

# HEALTH & PE

Volume 3, Issue 4, 2019



HEALTH & PE is published and distributed by:  
**Warringal Publications, PO Box 299, Richmond, VIC 3121**  
**P: (03) 8678 1118 W: [www.warringalpublications.com.au](http://www.warringalpublications.com.au)**  
**ISSN 1837-8161 / Copyright 2019 © Health & PE**

# CONTENTS

<b>The neuroscience of stress: Understanding the science to increase well-being and performance in high school . . . . .</b>	<b>4</b>
Understanding neuroscience principles . . . . .	4
The Brain and Learning . . . . .	5
Mirror Neurons . . . . .	7
Stress . . . . .	7
Motivation . . . . .	7
Warning Signs . . . . .	8
Social Media as a Warning Sign and Coping Strategy. . . . .	8
Be Aware! . . . . .	8
Breathing . . . . .	8
Sleep and the Brain . . . . .	8
Exercise . . . . .	9
Nutrition . . . . .	9
 <b>The physical and mental health benefits of bootcamp – Hooyah to that! . . . . .</b>	<b>11</b>
Exercise can help maintain good health and reduce the risk of chronic disease. . . . .	11
Physical activity is also good for the mind and brain and therefore mental health. . . . .	11
What is Bootcamp? . . . . .	12
Benefits of a bootcamp program . . . . .	13
Is bootcamp the best choice of physical activity? . . . . .	14



# THE NEUROSCIENCE OF STRESS: UNDERSTANDING THE SCIENCE TO INCREASE WELL-BEING AND PERFORMANCE IN HIGH SCHOOL

**Rita Princi-Hubbard B.Psych(Hons), M.Psych(Clin), Clinical Psychologist**

Stress is everywhere. At school it is mostly associated with pressure, anxiety, tension and worry. The more stress that is present the more likely it is for students to experience challenges with concentration, motivation, memory, planning and organising, completing assignments and studying for tests and exams. However, when neuroscience or brain-based principles of stress are understood, a balance between helpful and unhelpful stress can be achieved. Then the focus shifts firstly, to attaining and maintaining well-being then secondly, to increasing and sustaining performance.

## Understanding neuroscience principles

### The science of “us”

Connection is the first neuroscience principle. In particular, when neurons fire together they create consistency. The connection principle also applies to *humans* because we need to connect to others in order to thrive. The role of survival is to protect ourselves but as soon as we feel even a little uncomfortable our learning drops and disconnection occurs.

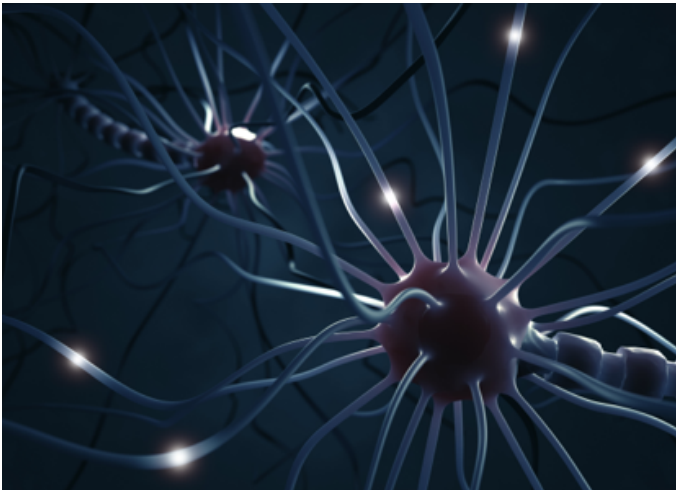


Figure 1: Neurons work best by firing together, a connection principle that also applies to humans

*Memories* are networks of neurons that fire together to create consistency. Repetition strengthens these networks. Therefore, the more we see something, hear something, feel something or think something, the stronger the neural connections become which means that we will be more likely to experience or do that something again.

So, when a student feels optimistic and keeps trying despite challenges, then neurons will connect and fire to help them continue with a task and increase the likelihood for success. However, when a student feels pessimistic and doubts his/her ability, then neurons fire together to either avoid the task by procrastinating or keep working on the task but never feeling confident to finish it.

The more a student reacts in the same way the more the neurons will fire together to strengthen the usual response. Neurons are strongly wired to experience distress, then glial (or glue) cells are created to feed off the neural debris and glue the neural networks together, which means that the networks become stronger and they are more likely to be activated again. However, when a new, positive pathway is created, the new neurons fire together to increase wellness. Consequently, a student's awareness about this process can help direct him/her to focus on consistently repeating a new way of responding to facilitate the creation of new neural pathways. This is called neural plasticity, which enables new memory networks to be created.

### Triune brain

The triune brain, as explained by Paul MacLean (1990), is a simplistic model but a useful way to think of the role of each of the 3 key areas of the brain and the impact on functioning when these areas are not integrated.

