

Part I
**Creating
a high-
performance
brain**

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KEY 1

Nutrition

Refuelling smart

'To eat is a necessity, but to eat intelligently is an art.'

Francois de La Rochefoucauld

Think of your brain as a car and your body as a highway. Would you prefer to be driving a brand new Ferrari, or a rust bucket leaking oil and coughing smoke all over the road?

If your brain was a car, and you knew it needed fuel, what sort of fuel would you choose? Premium high octane, economy or diesel? What sort of car would you drive? Would you look after it, washing, waxing and cleaning it on weekends, or would you be one of those people who smoked on the way to work and left lolly wrappers and food crumbs all over the seats?

Substitute your brain for the car. How well do you fuel your brain? Are you eating clean, or is every night a frenzy of fast food and fizzy drinks? Then there's alcohol ...

Paleo, Pritikin and Pizza Hut aside, we now know from years of nutritional research that our choice of foods can influence:

- » our memory
- » our general cognitive skills

- » our mood
- » our mental health
- » our ability to perform well in the workplace
- » even our potential risk of brain disease.

We eat because we are hungry, because we are bored or to be social. We eat for pleasure or because we are miserable. We sometimes even eat because we are forced to (remember those dreaded cold brussels sprouts from childhood?).

What we are often blissfully unaware of however, is the influence that the many different physiological, psychological, social and environmental factors have on determining the how, what and when of our eating. These in turn impact our decision making and, importantly for many of us, our business outcomes.

So how do we keep our brains in optimal physical condition? In the Neuron Grand Prix, what needs to happen to claim podium position?

Brainy facts about nutrition and work

- » Our brain is an energy hog that consumes 20 per cent of all the energy we put into our body. Providing sufficient energy through an array of proteins, fats and carbohydrates is essential for good cognitive performance and health.
- » We can go without food for a while, but water is essential to healthy thinking. Even 1 per cent dehydration is associated with fuzzy thinking, so keep up your fluid intake with six to eight glasses of water every day.

- » Caffeine keeps us awake and alert. Some studies have shown it also helps the formation of long-term memory following study.
- » There is no single best diet or food. Following a brain-healthy eating pattern incorporates certain aspects of the Mediterranean diet and sticking to 'real food'. It's about including a wide variety of fresh, unprocessed foods, vegetables and fruits, lean protein (including three portions of oily fish each week), seeds, nuts and whole grains.
- » Our food choices determine our mood and contribute to our mental wellbeing and focus. Avoiding processed foods full of fat and sugar is the best way to maintain healthy cognition.

You're such a fathead

The human brain is around 60 per cent fat, so the next time you call someone a fathead, they are well within their rights to say, 'Same to you'. Consuming the right fats to sustain our brain's function and maintain our neural architecture is absolutely critical to functional integrity and brain performance.

The brain can produce its own cholesterol, but we rely entirely on our dietary intake of essential fatty acids (omega-3) to create neurotransmitters and keep neuronal membranes flexible for optimal brain function.

Low levels of omega-3 may cause your brain to age faster. Studies by ZS Tan and others using MRI scans and memory tests showed that those in the lowest 25th percentile for omega-3 consumption had smaller brain volumes and scored lower on memory, abstract thinking and problem solving.

An imbalance or overconsumption of bad fats changes the brain and contributes to poorer brain performance. Research has linked trans fats, as found in margarines, fast foods, baked snacks, biscuits, pies and frozen pizza, to poorer memory in young and middle-aged men. As Beatrice Golumb expresses it, ‘Trans fats increase the shelf life of foods and reduce the shelf life of people’. For those in the earlier part of their career, where performance matters, paying attention to food choices can make a difference.

Dr Golumb’s study found the following:

- » Men under the age of 45 who ate more trans fats performed worse on word memory tests, even after taking into account variables of age, education, ethnicity and depression.
- » Each additional gram of trans fat consumed was associated with an estimated 0.76 fewer words correctly recalled.
- » Those eating the highest amount of trans fats overall showed a 10 per cent reduction in words remembered compared with those adults who ate the least trans fats.

