

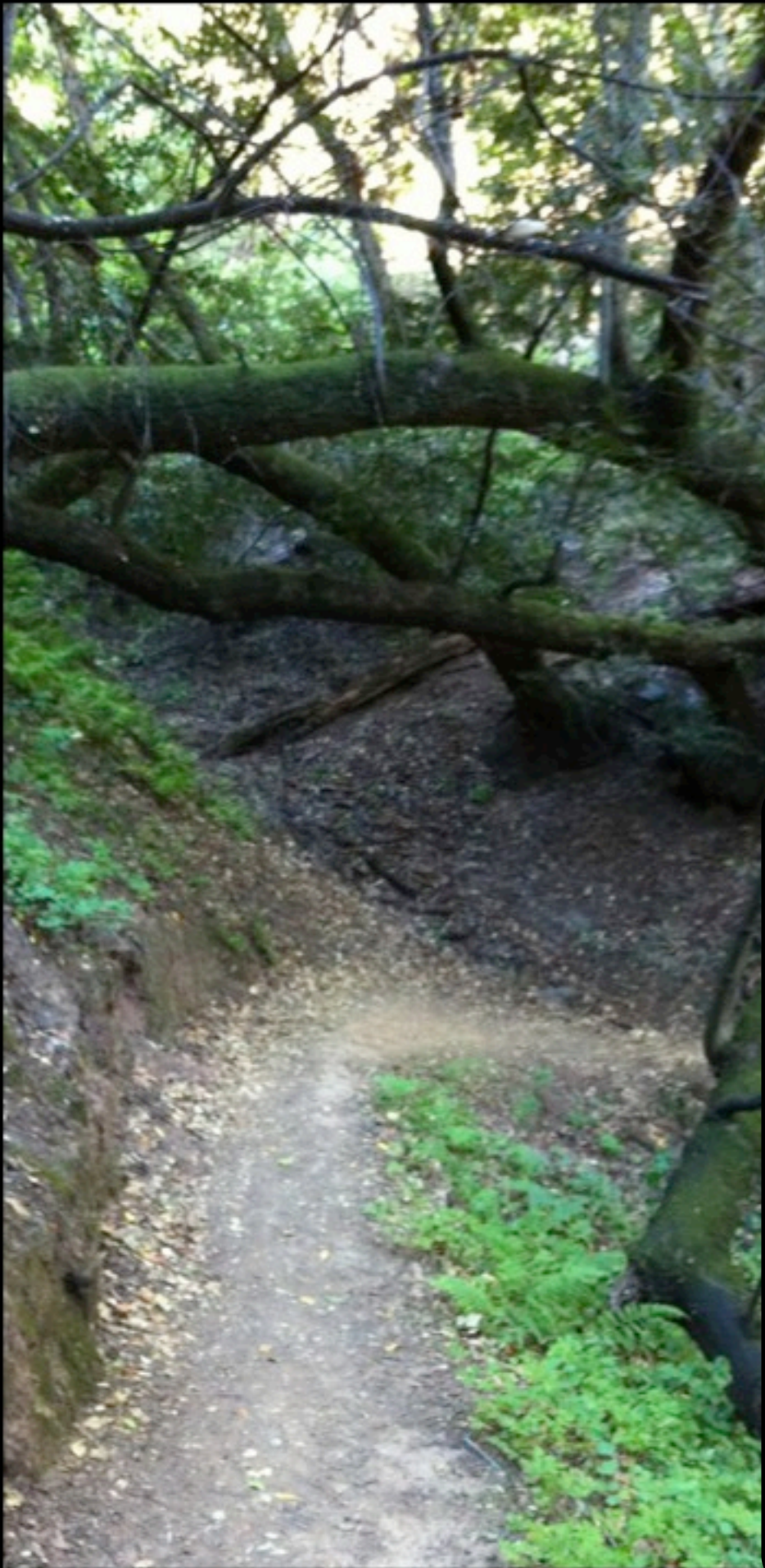
Practical Considerations in Using Exercise As Treatment for ADHD