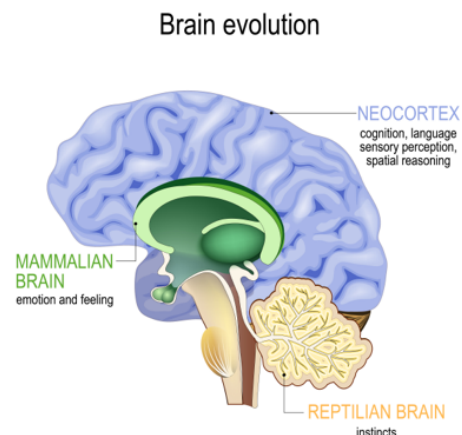


Figure 2: A simplistic model of the brain, depicting three main regions.



## Neurofundamentals

- 1 – Primitive, reptilian brain (instincts and survival)
- 2 - The paleomammalian complex – limbic system or emotional brain (impulsive)
- 3 - Pre-frontal cortex, or neocortex (smart brain)

## The brain and learning

The brain develops from the bottom up: from the brain stem to the top of the brain or pre-frontal cortex. The brain also develops from the inside out, from the limbic system to the pre-frontal cortex.

### The primitive brain (the survival brain) – 1

The primary focus of the brain is survival. First things first! All information enters through the impulsive brain, via the thalamus (or relay station) and connects with the amygdala with one synapse at 50 milliseconds (which can be referred to as the speed of unconscious processing). This process is the point at which the brain checks whether the incoming information is safe or dangerous.

When it is deemed to be safe then the information is redirected to the pre-frontal cortex or smart brain, but at a slower pace (500-600 milliseconds) as conscious processing takes longer. During this slower process is where thriving and sustained learning occurs. We also learn when the survival systems are activated, but we usually learn to fear the task and avoid it in the future.

The main function of the primitive brain or survival brain is to activate the flight, fight or freeze response whenever we feel unsafe. This part of the brain is active when we are hungry, thirsty, sleep-deprived and tired, or have been overactive, but also when we've been underactive. This area of the brain develops in the first few weeks after conception. We share the primitive brain with all creatures that have brains. When we are in trouble the survival brain is activated but at the expense of the pre-frontal cortex or smart brain. For this reason logical thinking decreases. It's a very powerful system. **We react first then decide second.**

**Myth.** We do things because we've thought about it. However, this process is not true for fear or prejudicial reactions. Our brains evolved to operate in small tribal groups and be suspicious of other groups. Therefore, the **brain sifts through and selects information that matches the fear or prejudicial reaction** (Cozolino, 2018).

### The paleomammalian complex – limbic system or emotional brain (the impulsive brain) – 2

The paleomammalian complex (also known as the limbic system, emotional brain or the impulsive brain) is fully developed at birth but only partly functional. It needs the environment to help it develop further. The key functions of this area of the brain start with the **thalamus**, also known as the relay station because all information that is experienced enters the brain via the thalamus, which then connects with memory systems. It also connects with the **amygdala** in one synapse. The role of the amygdala is to determine whether incoming information is safe or dangerous. Therefore, the amygdala plays a major role in anxiety due to its role in the brain's early warning system. The **hypothalamus**, another key area, monitors and controls the internal systems of sleep, circadian rhythm, appetite and thirst. However, when these needs are unmet it sends a signal to the amygdala. As a result, a stress response is initiated in order to prepare the body to handle stressful events via the HPA axis (i.e., hypothalamus, pituitary glands and adrenal glands) - the fight, flight or freeze response.

**The hippocampus** is another critical area of the brain because it maps events and develops context as it stores all information about everything experienced each day. One of the important roles of the hippocampus is its responsibility for short-term memory. Critically, during the dreaming phase, or rapid eye movement (**REM**) stage of sleep, the hippocampus transfers essential information absorbed during the day to the **left pre-frontal cortex** so information can be accessed the next day. This process is known as hippocampal discharge.

Over time, the more the same information is stored in the hippocampus each day, then transferred during REM sleep, the information is then transferred to long-term memory storage and available for processing. Interestingly, insignificant details are discarded during sleep, which clears the hippocampus for a new day to store new details. Another important process of the hippocampus is its release of brain derived neurotrophic factor (**BDNF**) during sleep. BDNF can be described as "brain food" as it supports the health of neurons.

Therefore, lack of sleep interferes with the stress relieving process of hippocampal discharge and the release of BDNF, as the hippocampus is highly sensitive to the smallest clue of stress.

The hippocampus associates fear with environmental stimuli, which means it cannot then apply context to make sense of the incoming information because this process is dismissed when we are highly stressed, anxious and depressed. As a result, we become trapped in loops of distress and can lose rich memories, which

start to fade as sadness develops. Therefore, the hippocampus needs regular, consistent sleep as well as regular exercise, which decreases cortisol (a steroid hormone released during stress) and increases dendritic connections between neurons to improve memory.

