

Brain Cross Training

Brain Training Workouts

Mark Ashton Smith Ph.D.

2015

CONTENTS

Foreword	3
Hormesis and Vitagenes	4
Aerobic or Resistance Workouts?	5
Intensity	5
High Intensity Interval Training (HIIT)	6
Workout Apps on the Market	8
Summary	7

Foreword

My training is in cognitive neuroscience. I earned my doctorate from Carnegie Mellon and the University of Pittsburgh's flagship [Center for the Neural Basis of Cognition](#) program. I have since worked as a Lecturer/Assistant Professor at the University of Cambridge's [Experimental Psychology Department](#) – the top ranking Psychology Department in the top ranking University in the UK - where the basis of IQ Mindware's training program was devised.

In this series of eBooks I present you with the most effective, evidence-based cognitive interventions within a brain 'cross training' paradigm that combines computerized brain training with other strategies to improve brain health, resilience, performance and creativity.

Enjoy your training!

Mark



Mark Ashton Smith, Ph.D.

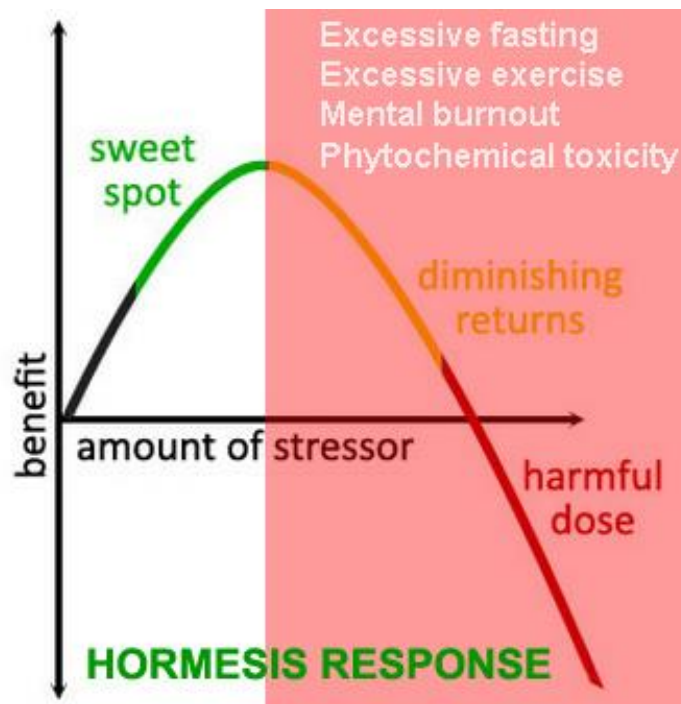
[Personal Website](#)

[IQ Mindware](#)

[LinkedIn](#)

Hormesis and Vitagenes

In the previous eBook we learned that stress – in the right doses and applied at the right times – is highly beneficial for the brain and body. We can harness it in brain cross-training programs using the **hormesis response**.



Without stress, the vitagenes and adaptive cellular stress responses don't kick into action to build resilience, health and better brain functioning.

In this eBook we will be looking at specific workouts that put you in the **hormesis sweet spot** improves **neuroplasticity** for adaptive learning and **cell protection** for healthy brain cells.

Combining exercise with effective computerized cognitive training (e.g. IQ Mindware apps) can result in **hormetic synergies** for enhanced brain benefits.

Aerobic or Resistance Workouts?

Most of the benefits reviewed above are based on **aerobic exercise**, not strength training. Some studies show greater benefits of aerobic training compared to resistance (strength) training. For example

- [Endurance fitness training](#), but [not strength training](#), has been shown to result in increased BDNF concentrations, a neurotrophic factor that plays an important role in **neuronal growth** and **neuroplasticity**.