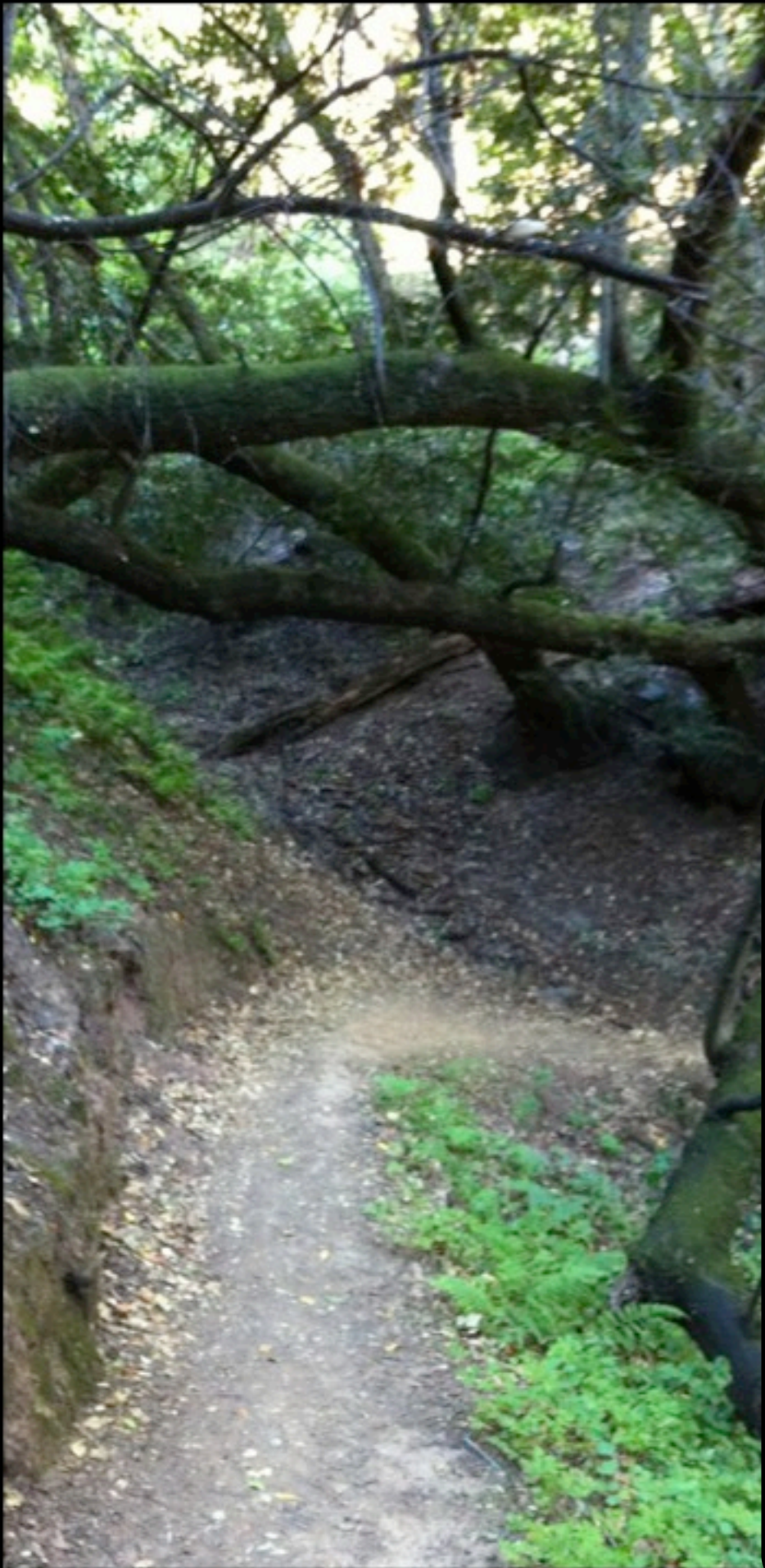
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Private Practice Psychiatry, Belmont CA











Evolutionary Milestones

Humans evolved primarily as hunter gatherer species

▶ 84,000 Generations

- From emergence of *Homo* species 2.4 million years ago, humans have survived primarily as hunter gatherer species

▶ 350 Generations Ago

- Agricultural Revolution

▶ 75 Generations Ago

- Industrial Revolution

▶ 2 Generations

- Digital Age

Typical Activities of Hunter-Gatherer

Physical activities of our paleolithic ancestors have correlates in modern day forms of exercise

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- ▶ **Resistance Training: Lifting, Throwing, and Carrying Objects**
 - Encompass functional movements such as pushing, pulling, sprinting, and jumping

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- ▶ **Resistance Training: Lifting, Throwing, and Carrying Objects**
 - Encompass functional movements such as pushing, pulling, sprinting, and jumping
- ▶ **Interval Training: Periodic bursts of high-intensity activity**
 - Brief bouts of sprinting alternating with walking or jogging in pursuit of prey

Nature Deficit Disorder

Diminished use of senses and attentional difficulties due to alienation from nature

A photograph of a stone staircase in a forest. The path is covered with fallen brown leaves. To the right, a large tree root is exposed on the ground. The background is a dense forest with green and brown foliage.