Gut instinct

Everyone knows the saying ‘trust your gut’. But is this actually good advice, not just in relation to our business instincts, but when it comes to what we like to eat?

Our food choices have been shown to affect how we feel. If we are unhappy at work, we sometimes seek consolation through eating — and what we choose to eat then is often not good food. We go for ‘comfort foods’, high in trans fats and refined sugar, which provide an instant high, followed by a big crash and burn, leading to a further drop in mood and energy.

Food choice matters because it determines mood and performance. One Spanish study of more than 12 000 subjects (average age 37 years), followed over a six-year period, revealed that those consuming a diet highest in trans fats had a risk of depression that was 48 per cent higher than those who consumed the least trans fats. Yes, not everyone in Mediterranean countries necessarily follows a healthy Mediterranean diet!

Medically, this finding is explained by the fact that trans fats stimulate a higher level of inflammation in the body, increasing the risk of fatty plaques being laid down and interference with the brain's neurotransmitters concerned with regulating mood.

Conversely, enjoying a diet higher in omega-3s, the fatty acids essential for good brain health and function as found in oily fish, has been shown to be associated with a lower risk of depression and cognitive decline.

So *should* we trust our gut when deciding what we feel like putting in our stomachs?

The answer is, not necessarily!

We have what is called a gut microbiome, a diverse bacterial population that lives in our gut. These bacteria can direct our brain's food choices to suit their survival needs, although we can counterbalance this through healthy food choices to change the gut microflora so as to stay healthier both physically and mentally.

FAT IS NOT ALWAYS UGLY

Not all fats are bad fats. Cholesterol, which has typically been portrayed as the Dr Evil of the fat world, is essential to the brain for synaptogenesis (the formation of new synapses) and hence critical for brain plasticity, learning and memory. Saturated fats, as found in meat, dairy, nuts and olive oil, benefit brain function when consumed in moderation.

Our brain has a very special relationship with cholesterol. The brain synthesises its own, retaining it and effectively shielding it from the rest of the body behind the blood–brain barrier. Twenty-five per cent of the body’s total cholesterol is found in the brain, mostly as myelin, the fatty coating around nerve cells that speeds up the transmission of electrical impulses.

Cholesterol is needed also for the formation of dopaminergic neurons, involved in our brain’s reward response system and motivation. Feeling good and being mentally rewarded for our efforts are critical for maintaining engagement and performance.

MINDING YOUR MIND INCLUDES MINDING YOUR WEIGHT

Obesity shrinks the brain. It reduces brain volume. It is also a risk factor for cognitive decline. With 30 per cent of the world’s population either overweight or obese, there are now more than 2.1 billion people at risk of cognitive decline through this factor alone.

Having a smaller brain volume affects brain function (see figure 1.1):

- » in the hippocampus, the area of the brain associated with learning and memory
- » in the frontal lobes, the area associated with higher-level thinking, including paying attention, planning and organising
- » in the anterior cingulate gyrus, the area associated with decision making, empathy and emotion
- » in the thalamus, the area associated with coordinating other areas of brain function.

