

NEUROPLASTICITY

Exercises to build Neuroplasticity

1. Cognitive and Mental Training

1.1. Learn a New Skill

Learning new skills and how do new tasks activates multiple brain regions. It promotes physical growth of your brain's synapses (synapses connect your brain's neurons) as the brain needs to form new connections and reorganise itself. The brain can literally rewire itself, adapting to the demands of learning and using a new skill. Then repeated use of a new skill strengthens the connections between neurons involved in that skill, making them more efficient. This also helps create a growth mindset, where you believe you can learn new things and embrace challenges (even if you have set backs); self belief creates the energy to embrace learning.

Things you can try:

Playing a musical instrument

Learning a new language

Picking up a craft (e.g. woodworking, knitting)

Coding or chess

1.2. Brain Games & Puzzles

Engages your problem solving abilities, stimulates improvements in working memory, making the brain work harder and learn new things forms new neural pathways and strengths existing ones. Targets specific cognitive areas of the brain and improves their abilities such as problem solving and focus.

Things you can try:

Sudoku, crosswords, logic puzzles

Luminosity, Peak, or Elevate apps

Spatial reasoning games (e.g. Tetris, jigsaw puzzles)

1.3. Memory Training

Memory training can help build neuroplasticity by repeatedly engaging brain networks associated with memory functions, strengthens existing neural pathways and creates new connections. This leads to changes in brain structure and function, reflecting increased efficiency and capacity in the memory system.



Things you can try:

Practice memorising word lists, phone numbers, or poetry.

Use mnemonics or the method of loci (memory palace) technique.

2. Physical Exercise

2.1. Aerobic Exercise

Increases BDNF (brain-derived neurotrophic factor), which supports neurogenesis. This explained: BDNF is protein that plays a vital role in the brain's health, growth, and function. It's a growth factor for neurons, promoting their survival, growth, and the development of new connections. BDNF is involved in learning, memory, and various brain functions, and it has been linked to mental health conditions like depression and anxiety. Neurogenesis is the process by which new neurons are formed in the brain. Neurons are nerve cells that send messages all over your body to allow you to do everything from breathing to talking, eating, walking, and thinking. Until recently, most neuroscientists (scientists who study the brain) thought we were born with all the neurons we were ever going to have, but there is evidence now supporting the theory that neurons can be formed in some areas of the brain.

Things you can try:

Brisk walking, running, swimming, cycling

Aim for 30 minutes, 3–5 times a week

2.2. Coordination & Balance Workouts

Stimulates cerebellar and motor cortex functions, supports neuroplasticity by enhancing neural excitability and promoting long-term potentiation (LTP) like changes in brain connectivity. This stimulation can improve motor learning by modulating pathways, like the cerebello-cortical connections, and enhancing movement coordination and error correction.

Things you can try:

Dance routines

Tai Chi or martial arts

Yoga

Slacklining

Juggling or circus skills

melissaannedevere@gmail.com



2.3. Combine Exercise with Learning

Combining exercise with learning significantly enhances neuroplasticity by creating a synergistic (interaction of the two, exercise and learning can create a greater impact, than the two done separately may do) effect that promotes brain growth and adaptation. Exercise increases the release of neurotrophic factors like BDNF, crucial for neuron survival, growth, and synaptic plasticity. Learning demands create new connections and strengthens existing ones, further stimulated by the exercise-induced neurotrophic factors

Things you can try:

Try dual-tasking: listen to an audiobook while walking, or count backwards while balancing on one foot.

3. Mindfulness and Meditation

Mindfulness involves focusing attention on the present moment, this focused attention is believed to induce structural changes in the brain that may be linked to enhanced neuroplasticity. It may enhance thickness of the brain's cortex which is associated with brain functions such as awareness and concentration. Studies have shown regular mindfulness practice can lead to structural changes in the brain, such as increased grey matter density in the prefrontal cortex and decreased density in the amygdala. As well as enhancing the communication between different brain regions, leading to improved cognitive function and emotional regulation. The amygdala, the brain region associated with fear and stress, can become less active in response to emotional stimuli after mindfulness training. The focused attention techniques, strengthen neural connections in areas related to attention, concentration, and emotional regulation. By strengthening the neural pathways involved in emotional regulation, mindfulness and meditation may help you manage stress and regulate emotions more effectively.

Things you can try:

Breathwork: Try focusing on your breath for 10–20 minutes a day.

Loving-Kindness Meditation: To cultivating feelings of love, kindness, and compassion towards oneself and others. This activates positive emotions and can build emotional regulation.



Body Scan: A mindfulness exercise where you slowly bring attention to different parts of your body, from head to toe, noticing sensations, just observing, not judging.

Yoga Nidra: A form of guided meditation and relaxation technique, practised lying down and involving a teacher taking you through a sequence of instruction using visualisations and techniques to bring deep relaxation, sometimes called 'yogic sleep'.

4. Social Engagement

Regular social interaction helps reinforce neural connections and strengthens your cognitive reserve which can slow down age related mental decline. Conversations and activities where you interact with others, can stimulate mental processes like attention and memory.

Things you can try:

Deep Conversations: Stimulates complex thought and emotional processing. Regularly discuss meaningful topics or debate ideas.

Volunteering or Mentoring: Builds emotional intelligence and empathy, which are linked to brain plasticity in social cognition areas.

5. Lifestyle swaps and change ups

Some lifestyle changes / choices, may improve cognitive function and stimulate the brain.

Non-dominant hand, using your non-dominant hand in daily tasks can boost neuroplasticity, the brain's ability to rewire itself. This is because it forces the brain to create new connections and engage different areas, leading to improved coordination, mental agility, and cognitive function. Essentially, it's like strength training for the brain.

Rearranging furniture or taking a new route to work, will also support neuroplasticity in the brain in similar ways to using the non-dominant hand.

Travel and exploring new environments significantly support neuroplasticity by introducing novelty, creating new neural pathways, and enhancing cognitive flexibility. These experiences force the brain to adapt and learn, stimulating growth and connection between different brain regions.



Navigating unfamiliar places challenges the hippocampus (part of the brain used for memory and spatial navigation), by getting it to engage and work harder, essentially making it train.

Intermittent fasting (IF) can possibly support neuroplasticity through various mechanisms, including increased levels of Brain-Derived Neurotrophic Factor (BDNF), which is crucial for neuron survival and synaptic plasticity. During Intermittent Fasting, the body shifts from largely using glucose for energy to relying on ketone bodies. When ketone bodies become the brain's main energy source, it is believed to improve neuronal energy efficiency, cognitive performance, and stress resistance. There is a particular ketone (Beta-hydroxybutyrate - BHB) which provides energy when not enough carbohydrates or sugars have been eaten. When Intermittent Fasting causes the increase of a ketone, BHB, it can then increase the cellular activity/responsiveness of BDNF and BDNF is crucial for brain health and cognitive function.

It also can enhance hippocampus (part of the brain associated with memory) neurogenesis (the generating new neurons), reduces inflammation of the neurons, and improves mitochondrial function, all of which contribute to a healthier and more adaptable brain. Always consult a medical specialist before trying Intermittent fasting.