Nature Deficit Disorder

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Exercising to Improve ADHD Symptoms

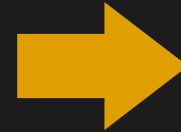
Characteristics of an ideal exercise program for ADHD

ADHD Symptoms

ADHD Exercise Program

Structure

Often has difficulty organizing tasks and activities



Structured workouts that are part of a comprehensive program

Variety

Often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort



Incorporate constantly varied functional movements: squatting, pushing, pulling, sprinting, throwing

Novelty

Often has difficulty sustaining attention in tasks or play activities



Learning and acquisition of new skills in natural environments

Monitoring

Is often easily distracted by extraneous stimuli



Exercise outdoors with active and passive attention

Exercise Programs for ADHD

Programs that include cross-training outdoors

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Crossfit

“constantly varied, high-intensity functional movements with goal of increasing work capacity across broad time and modal domains”
crossfit.com

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Fit by Nature

Outdoor fitness program incorporating cross-training and body weight exercises across different terrains. Adventx.com

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Programs that include cross-training outdoors

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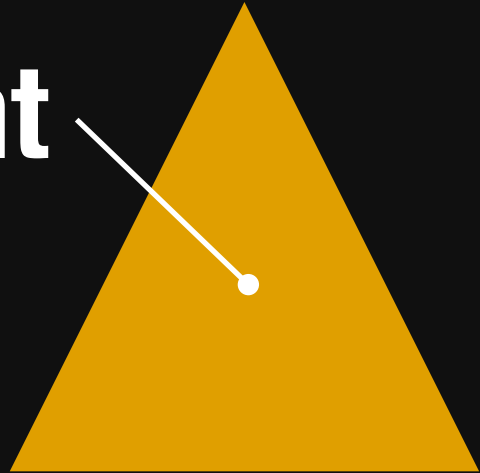
Primal Fitness

Moving frequently at a slow pace, lift heavy things, and sprint. marksdailyapple.com

Primal Fitness

“The Primal Blueprint” by Mark Sisson

Sprint

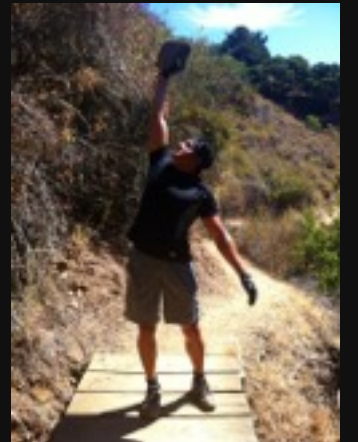


“All Out” efforts once every 7-10 days,
for <10 minutes



**Lift Heavy
Things**

Brief, intense sessions of full-body
functional movements for up to 30
minutes 1-3x/week