However, [this excellent article on the brain benefits of exercise](#) reviews diverse evidence for the brain benefits of strength training among the elderly, and suggests that while evidence is limited for the benefits of strength training, this may be due in part to lack of studies – not something intrinsic to the type of exercise. The 2008 [Physical Activity Guidelines for Americans and the Harvard School of Public Health](#) recommends that healthy adults get:

- [A minimum of 2-1/2 hours per week of moderate-intensity aerobic activity, or get a minimum of 1-1/4 hours per week of vigorous-intensity aerobic activity, or a combination of the two.](#)
- A minimum of 2 ½ hours per week of moderate-intensity aerobic activity (e.g. brisk walking, jogging, swimming, cycling) or a minimum of 1 ¼ h/w of intense aerobic activity (e.g. spin classes, circuit training, CrossFit) – or combinations of both.
- Adults of all ages should also do muscle-strengthening activities on at least two days for the week.

Intensity

Within reasonable limits, intense exercise changes the body and muscles at a molecular level in ways that milder physical activity doesn't match as reviewed in [this New York Times feature](#).

- [Walkers whose usual pace is brisk tend to live longer than those who move at a more leisurely rate, even if their overall energy expenditure is similar.](#)
- When the body is stressed by intense exercise, stress hormones (catecholamines) are released which trigger the production of an energy regulating protein (CRTC2) that improves glucose metabolism and fat release

for burning fuel. [This has been shown to result in greater endurance and stronger muscles.](#)

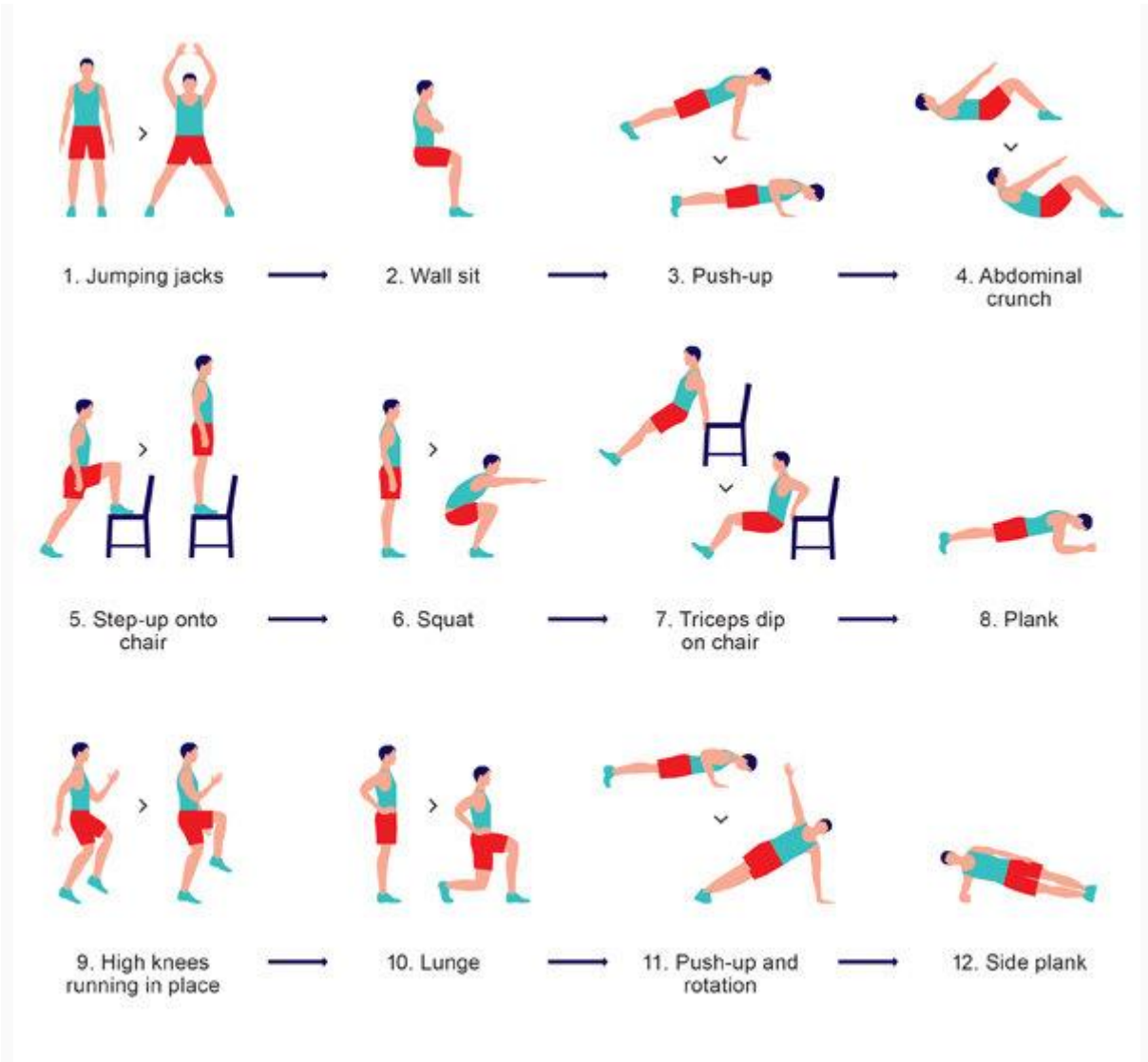
High Intensity Interval Training (HIIT)