## Limbic system

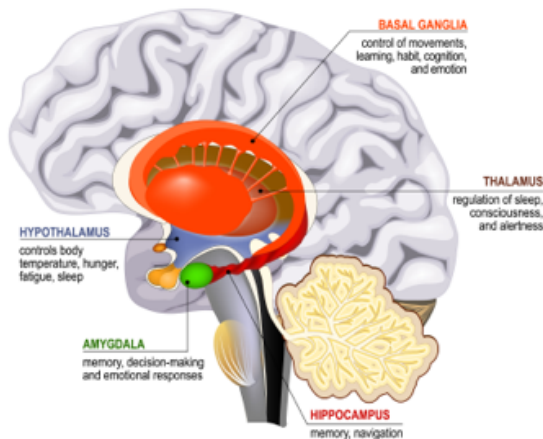


Figure 3: An overview of the brain's limbic system.

Too much cortisol causes atrophy in the hippocampus and inhibits memory. Regular sleep and exercise decrease cortisol and improve memory and well-being.

### The neomammalian complex (pre-frontal cortex) – the “smart brain” – 3

At birth, this part of the brain is only partially developed and almost non-functioning. The pre-frontal cortex, or smart brain, needs a healthy connection with the environment in all ways - physically, emotionally, cognitively and socially - to create opportunities to learn and form neural connections. The smart brain is not fully developed until 25 years of age.

The **left-prefrontal cortex (LPFC)** is predominantly the verbal side. It is responsible for analysis and synthesis of information, language and mathematics, planning and organising and ways to handle problems. Specifically, the LPFC controls the lower cortical structures. However, when we experience stress and anxiety, the LPFC shuts down and we experience difficulty with decision-making and speech. Neuroscience researchers refer to this difficulty as “speechless terror”.

An example of this phenomenon can be seen during public speaking. Even though a student may have

practised his/her speech, when standing in front of an audience they may begin to feel anxious because they are questioning their ability to present. Then the survival systems are activated and cortical blood flow in the LPFC is redirected away to the survival systems. Therefore, the LPFC does not have sufficient blood flow to activate speech.

This example also shows how unhealthy stress interferes with our ability to express ourselves and what we know. Unfortunately, this experience can lead to more stress as a result of feeling inadequate or embarrassed, which can then exacerbate the activation of the survival systems at the expense of the LPFC.

The **right prefrontal cortex (RPFC)** is responsible for nonverbal functions. Its ‘language’ is melody, physical gesture and facial expressions. The RPFC is vital in the retrieval of memory and for spatial recognition and nonverbal problem solving, spatial awareness, creativity, and, importantly, emotional wellness.

The RPFC develops significantly during 0 to 3 years of age, a critical time life stage, also known as the first 1,000 days. During this time, young children depend on healthy attachments with caregivers for healthy development to occur, which increases their sense of safety and ability to connect with others. The RPFC, therefore, is critical in developing healthy relationships with others throughout life.

The **right orbito pre-frontal cortex** needs to be activated in the RPFC for development of empathy and compassion for self and others. Therefore, this part of the brain is important for developing higher emotional intelligence (EQ), comprising self-awareness, self-regulation, empathy and compassion, social skills and motivation.

Interestingly, research shows EQ is the biggest predictor of success in life - not just in academic performance, but in every area of life. However, sometimes people with higher EQ (also not fully developed until 25 years of age) can tune into others’ emotions and feel their emotions, which can increase stress. Further, people with higher EQ are sometimes sought out as “counselors” for their friends, because of their higher empathy, compassion and trustworthiness. Therefore, it is important to teach people with higher EQ to care for themselves first, and to teach people with lower EQ ways to become more empathic and compassionate. Unfortunately, stress and stressful environments can affect the development of the right orbito PFC and lead to low resilience.

When we have good functioning in the right orbito pre-frontal cortex we are more able to connect with others in healthy ways. Therefore, we need right-brain to right-brain connection.

## Mirror neurons

Neuroscience researchers discovered that some neurons fire both when we perform a behavior and when we observe another person perform a behavior. This finding then led the researchers to further explore whether some neurons that fire when we have an emotional reaction also fire when we observe another person experience an emotional reaction. Their findings showed that our brains are designed to MIRROR other people's EMOTIONS and BEHAVIOUR! This means that watching others can influence our behavior and emotions. Advertisers depend on this fact! Therefore, students' stress may further increase when observing their peers.

## Stress

While too much stress can decrease a student's ability to focus, concentrate, plan and organise, and interfere with their sleep and motivation, there is a formula that can help harness healthy stress to achieve.