**Move Frequently at
a Slow Pace**

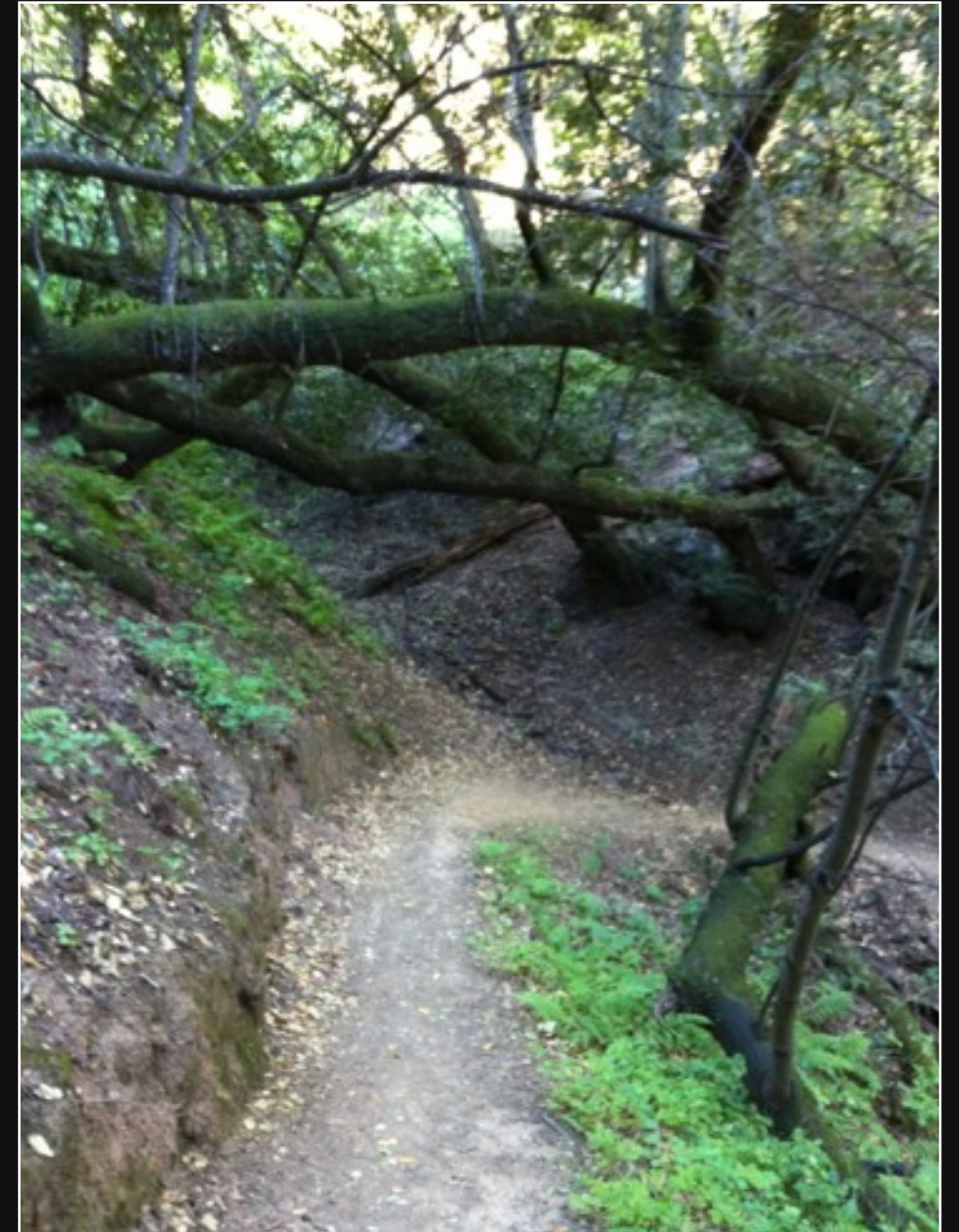
Walk, hike or jog at
55-75% maximum heart
rate for 2-5 hours/week