Scientific evidence indicates that **high intensity interval training** (HIIT pronounced 'hit') – combining aerobic and strength training – is an efficient means of exercise to help decrease body fat, improve insulin sensitivity, and improve VO₂max and muscular fitness. Interval training requires extremely intense activity intermingled with brief periods of recovery. This intermittently triggers adaptive cellular stress responses in a very efficient way.

There's very good evidence that high-intensity interval training provides many of the fitness benefits of prolonged endurance training but in much less time. Chris Jordan, the director of exercise physiology at the Human Performance Institute in Orlando, Fla.

Work by scientists at McMaster University in Hamilton, Ontario, and other institutions shows, for instance, that even a few minutes of training at an intensity approaching your maximum capacity produces molecular changes within muscles comparable to those of several hours of running or bike riding. **Based on the hormesis response, HIIT should be an effective type of brain training.**

[The '7 minute workout' has been reviewed in the New York Times](#), and is a popular HIIT option. There are 12 exercises. Exercises are performed for 30 seconds, with 10 seconds of transition time between bouts. Total time for the entire circuit workout is approximately 7 minutes. The circuit can also be repeated 2 times, depending on time and fitness level.



The side plank (no. 12) should be done on both sides. Modifications or extensions to this routine can easily be improvised – for instance, adding pull-ups or burpees.

Workout Apps on the Market

There are a number of apps on the market that are recommend for constructing, scheduling and motivating workout routines during your week. These include the following:

Johnson & Johnson Official 7 Minute Workout App (Free; Android, iOS)

The app guides users through the original 7 minute workout, as well as more advanced routines of varying duration and intensity, complete with short videos. A Smart Workout feature can function as your personal trainer. Users can create their own custom workout routines.

Workout Trainer (Free; Android, iOS)

Skimble's Workout Trainer ([Android](#), [iOS](#)) offers users thousands of free workouts complete with timed step-by-step audio and video instructions to help you get the most out of your workout. In addition to the built-in workouts, users can access the app's library to build their own custom routines and share them online, as well as try out routines shared by the community.

Fitstar (Free; iOS)

[FitStar](#) functions as your personalized training coach, adapting its exercise routines to match your physical capability, carefully calibrating workouts to be challenging without being too difficult. Users can configure their ideal exercise duration and workout goals, and the app will whip up a workout session for you. Once done, you can rate the difficulty of the workout, allowing the app to slowly learn and adapt to your workout capacity, challenging you without getting out of your hormones 'sweet spot'.

Sworkit (Free; iOS, Android)

Rather than focus on set exercise routines, Sworkit ([Android](#), [iOS](#)) has users creating targeted workout routines. Select whether you want to build strength, do yoga, practice cardio, stretch, pilates or build a custom routine. Sworkit builds you a routine of randomized exercises that fit your exercise goals. Each

workout is different, making sure that you stay alert and are never bored by your workout.

IQ Mindware Apps

If you are interested in finding out more about the IQ Mindware app **i3** for brain performance and resilience, you can do so at [this website](#).

Combining exercise with effective computerized cognitive training like this app can result in brain training **synergies** for extra benefits.