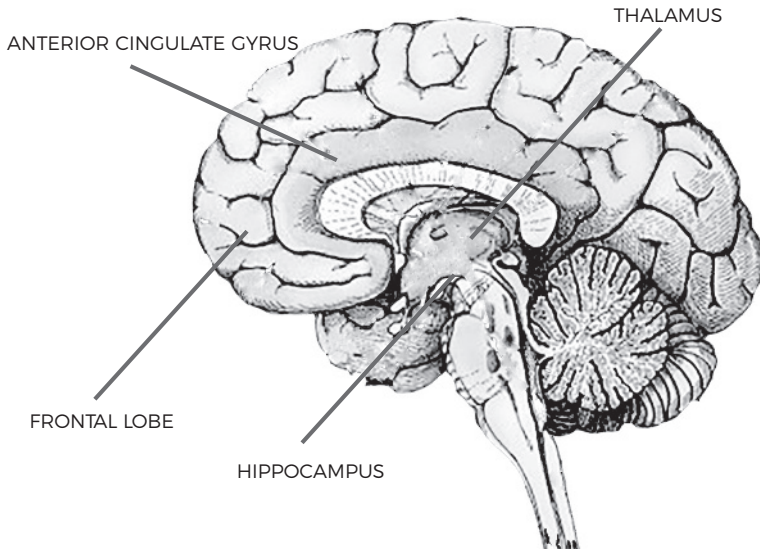


Figure 1.1: parts of the brain affected by obesity

Obesity affects our cognition because greater effort is required to complete complex decision-making tasks. Encouraging all staff to watch their weight not only helps them to stay fitter and healthier; it is a way to maintain their cognition.

Food and focus

We reach our cognitive peak for motor performance around the lofty age of 24. But before you slump into a deep depression about being ‘over the hill’, although your speed of processing may have slowed down, your increasing ability to use your experience and growing wisdom enables your brain to take a few mental shortcuts.

It’s a bit like discovering the disguised cut-throughs that enable you to escape the Ikea store more quickly without having to follow the illuminated arrows for the 30 kilometres

required to reach the checkout, when all you wanted was to buy a nice new office lamp.

A study in 2014 by Thompson and others analysed the influence of age on performance in 3035 players (aged 16 to 44) of the video game *StarCraft II* and found that while cognitive motor decline starts early, it is compensated for by the continuing adaptability of our massively plastic brain.

Hurrah!

One of the things we want to be able to do at work is focus on what matters, so we stay on task and get our work done. In some instances, the modern workplace seems to conspire against us by presenting us with ever-increasing levels of distraction.

We can help boost our focus by paying attention to which foods we choose to eat. It really is as simple as focusing on eating ‘real food’. The following foods have been shown in nutritional studies to assist in boosting focus, and this list is by no means exhaustive. Just think of fresh, minimally processed foods and you will be on the right track, but consider especially:

- » leafy greens — kale, spinach, Chinese broccoli, chard and other dark leafy greens
- » whole grains — oats, couscous, brown rice, rye, barley and (for those who can tolerate gluten) wheat
- » coffee — two or three cups of coffee each day to keep us awake, alert and primed to pay attention
- » berries — especially the deeply pigmented blue and red fruits, such as blueberries, cherries, plums, strawberries and raspberries
- » cold-water, oily carnivorous fish — wild salmon, herring, mackerel, pilchards, sardines and anchovies
- » nuts and seeds — walnuts, almonds, flaxseed, sunflower seeds

- » dark chocolate — minimum 70 per cent cocoa solids, preferably the best you can find, because here it's quality, not quantity, that matters
- » eggs — choline boosts focus and helps to reduce cortisol, one of our stress hormones.

PRIMING THE PUMP

As mentioned, the brain consumes 20 per cent of the energy we use each day, despite comprising only 2 per cent of our body mass. Like a credit card with a high interest rate, it's for the best if we keep it in the black. People who skip breakfast have greater activity in the pleasure-seeking part of the brain and are more easily seduced by pictures of high-calorie food. Skipping breakfast means you are more susceptible to that advert for Subway or McDonald's you pass on your way to work.

When we skip meals, our neurons, which rely on glucose as their primary energy source, have to break down stores from elsewhere. That's why it's better to have a handy supply of snacks such as fruit, a handful of nuts or some crackers to get you through a busy thinking time so you can maintain your cognitive stamina and focus.

Paradoxically, intermittent fasting has a positive impact on our biochemical balance, improving insulin sensitivity and lowering peripheral cholesterol. Skipping an occasional meal is not a problem and can help with weight loss or maintenance.

Overall, providing our brain with a steady supply of oxygen and appropriate nutrients is the best way to keep it fuelled up for best performance.

If you've been wondering whether hunger and fatigue really make that much difference to outcomes, the answer is yes they do. If you've got to focus over a long period of time, taking

regular brain breaks and having a meal or a snack replenishes your ability to keep making decisions.

Avoiding decision fatigue matters. Think about those times at work when running out of mental juice could potentially alter your decision making and outcomes. That's why important decisions should not be made late in the day.