Move Frequently at a Slow Pace

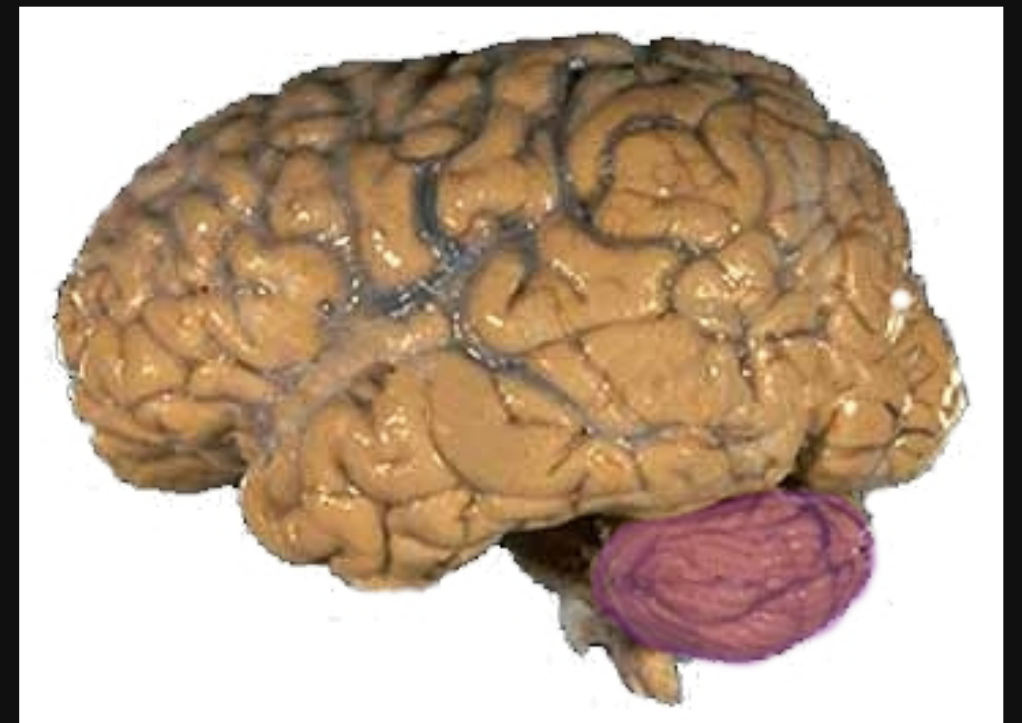
Leisurely walks in nature at least five times/week