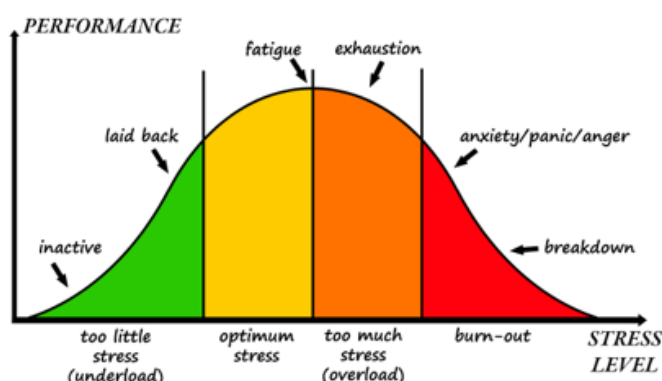


Figure 4: A certain level of stress can be helpful, but too much interferes with health and performance.

Yerkes and Dodson (1908) found that people require 50 percent stress in order to achieve 100 percent performance. However, importantly, the 50 percent stress needs to be accompanied with an "I can do" attitude and lots of practice to complete the task at the highest level. The research also showed that when stress increased beyond 50 percent then performance decreased when the belief changed to "I can't do". Since then researchers have replicated these findings and applied them to many settings, including the educational environment.

One of the most important ingredients for achieving optimum performance and increasing a student's belief in their ability to manage stress is **balance**. Balance is achieved by (a) regular sleep, with lots of opportunity for REM to release BDNF and for hippocampal discharge; (b) exercise, to decrease cortisol and create BDNF; (c) healthy nutrition to increase healthy brain-gut connections; and (d) healthy relationships with friends, family and teachers.

## Motivation

*What is motivation?* Neuroscience research explains motivation is *dopamine release*! In particular, dopamine – a neurotransmitter – is released when a task is successfully achieved. For example, when a grade is achieved, when a goal is kicked, when the next level is achieved in a video game, or when we make a delicious sandwich then dopamine is released and we are more likely to do that again.

*How do we get it?* We need "meaning" that grabs us! We need a reason that is important to us. When others expect us to do something and we know that it is their goal, even if it is their goal for us, we are less likely to achieve it if it is not our goal too. Therefore, firstly, the focus needs to be on our reason to pursue the goal and why achieving the goal is important for us. Secondly, we need to ask ourselves, "Am I being realistic?" and "Who can help me?"

As a result, we will be more able to approach the goal even if there are challenges. When students are able to connect with the goal then they will be more able to commit to it, persevere despite challenges, acknowledge the effort it will take, understand the importance of goal setting by breaking down the task into manageable chunks, and achieve balance with breaks, exercise, rest and sleep, fun, and time with family and friends. Importantly, it is recommended to always be mindful of any warning signs!

**CAUTION:** When a challenge is SUCCESSFULLY AVOIDED, dopamine can also be released which can interfere with moving forward and fulfilling goals, thereby increasing disappointment which can then lead to anxiety and further avoidance. A vicious cycle!

## Warning signs

### *Signs of Emotional Distress – SURVIVAL BRAIN ACTIVE*

- Reduced sleep (insomnia) or over sleeping (hypersomnia); tiredness/fatigue, lethargy; disrupted sleep routine
- Appetite increase or decrease; over-focus on body image
- Obsessing about problems or seemingly unrelated problems
- Hyperactive, jumpy and fidgeting
- Poor memory
- Difficulties in expressing and explaining
- Decreased concentration & attention; decreased memory;
- Not listening; misinterpreting and jumping to conclusions
- Withdrawal; not starting or completing assignments or not studying for exams; over-studying and not able to submit an assignment
- Difficulties with planning and organising
- Anxiety and panic during tests and exams
- Over-emotional – crying easily, becoming angry easily
- Over-logical – arguing and debating
- Increase in risk-taking behaviour
- Increased clumsiness and accidents
- Wanting to disappear

## Social media as a warning sign and coping strategy

Social media can be used for relaxation and for connecting with others, which can be a stress reliever. Research shows that social media can simulate a sense of belonging, which can activate dopamine release. However, when it is used to avoid study or another task then the avoidance and sense of relief can also lead to a dopamine release. As a result, when a student tries to then approach study, they may experience increased anxiety as the HPA axis will be activated when they realise that the study they had planned has not been completed. The likely result is that they will be more likely to reconnect with social media and dopamine will be released because they have successfully avoided the perceived stressful study requirement. Another vicious cycle is created!

However, social media can also increase stress while a student is concentrating when they are constantly

interrupted by notifications popping up intermittently. The notifications may be about friends' posts in which the student is included, or friends' posts in which the student is not included, or about local and worldwide events.

Therefore, balance is again recommended to manage the many and varied warning signs.

## Be aware!

- Are your thoughts, feelings, choices coming from your survival brain or from your smart brain?
  - Are you in charge of your choices or are you reacting?
  - Remember what happens when survival brain is activated? We react then we justify later because of reduced cortical blood flow in the LPFC.
- Your smart brain needs to be in sync with your survival brain.
  - When the key areas of your brain are integrated then you will feel more connected with yourself and be aware of your choices, enabling you to make the best decisions for your learning and well being.