STOCKING UP ON WILLPOWER

Every time we make a decision, big or small, we exert willpower — and our daily stock of willpower is not infinite. With around 30 000 decisions to be made every day, it's easy to see how our cognitive energy can be depleted over the course of the day. Self-control principally involves the prefrontal cortex and is hugely energy demanding. Avoiding confused thinking in the workplace resulting from low glucose levels is essential from a health and safety perspective.

The ramifications of poor decisions may impact more than just the hungry person involved. It could spell the loss of a job, a client or even a business.

We can recover willpower and cognitive stamina through the simple act of eating something to restore the glucose supply our neurons need to start firing again. A study by Roy Baumeister and John Tierney showed how drinking one glass of sweet lemonade can produce the desired effect. (Artificially sweetened lemonade doesn't produce the same improvement.) But sugary drinks are not the answer in the 'real world'. Animal studies have shown that adolescents who drink sugar-sweetened drinks daily show increased inflammation of the hippocampus, the area of the brain associated with learning and memory, leading to an impaired ability to learn and remember.

The Western diet is often high in added sugar. Worldwide consumption has tripled over the past 50 years. This is associated with the rapid escalation in the global incidence

of obesity and type 2 diabetes, both risk factors for cognitive decline and dementia. Animal studies have shown that having too high blood glucose levels affects insulin receptors in the brain, leading to a dulling of spatial learning and memory. Choosing to consume fewer foods that are high in sugar and to increase fibre and protein intake along with omega-3 supplements appears to partially negate this effect.

We obtain the glucose we need from the carbohydrates found in fruits and vegetables, so eating a small banana instead of a sugary snack will do the trick, as will snacking on blueberries, shown in studies to boost memory and concentration for up to five hours.

Creating a workplace culture that discourages (rather than bans) soft drinks and sugary snacks, leading by example, is one way to assist all brains at work to stay healthy and function better.

The java jive

The world's most widely consumed psychostimulant is caffeine. We drink it in our coffee, tea and energy drinks. We eat it as chocolate. We love our caffeine because it gives us a buzz, it keeps us alert and we enjoy the taste.

When first established in the 17th century, European coffee houses became meeting places and powerhouses of intellectual discussion. Perhaps we cannot make the same claim of our cafés and coffee outlets today, yet many business meetings revolve around meeting up for a coffee.

WE USE COFFEE TO KEEP US ALERT, BUT DOES IT ACTUALLY IMPROVE PERFORMANCE?

The short answer is no, it makes no difference overall, *except* when it comes to learning and forming long-term memory. A study published in *Nature Neuroscience* in 2014 showed that

timing is everything here. Drinking a coffee (or tea) *after* learning something enhances memory consolidation. So treating yourself to your daily java after the lecture or training course is finished is the way to go!

Just remember, too high a dose of caffeine will start to disrupt working memory performance through the overstimulation effect. Caffeine increases the rate of neuronal firing, which would seem beneficial but quickly leads to cognitive exhaustion and the feeling we need another cup.

The recommended maximum intake of caffeine is 400 mg a day, or about three cups of coffee. There is a wide spectrum of individual sensitivity, however, and too much caffeine can make you feel jittery or lead to heart palpitations.

There have been a number of deaths reported from overconsumption of caffeine, usually in the form of 'energy' drinks. These innocuous-tasting drinks can contain very high levels of caffeine, which, when consumed in large amounts over a short period of time, can lead in susceptible individuals to unstable heart rhythms and tachycardia (rapid heartbeat). According to the University of New South Wales (cited by ABC Health and Wellbeing), per-drink caffeine levels are as a rule of thumb (depending on the length of time of brew and the type of tea or coffee beans):

- » one cup of barista-style coffee contains 40 to 90 mg caffeine
- » one cup of instant coffee contains 60 to 100 mg
- » one cup of black, green or white tea contains 30 to 100 mg

Among the energy drinks:

- » Red Bull contains 80 mg per 250 mL
- » Mother contains 160 mg per 500 mL can.