- ▶ **Exercise in green environments reduces stress and improves focus**
- ▶ **Leisurely walks improve fat metabolism and insulin sensitivity**
- ▶ **Engages passive attention**



ADD and the Cerebellum

- ▶ **Cerebellum is responsible for coordination, precision and accurate timing of movement**
- ▶ **Contains 50-80% of total neurons in brain**
- ▶ **Cerebellum is dysfunctional in ADD**
- ▶ **Moving to rhythm or cadence may improve symptoms of ADD**
- ▶ **Cadence beats: podrunner.com**



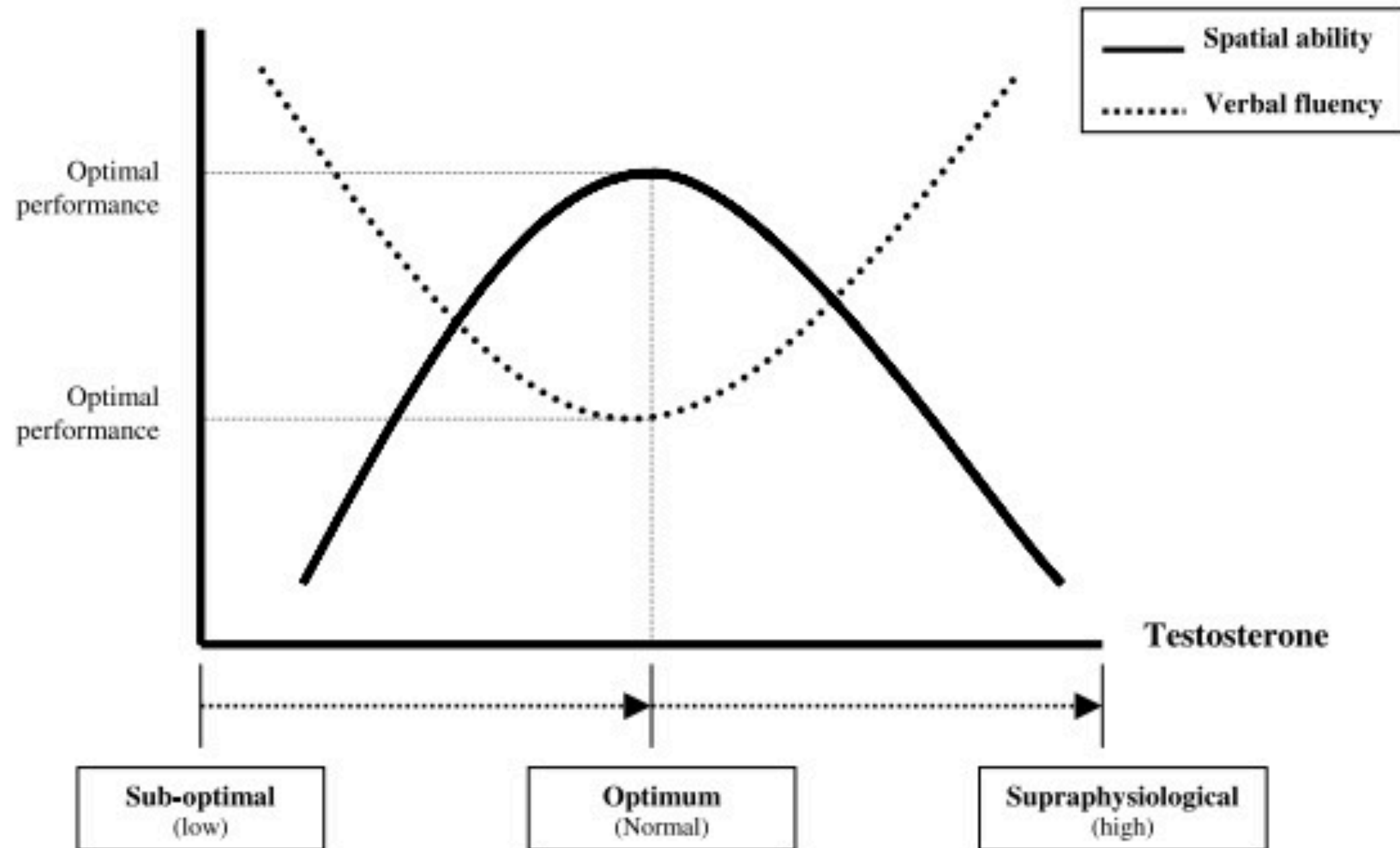
Lift Heavy Things

Pushing, pulling, squatting, and throwing

- ▶ **Heavy resistance training increases growth hormone (GH) and testosterone**
- ▶ **Low levels of GH/IGF-1 associated with cognitive decline**
- ▶ **Testosterone may improve some domains of cognitive function**



Performance



Low-to-normal T levels = improved performance on spatial tasks, reduced on verbal fluency tasks

Normal T levels = optimum performance on both tasks

Normal-to-high T levels = reduced performance on spatial tasks, improved performance on verbal fluency tasks

Body-Weight Resistance Training

The Big 5 of Body Weight Resistance Training

1	Upper Body	Push-ups, pull-ups, chin-ups, rows
2	Lower Body	Squats, lunges, jumps
3	Core	Sit-ups, hanging leg-raises, planks
4	Back	Good Mornings, bridging
5	Total Body	Squats, dead lifts, bear crawls, burpees







Sprint

Running at maximal intensity for no more than 30 seconds

- ▶ **Exercise intensity correlates with rise of catecholamines and brain-derived neurotrophic factor (BDNF)**
- ▶ **High-intensity interval training (HIIT) may increase glycogen storage in astrocytes cells**
- ▶ **Carb loading for the brain**