## Breathing

We need to breathe to stay alive! Research tells us that different areas of the brain can be activated dependent on whether we are breathing slow and calmly or fast and rapidly. Interestingly, when breathing becomes more rapid, the survival systems of the brain are activated, LPFC and RPFC areas are compromised, the HPA is activated and stress increases. However, when breathing is slower, with more focus on the out-breath than on the in-breath, then the survival systems deactivate and the frontal areas of the brain are accessible again. Hence, for this reason, research recommends regular meditation and mindfulness practice to calm the brain and the body to manage stress and decrease the development of anxiety and depression.

## Sleep and the brain

### Hippocampal discharge & neural growth

**According to the National Sleep Foundation,** teenagers need between 8.5 and 9.5 hours sleep per night on average to function at their highest level for rest and **hippocampal discharge**. Not getting enough sleep limits a teenagers' ability to learn, listen, concentrate and solve problems. Lack of sleep can also increase physical pain, depression and anxiety and significantly reduce memory.



### Useful tips to achieve healthy sleep

- Reduce 'screen time' – less TV, video games and internet before bed.
- Read an actual book.
- Light exercise before bed.
- Avoid NAPS longer than 10 to 20 minutes as sleeping before bedtime can interfere with nighttime sleep
- Maintain a 'sleep routine'. Relax, get ready for bed, go to bed at same times each weeknight.
- Sleep tracking and meditation applications can also be helpful.

## Exercise

### Breaks and movement

Neuroscience research recommends regular breaks when studying. A study by Fenesi and colleagues in 2018 found that during a 50-minute lecture, students recalled more information when they were able to get up and move 3 times during the lecture when compared with students who did not move during that time. Therefore, frequent breaks are recommended during study and generally exercise will help with concentration and motivation and improve sleep and memory function.

## Nutrition

Healthy nutrition is important for good physical and mental health. It is important to be mindful of the negative impact of excessive sugar intake, caffeine consumption and processed foods on both the body and the brain. Recent neuroscience and nutrition research now provides scientific evidence supporting the impact of these foods on brain function and the benefits of reduced sugar, increased protein, fruit and vegetables - and water.



Figure 5: Good sleep, regular breaks, social interactions and healthy nutrition all support good performance.

Stress is everywhere. However, when students understand the neuroscience principles that explain both helpful and unhelpful stress, they will be better equipped to achieve balance and meet their needs for slow and calm breathing and achieving sufficient sleep, regular exercise, healthy nutrition, relaxation and mindfulness, and time with family and friends. This important formula will equip students to increase their ability to perform at their true potential.

## Student activities

1. What is the difference between healthy and unhealthy stress?
2. What key areas of the brain are activated when feeling stressed? What are the functions of each of these key areas?
3. How can you help reduce your triggers by being aware of when your stress levels increase?
4. Why is it important to focus on wellness before performance?
5. Explain why maintaining a healthy sleep routine, nutrition (food and water), exercise/ rest, time in nature and being in helpful relationships is important for your brain.

## Exercises

- Allow time to vent when needed. Know the people who will listen to you with the intent to hear.
- Acknowledge your underlying fears – use mindfulness, exercise, talking with supportive others; friends, family and teachers.
- Sleep, healthy nutrition, exercise, smile, laugh, relax – be kind to you.
- Empathise with yourself and talk with other people who empathise with you.
- Learn to stay calm when you're anxious. Remember to practice breathing, mindfulness and meditation exercises regularly.
- Incorporate relaxing activities into your daily life.
- Consider counselling if everything becomes too overwhelming.