You might think, well, Mother has no more caffeine per millilitre than Red Bull. The issue is that once the can is open, of course you are more likely to drink all of it!

It doesn't take much to reach that recommended daily limit of 400 mg. But by staying close to an average of two to three cups of coffee a day, you won't be putting yourself at any particular risk of harm to your health.

OTHER BRAINY BENEFITS OF COFFEE DRINKING INCLUDE A LOWER RISK OF DEMENTIA AND, ACCORDING TO THE NURSES' HEALTH STUDY OF OVER 50 000 WOMEN, A LOWER RISK OF DEPRESSION.

Our daily desk

Carl Honoré believes eating well is a lost art. 'Food is often little more than fuel to pour down the hatch while doing other stuff—surfing the Web, driving, walking along the street. Dining “al desko” is now the norm in many workplaces. All of this speed takes a toll. Obesity, eating disorders and poor nutrition are rife.'

It may not be appropriate for workplaces to regulate what their staff eat, but promoting a work culture that endorses healthy nutrition makes sense, especially as we spend two-thirds of our lives there. Leading by example means that everyone from the CEO down stops for lunch and takes appropriate refuelling breaks mid morning and afternoon, and that healthy food choices are made readily accessible.

The Association of UK Dieticians has put in place 'Nutrition in the Workplace', a service providing nutrition workshops such as 'Good mood food' and 'How to sustain yourself through a busy working day'. In addition they provide one-on-one nutrition clinic days.

Nutrition Australia runs a similar workplace health and wellbeing program, providing information and education to companies in the form of nutrition seminars; cooking demonstrations; lunch 'n' learns; menu, catering and vending machine assessments; one-on-one consults; and customised programs.

THE QUESTION IS, WITH GROWING KNOWLEDGE OF HOW IMPORTANT NUTRITION IS TO OUR MOOD, WELLBEING AND PERFORMANCE, CAN WE AFFORD THE CONSEQUENCES OF POOR NUTRITIONAL CHOICES?

TIME IS MONEY

When feeling time poor and under the pump or chasing deadlines, we are not focused on making the best food choices. We make do by eating on the run, grabbing whatever food is available, which is typically fast foods laden with fat, salt and sugar. Indulging in poor nutritional choices at the very time when you require your best thinking skills leads to poorer performance and poorer decisions.

The outcome? A downturn for our bottom line.

There are many reasons why it makes good business sense to promote healthy workplace nutrition:

- » It boosts overall health and vitality.
- » It boosts productivity and performance.
- » It reduces absenteeism and sick leave rates associated with chronic health problems.
- » It reduces the costs associated with:
 - » higher levels of sick pay
 - » disability associated with chronic health conditions
 - » early retirement.

A healthy workforce is a healthy business.

We need good food:

- » for stamina — to provide us with the fuel we need to get us through our long working day
- » for focus — to help us pay attention to what matters, learn and remember
- » for a positive mood — to raise confidence and competence, and foster a balanced approach to our tasks
- » for better cognition — for problem solving, decision making, innovation and insight.

FEED YOUR BRAIN

It's all about the right fuel for the right vehicle.

A multitude of eating plans and diets are promoted, each of whose authors tout their particular program as inherently superior to all others. Some have a scientific basis; others are more faddish. Extreme examples will not only give your brain a big fat headache but can be dangerous to your general health.

But is there one superior brainy diet? In 2014 Katz and Meller compared the medical evidence for and against all the current mainstream diets, to see if one really did have the edge over another. What they discovered was that the solution to great health comes from what they term 'real food'.

While many eating plans have merits, whether you choose to follow a vegetarian, vegan macrobiotic, raw, gluten-free or just plain fussy diet doesn't matter, so long as your chosen way of eating provides your brain and body with all the essential nutrients it needs to stay healthy.

Rather than following the latest fashion trend of over-proscriptive, regimented eating plans, healthy eating starts by including healthier alternatives. If it's fresh, locally sourced

and unprocessed, chances are it will be a healthy food. And making a series of small changes is easier to adapt to for the longer term.

If in doubt, remember that ‘diet’ is simply an acronym for ‘Do I eat this?’