High-Intensity Interval Training

HIIT involves “all out” efforts with fixed work:rest ratios

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30:30
Total time: 10 min

30 seconds of work

30 seconds of rest

High-Intensity Interval Training

HIIT involves “all out” efforts with fixed work:rest ratios

15:45
Total time: 10 min

**15 seconds of
work**

45 seconds of rest

30:30
Total time: 10 min

30 seconds of work

30 seconds of rest

High-Intensity Interval Training

HIIT involves “all out” efforts with fixed work:rest ratios

Tabata
20:10
Total time: 4 min

20 seconds of work

**10 seconds
of rest**

15:45
Total time: 10 min

**15 seconds of
work**

45 seconds of rest

30:30
Total time: 10 min

30 seconds of work

30 seconds of rest

Exercise, Nutrition and The Brain

Food For Thought: How Nutrients Affect the Brain



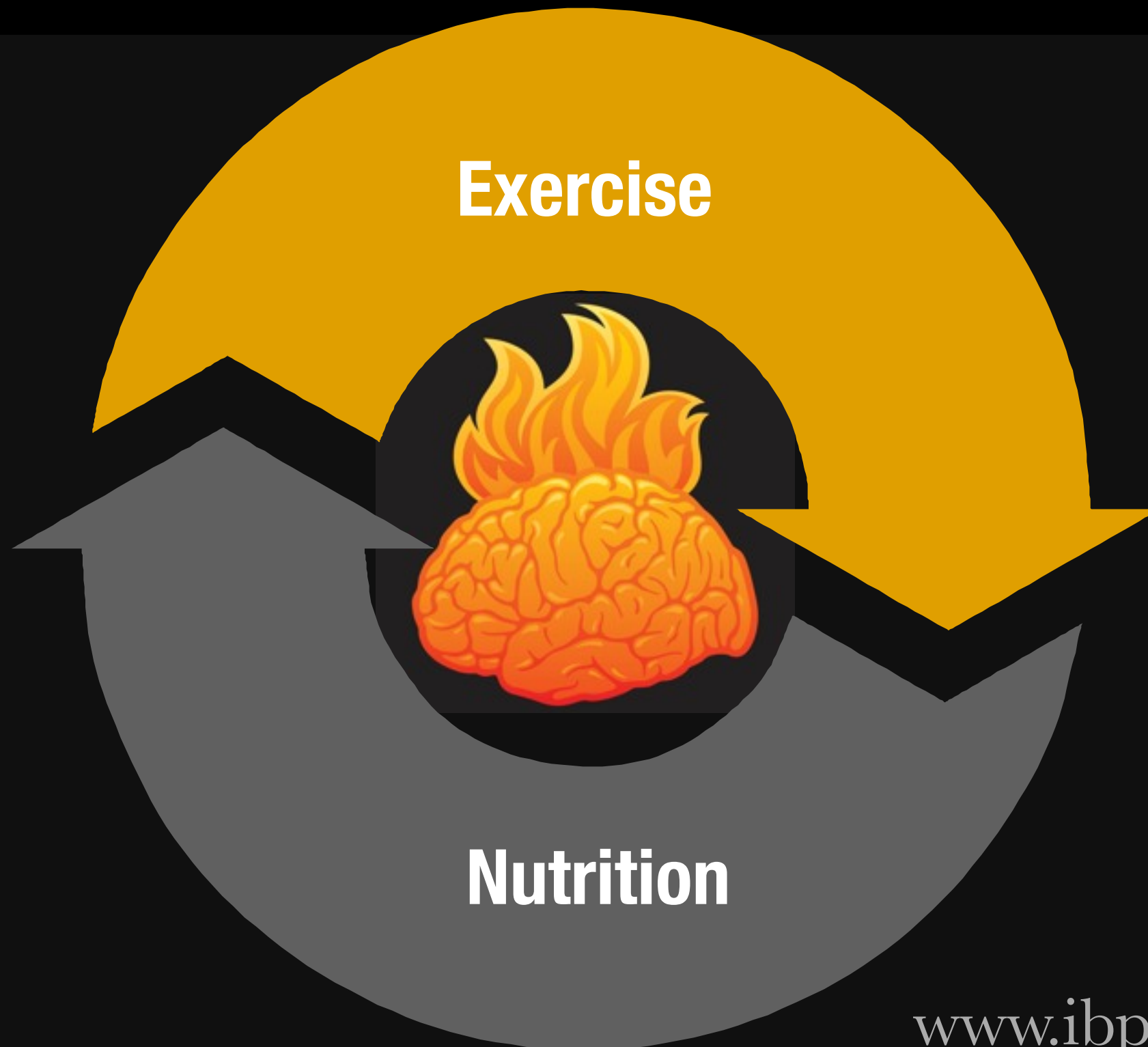
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Intermittent Fasting

Nutritional strategy that alternates brief periods of fasting with non-fasting

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► **Fasting raises catecholamine levels**

- Norepinephrine and dopamine levels rise in the first 8 hours of fasting

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▶ **Fasting reduces markers of chronic inflammation**

- Reductions of inflammatory markers (IL-1, IL-6) observed in the first 12 hours of fasting

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▶ **Fasting increases BDNF levels**

- Intermittent fasting increases brain-derived neurotrophic factor

How to Succeed with Intermittent Fasting

Alternate periods of fasting with non-fasting for 1-3 non-consecutive days/week

For more information: www.brainwebinar.com

How to Succeed with Intermittent Fasting

Alternate periods of fasting with non-fasting for 1-3 non-consecutive days/week

6:00 PM

10:00 AM

Modified Fast: 16 hours

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Recommended Diets

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- **Zone Diet**
- **Paleo Diet**

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Lift

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Omega-3 Fatty Acids

Maintain fluidity of cell membranes and reduce inflammation

- ▶ **“Modestly” effective in the treatment of ADHD**
 - Small but significant effect in improving symptoms of ADHD
- ▶ **Improve glucose utilization in brain and muscle tissue**
 - Sensitizes insulin receptors
- ▶ **Reduce markers of chronic inflammation**
- ▶ **Recommended Dose: 2 grams (EPA+DHA), twice daily**