## References

- Ackerman, S. (1992). *The Development and Shaping of the Brain in Discovering the Brain*. Academies Press. Washington (DC). Online <https://www.ncbi.nlm.nih.gov/books/NBK234146/>
- Allen, K. (2019). Making sense of belonging. Australian Psychological Society (APS), June 2019, Vol 41, Issue 3.
- Austin, K., (2016). The Pros and Cons of Teens on Social Media. Phone Sheriff. Online <http://www.phonesheriff.com/blog/the-pros-and-cons-of-teens-on-social-media/> June 23, 2016.
- Cronin-Golomb, A. (2016). Great Nature's Second Course: Introduction to the Special Issue on the Behavioral Neuroscience of Sleep. Behavioral Neuroscience. American Psychological Association 2016, Vol. 130, No. 3, 267–270.
- Cozolino, L. (2014a). Attachment-Based Teaching : Creating a Tribal Classroom WW Norton & Co, New York, USA.
- Cozolino, L. (2014b). The Neuroscience of Human Relationships: Attachment and the Developing Social Brain (Second Edition). Norton Series on Interpersonal Neurobiology. W.W. Norton & Co, New York, USA.
- Fenesi, B., Lucibello, K., Joseph, A.K. and Heisz, J.J. (2018) Sweat So You Don't Forget: Exercise Breaks During a University Lecture Increase On-Task Attention and Learning. Journal of Applied Research in Memory and Cognition. April 17, 2018.
- MacLean, P. (1979). Paul MacLean and the triune brain. Science 8 June 1979. Vol. 204, Issue 4397, pp. 1066-1068
- McCabe, D. (2014). 10 food tips to help your brain. Online <https://www.foodmatters.com/article/10-food-tips-to-help-your-brain> November 11, 2014
- National Sleep Foundation. (2019) Online <https://www.sleepfoundation.org/articles/teens-and-sleep> August 12, 2019
- Siegel, D. (2011). *The Whole Brain Child*. Scribe, Melbourne.
- Siegel, D. (2012). *The Developing Mind*. The Guilford Press, New York.
- Wachs, T., Georgieff, M., Cusick, S. and McEwen, B.S. Issues in the timing of integrated early interventions: contributions from nutrition, neuroscience, and psychological research. Department of Psychological Sciences, Purdue University, West Lafayette, Indiana. *Department of Pediatrics, University of Minnesota Medical School, Minneapolis, Minnesota*. Hersity Lecture Increase On-Task Attention and Learning. Journal of Applied Research in Memory and Cognition. April 5, 2018.
- Willis, J. (2007). The Neuroscience of Joyful Education Brain research tells us that when the fun stops, learning often stops too. Educational Leadership. 2007 Summer | Volume 64 Engaging the Whole Child (Online only).

# THE PHYSICAL AND MENTAL HEALTH BENEFITS OF BOOTCAMP – HOOYAH TO TH

Karen Murphy, School of Pharmacy and Medical Sciences, University of South Australia

Everyone knows that being physically active is good for you. Physical activity or exercise has a wide range of benefits for both physical health and mental health. But what do we mean by physical activity? According to Australia's Department of Health, it is anything that gets your body moving, makes you breathe faster and gets your heart pumping. Being physically active can also provide opportunities to be social and make new friends. Bootcamp, an increasingly popular activity, ticks all these boxes and more – here we'll unpack the benefits and recommendations for physical activity and then dive more deeply into bootcamp and its health values.



Figure 1: Physical activity comes in many shapes and forms – and can provide opportunities to make friends and be social. OBC North Adelaide bootcamp. Permission from Rob Coad.

## Exercise can help maintain good health and reduce the risk of chronic disease.

Regular moderate exercise has been shown to help with a range of factors including: maintaining a healthy weight and reducing overweight and obesity; reducing risk factors for heart disease like lowering blood cholesterol levels and blood pressure; maintaining good blood sugar control and reducing the risk of developing type 2 diabetes; and lowering the risk of developing Alzheimer's disease, dementia, Parkinson's disease and cancer.

Exercise is also used for rehabilitation after surgeries like knee and hip replacements and after suffering a stroke;

it helps develop co-ordination and motor skills in children and also helps with building strong muscles, improving bone density, increasing mobility and reducing the risk of falls, particularly in older people.

## Physical activity is also good for the mind and brain and therefore mental health.

Feel-good chemicals your brain releases after exercise can make you feel better if you are down or even if you are already feeling okay. Exercise stimulates the release of hormones within the brain called endorphins and neurotransmitters such as serotonin which make you feel good and lift your mood after long and vigorous exercise – sometimes known as 'post-exercise high' or 'runners high'. Physical activity can help improve mood, not only due to the production of these feel good hormones, but the opportunities exercise provides to meet people and build confidence and self-esteem.

Research has also shown a link between regular physical activity and lower stress, anxiety and depression. Symptoms of depression can include low mood, reduced interest and pleasure in everyday activities, low motivation and poor quality of sleep. A large study that explored risk of depression and physical activity found that, compared with low levels, high levels of physical activity were protective against the emergence of depression in younger persons, adults and elderly individuals. Apart from the feel-good hormones and improved blood flow, exercise may ease or prevent symptoms of depression by increasing sense of control and self-esteem; improving social support and reducing isolation; providing distraction from worries; improving quality of sleep and increasing energy levels, according to the Black Dog Institute.

## How much physical activity is recommended?

Australia's physical activity and sedentary behaviour guidelines recommend that adults do at least 30 minutes of moderate to vigorous physical activity on most or all days of the week. For children and young people aged 5-17 years, a healthy 24 hours should look something like this:

- accumulate 60 minutes or more of moderate to vigorous physical activity per day involving mainly aerobic activities;



- several hours of a variety of light physical activities;
- activities that strengthen muscle and bone should be incorporated at least 3 days per week;
- break up long periods of sitting as often as possible;
- limit recreational screen time to 2 hours or less each day;
- uninterrupted 9 to 11 hours of sleep per night for children aged 5–13 years and 8 to 10 hours per night for those aged 14–17 years.



Figure 2: Benefits of moving more and sitting less from Australia's physical activity and sedentary behaviour guidelines.

