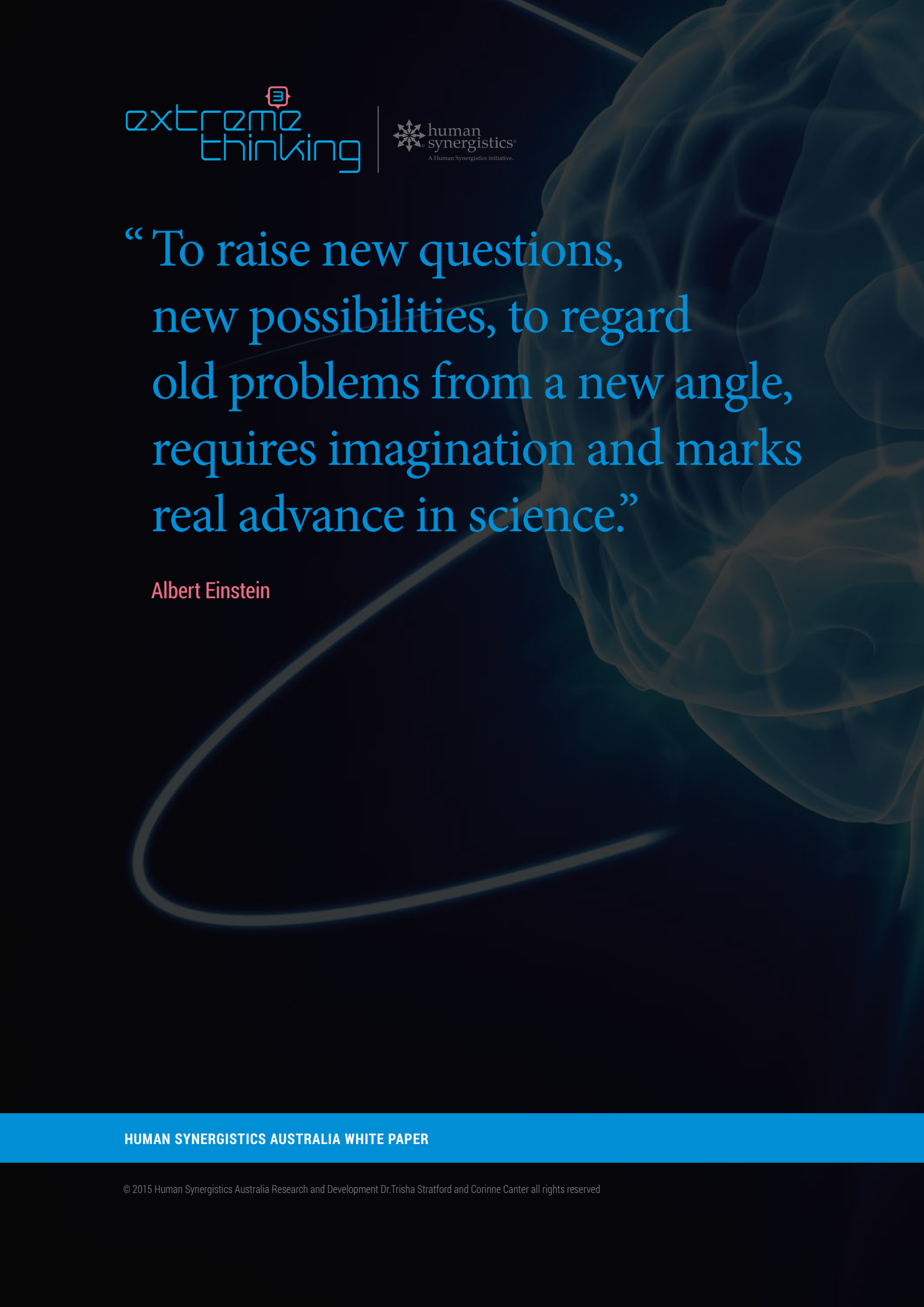

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"To raise new questions, new possibilities, to regard old problems from a new angle, requires imagination and marks real advance in science."

Albert Einstein

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