Power Program for ADHD

A comprehensive program for exercising to improve mood and cognition

Sprint  **1x/week ; “all out” efforts for less than 10 min**

**Lift
Heavy**

2x/week: body weight resistance training

**Intermittent
Fasting**

3x/week: fast for 12-18 hours

Omega-3 Fatty Acids

4 grams of EPA+DHA daily

Leisurely Walks in Nature

5 hours/week in outdoor activities

Primal Fitness In Action

The results of exercising in nature and intermittent fasting

December 2010

March 2012

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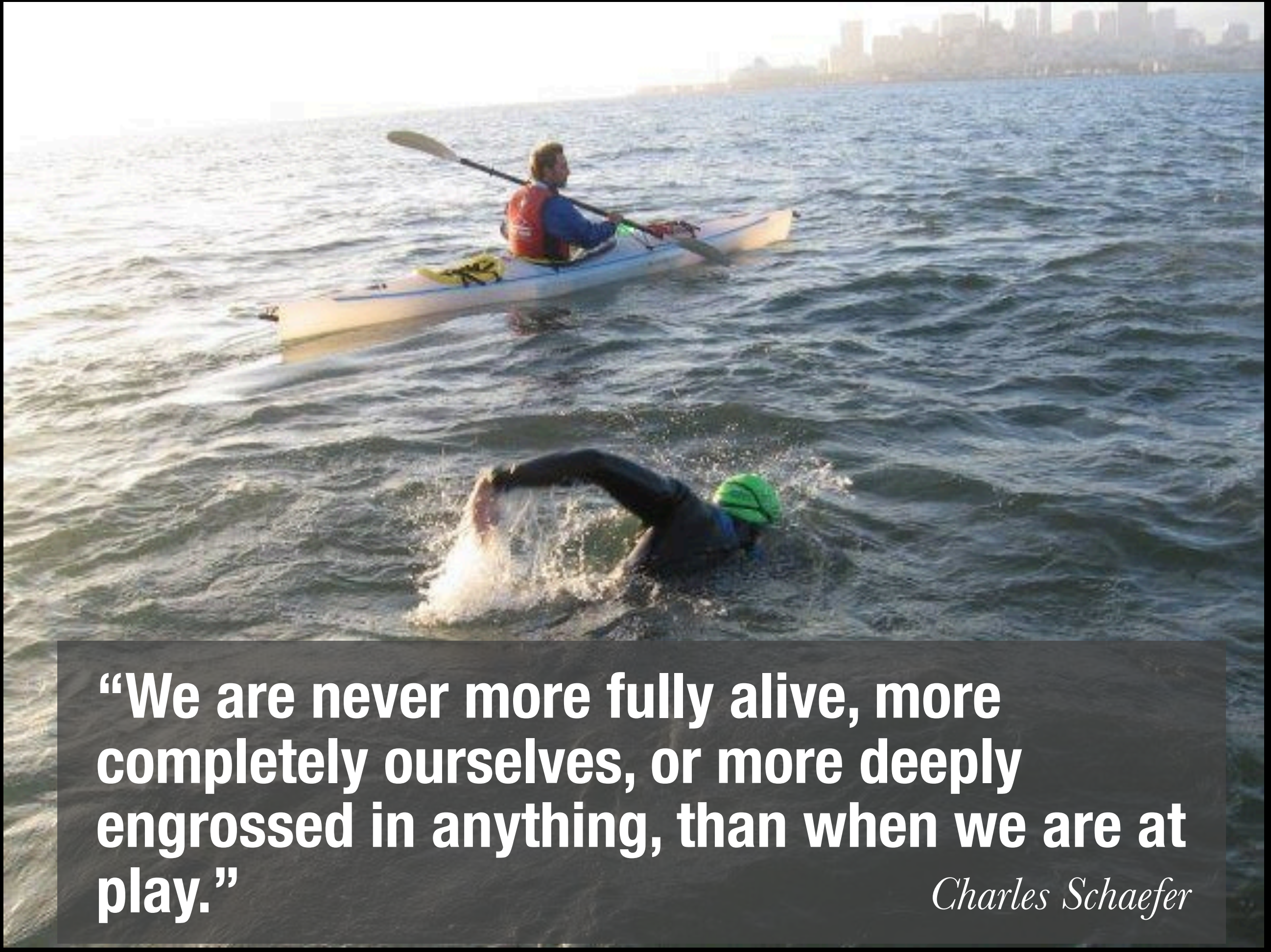






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For More Information

For more information about online coaching and other services

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