Although being physically active is good for the body, the National Health Survey in 2014–2015 found that adults 18 years and over were not active enough. Similarly, in 2011–2012, 74% of children aged 5–12 years, and 92% of youth aged 13–17 years, did not complete 60 minutes of moderate to vigorous intensity exercise every day. So why not?

There are so many personal, social, medical and environmental related reasons that people aren't physically active. Some struggle to find the motivation, and some don't like gyms or exercising by themselves, which is why it is important to find something that is enjoyable and sustainable in the long term. There are

many ways we can be physically active; from incidental activity like taking the stairs, walking to the bus, gardening and dusting, to planned activities like playing golf, walking, hiking, running, gym workouts, sport, and outdoor group activities like running clubs, Park Run – and bootcamps.

## What is Bootcamp?

Outdoor group fitness activities like bootcamps are popping up all over Australia. What would most people think of when they consider bootcamp for exercise? Probably something like military-style activities, outdoor exercise, running in the rain, mud or dust, uniforms and boots and lots of yelling from instructors. It sounds daunting; however outdoor exercise has been transformed in recent years to provide fitness and fun for all ages, and yes, perhaps sometimes in the mud and rain. Bootcamps are modelled on military-style training to build fitness, strength and endurance, usually with a group of people in an outdoor setting. Many providers advertise that bootcamp will help individuals make positive lifestyle changes to improve both physical and mental health through a combination of exercises that involve support, discipline, self-control, integrity and camaraderie.







Figure 3: Bootcamp workouts can vary greatly and contain a mix of aerobic and strength building activities. OBC North Adelaide bootcamp, permission Rob Coad.

Depending on the provider, bootcamp workouts can vary. In general, they contain a mix of body weight or strength exercises, cardiovascular or aerobic based activities as well as endurance and speed components. Workouts are often complemented with use of equipment such as weighted sandbags, battle bars and tractor tires for flipping, to military-style equipment including jerry cans, ammunition boxes, stretches and mooring ropes for use in drills such as a 'stores move'.

Original Bootcamp Australia (OBC) - North Adelaide owner, Senior Staff Sergeant Rob Coad, is a former member of the Royal Australian Army's 2nd Calvary Regiment (Armoured Surveillance Troop) and is qualified at various levels of fitness instruction. Rob has been running bootcamp since 2006 and leads a team of eight instructors across four platoons (groups) of recruits (participants) attending 60-minute sessions up to 8 to 12 times a month, rain, hail or shine.

"Over time we had 16 recruits in the program and within three to four months we had in excess of 50...", he says. OBC North Adelaide starts the month with a benchmark exercise to give the instructors an indication of a person's fitness levels. This allows the instructors to modify the program to suit all fitness levels by changing weights, 'reps' (repetitions of exercises) and distances to suit beginners through to elite athletes. At most bootcamps you can expect to do a range of exercises including running and sprints, push-ups, lunges, jumping jacks, crunches, burpees or grunts (an OBC term for burpees) as well as drills and circuit-style and group activities. Classes generally commence with a warm-up and conclude with a cool-down and stretch, and form is always corrected to avoid injury.



Figure 4: Bootcamp can involve military style drills with instructors egging you on – but at your own skill level. OBC North Adelaide bootcamp, permission Rob Coad.

An example of an OBC North Adelaide bootcamp session is shown in Figure 5.

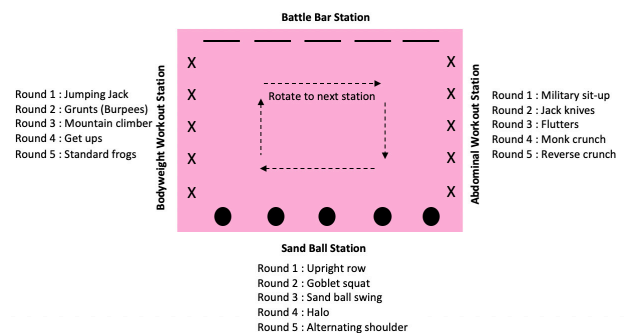


Figure 5: A standard Tabata style session for OBC North Adelaide's 60 recruits. Four sets of 20 seconds of exercise with a 10 second recovery. After the first 4 sets, each station moves to the next station in a clock-wise rotation and repeats with a new set of exercises. Each round is around 2 minutes in length.

## Benefits of a bootcamp program

Besides the physical and mental health benefits associated with exercise, bootcamps offer a whole-body workout designed specifically to build strength and endurance. It can often be a more challenging workout but it also encourages integrity or accountability if you are counting your own reps, discipline to not stop before the call of 'steady' and camaraderie to encourage your team mates.



Figure 6: People of all ages can take part. OBC Seal Pups North Adelaide. Permission from Rob Coad.