The eating plan that has consistently been shown by multiple studies to be good for the brain (and is of course taken for granted by the people of the region!) is that followed by the communities that have lived around the Mediterranean for centuries. This diet comprises green leafy vegetables, lean protein (especially cold-water, oily, carnivorous fish), seeds and nuts, whole grains, deeply pigmented fruits, olive oil and red wine (in moderate amounts).

Studies by Georgios Tsivgoulis and others have reported those without diabetes who followed the Mediterranean diet more closely had a 19 per cent lower risk of developing memory and thinking difficulties compared with those following a more typical Western diet that is considerably higher in trans fats, saturated fats and sugar.

Excluding certain food types — going ‘low-carb’ or ‘sugar-free’, for example — isn’t the way to a balanced diet. Neither will swallowing a bucketload of vitamins and minerals provide you with the cognitive edge you may be looking for. Even the so-called brain ‘super foods’ are insufficient on their own. While adding in some extra turmeric, cacao and fish oil may be useful, they don’t provide a lot of benefit in isolation.

In a nutshell, synthetic vitamins and supplements by themselves can never deliver the same benefits to be found in the unique synergy of elements that real food provides.

That's not to say having snack foods or fast food occasionally is going to be detrimental—as long as these foods are an occasional treat rather than staples.

**THE QUICKEST WAY TO COMPLETELY
STUFF UP OUR BRAINS IS TO STUFF
OUR BODIES WITH FAST FOOD.**

The excuses we make to ourselves for not choosing healthy foods are the obstacles we put in our own path. What we're really saying is, 'I don't want to invest the time in changing how I do things'.

Tips for building brain nutrition at work

For the individual

I'm just too busy to stop and eat.

Taking the time to pause and replenish your brain's fuel stores will increase efficiency and help you get your work done better and faster.

I don't have time to stand in line and wait to buy lunch.

Pre-ordering can save time, or bring lunch with you to work. Preparing a nutritious salad, wrap or roll need only take a couple of minutes in the morning.

The cafeteria only serves hot chips and deep-fried food.

As above, but maybe it's time to have a chat with management about introducing some healthy food alternatives at work.

When I'm really stressed and under the pump, I tend to gravitate to fast food and carbs.

Being aware of how we respond to stress allows us to be prepared with some healthy snacks such as a banana or a small packet of nuts, which makes it easier to forgo the donut or pizza alternative.

If we're all working late and someone orders in takeaway, I don't like to be difficult.

What we do occasionally isn't the problem. So unless working late is the rule and this is an office ritual, sometimes it's better to go with the flow and choose healthier options at other times.

For the organisation

Leadership starts by example:

- » If the CEO and senior execs are seen to take appropriate meal breaks and make healthy food choices, it demonstrates an appreciation of the importance of maintaining health and vitality.
- » Provide fresh water that is readily accessible to all staff, to keep brains hydrated and working well.
- » Vending machines that provide healthy snacks and drinks are great for busy people and will be appreciated.
- » Keep fresh fruit (instead of cookies) on view in a bowl or in the fridge in an office kitchen.
- » Provide safe food storage for those bringing food into the workplace.
- » Accommodate those with special dietary needs. As with many restaurants and cafés, including vegetarian, gluten-free and lactose-free options, for example, means everyone is included in a brain-friendly nutrition environment.
- » An in-house cafeteria is the ideal place to provide wholesome meals at a reasonable cost, creating a social hub where people can enjoy their meal break while catching up with colleagues.
- » Educational sessions led by accredited nutritionists can provide nutritional advice and practical ideas in lunch'n'learns.

- » Information brochures outlining healthy food options and nutrition policies in the workplace can reinforce the message that healthy eating is encouraged.
- » Discourage 'al desko' eating by making it a policy that meal breaks be taken away from the desk. Encouraging all staff to take regular meal and brain breaks rather than 'working through' promotes a healthy working brain culture and higher performance.
- » When catering for in-house meetings and conference sessions, use providers that offer a variety of healthy options, including platters of fresh fruit, salads and vegetables.