Most bootcamps are available for all ages and will require satisfactory completion of a pre-exercise medical questionnaire prior to taking part. OBC North Adelaide offers their main platoon for 13 years and older and a parallel 'Seal Pups' platoon for kids 5-12 years. The Seal Pups have similar types of activities to the main platoon but incorporate fun activities and group work to build social skills and motor and co-ordination skills. Most bootcamp sessions are held early morning on weekdays and weekends, catering for work commitments and people with children. Bootcamp programs are often designed to incorporate a mixture of different workout styles to avoid boredom. Rob Coad says, "Some of our clients are long-term recruits who have been doing our bootcamp for 12 years! They enjoy variety and we design our sessions so that no session is ever repeated."



Figure 7: Never a dull moment, bootcamp keeps you moving in all kinds of weather and environments. OBC North Adelaide, permission Rob Coad.

### Is bootcamp the best choice of physical activity?

Whatever gets people moving more and sitting less is key. Bootcamp offers something different to standard gym-based fitness programs, but it depends on what someone wants to achieve from their exercise. Outdoors training, use of equipment, periodised-style training, correction of form and team-based activities are quite unique to bootcamps. Working out with like-minded people in this type of team-based exercise can be highly motivating and encouraging. . Bootcamp may not be for everyone though. Playing team sports, walking or jogging regularly, swimming, golf, aqua aerobics and walking the dog regularly are also great ways to be active.

### Summary

Physical activity comes with a wide range of health benefits, from achieving and maintaining a healthy weight, improving health and reducing risk of chronic disease, dealing with stress and improving mood, as well as social connectedness with others and building



friendship networks. Any kind of physical activity is good for the brain and body; the key is to move more and sit less. But outdoor group based training like bootcamps offer something a little different to gym based activities. Not all bootcamps are the same, but most are traditionally modelled on military-style activities and are designed to provide individuals with a whole body workout from aerobic to strength to endurance and sprinting. Bootcamp may not be for everyone, but any exercise is better than no exercise.... and as they say at OBC North Adelaide... Hooyah!

### Student activities

1. Describe how Australia's Physical Activity and Sedentary Behaviour Guidelines differ for adults (18-64 years) and young people (5-17 years).
2. Based on the information above, get together in groups and design a tabata session of bootcamp using different exercises. You have battle bars and sandbags to work with if you desire. Each round is 2 sets of 20 seconds of exercise followed by 10 seconds of recovery. You have a total of 2 rounds.
3. Discuss with the person next to you: how motivating do you think it is to have a bootcamp instructor yelling at you to 'hurry up' with your running as opposed to an instructor who encourages you to run faster. How do you think this might influence someone's motivation?
4. What are some benefits to overall health you might see by undertaking outdoor group bootcamp sessions? List four.
5. What combination of physical activities could children and youth (5-17 years) undertake to meet the physical activity guidelines?
6. What are some ways adults 18-64 years could incorporate regular physical activity each day to achieve the physical activity guidelines?
7. How might bootcamp encourage camaraderie?
8. In groups, research how being physically active might help with improving different aspects of health – including heart health, learning and concentration, reducing depression, bone density, maintaining a healthy weight, and any others you would like to cover – and present to the class

### References

- The Department of Health <http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines#apa1317> accessed 12/8/19
- Exercise and Depression Fact Sheet [https://blackdoginstitute.org.au/docs/default-source/factsheets/exercise\\_depression.pdf](https://blackdoginstitute.org.au/docs/default-source/factsheets/exercise_depression.pdf) accessed 12/8/19
- Cooney G, Dwan K, Greig CA et al. Exercise for depression. *Cochrane Database Syst Rev* 2013;9:CD004366. doi: 10.1002/14651858.CD004366.pub6.
- Schuch FB, Stubbs B. The Role of Exercise in Preventing and Treating Depression. *Curr Sports Med Rep*. 2019 Aug;18(8):299-304. doi: 10.1249/JSR.0000000000000620.
- Schuch FB, Vancampfort D, Firth J, Rosenbaum S, Ward PB, Silva ES, Hallgren M, Ponce De Leon A, Dunn AL, Deslandes AC, Fleck MP, Carvalho AF, Stubbs B. Physical Activity and Incident Depression: A Meta-Analysis of Prospective Cohort Studies. *Am J Psychiatry*. 2018 Jul 1;175(7):631-648. doi: 10.1176/appi.ajp.2018.17111194. Epub 2018 Apr 25.
- Australian Institute of Health and Welfare 2018. Australia's health 2018. Australia's health series no. 16. AUS 221. Canberra: AIHW.
- Boot camp workout: is it right for you? <https://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/boot-camp-workout/art-20046363> accessed 13/8/19

Editor: Natalie Parletta

[www.warringalpublications.com.au](http://www.warringalpublications.com.au)

Email: [warringalpublications@edassist.com.au](mailto:warringalpublications@edassist.com.au)

Phone: (03) 8678 1118

Fax: (03) 8678 1118

PO Box 299, Richmond, VIC 3121