THREATS TO OPTIMAL PERFORMANCE

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OBJECTIVES

- Understand how learning capacity can be impoverished or embellished
- Define resiliency, optimal performance and therapeutic lifestyle changes (TLC)
- Explore recent research on neuroplasticity and TLC

BRAIN RULE TO FOLLOW:

- "If it doesn't matter to you, and if you don't have to try to succeed, NOTHING much will change in your brain!

  -Dr. Michael Merzenich

RIGHT CIRCUMSTANCES NEEDED TO HELP BRAINS TO GROW

- Change occurs when the brain is in the mood for learning (Merzenich, 2013)
- The brain must judge the experience as fascinating or novel and the behavioral outcome is deemed important or just good.
- Effort makes a difference for learning and change will be greater.
- What changes in the brain are the strengthening of the connections.
- The more powerfully connected the nerve cells are, the more reliable the behavioral productions.
- The plastic paradox of positive and negative does impact us all (Doidge, 2016).

READINESS CONTINUED….

- Mental rehearsal assists in brain plasticity based learning.
- The brain recalls the last good attempt, makes incremental adjustments and progressively improves. Memory guides most learning.
- Every movement of learning offers a moment of opportunity to stabilize, so some connections will be strengthened and others lost. Negative plasticity does erase some of the relevant and essential activity of the brain (Hampton, 2016)

WHAT IS OPTIMAL PERFORMANCE?

- Every person is performing all the time. Learning to calm the over-aroused parts of each of us is essential to optimal performance and functioning at our best (Sherlin, 2016)
- What can we do to become optimal performers?
- What threats hinder optimal performing?

THE BIG SIX THERAPEUTIC LIFE CHANGES (TLC'S)

- 1. Sleep
- 2. Exercise
- 3. Nutrition
- 4. iTechnology
- 5. Cognitive Challenge
- 6. Social Relationships

Ivey, et al. (2014).

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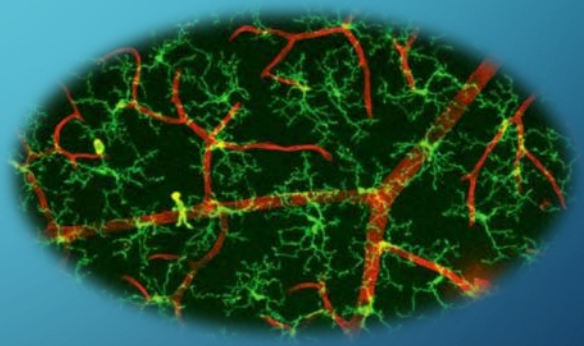
SLEEP HYGIENE

- 7-9 hour of sleep every night (Ivey et al, 2014)
- Increases metabolism and hormones
- Consolidates learning
- Increases attention
- Improves mood
- Allows the microglial cells to wake up and rid the brain of residual toxins (Xie, et al. 2013)



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EXERCISE

- Need at least 20-45 minutes per day with 1 minute of high-intensity interval training (Ratey, 2014)
- NEAT
- Enhances sleep
- Produces dopamine and other BDNFs
- Treats depression
- Increases gray matter
- Increases life longevity

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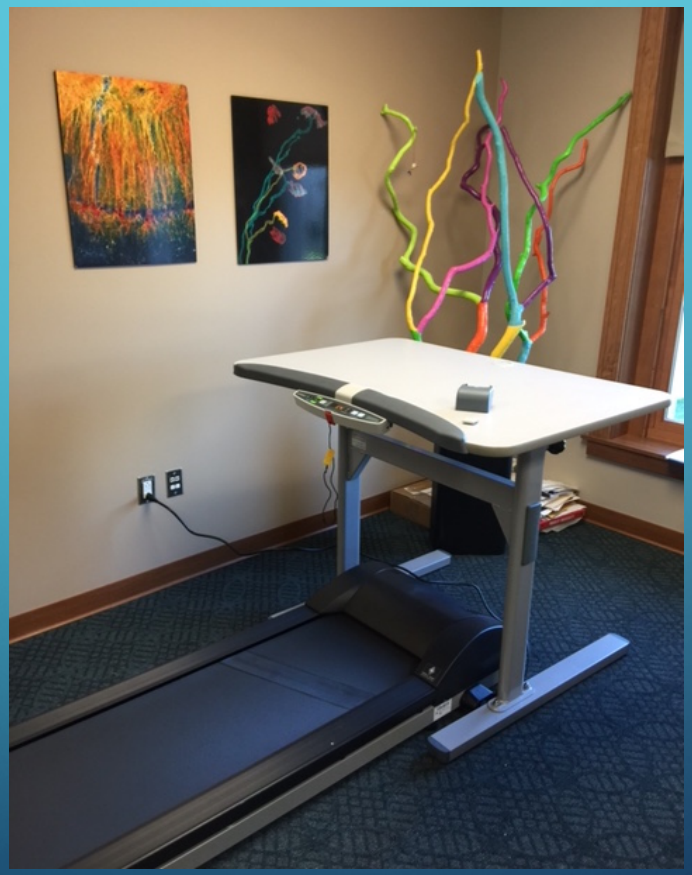
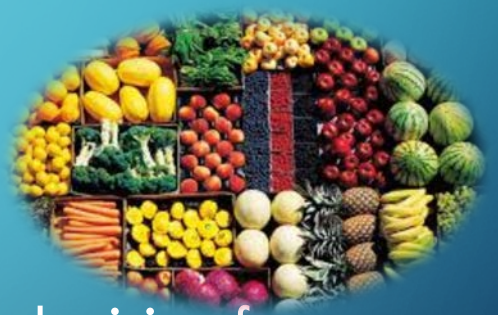
MY NEW BRAIN TRAINING TOOL



HEALTHY NUTRITION/DIET

- Low fat, complex-carbohydrate, high protein diet
- Eat organic and whole foods, if possible
- Increases myelination
- Decreases inflammation



- Consult with a dietician, functional medicine physician for use of possible supplements
- Assists the gut-brain axis and maintains a healthy gut microbiome
  - Gut microbiome = Sixth sense
  - Little use of alcohol and drugs

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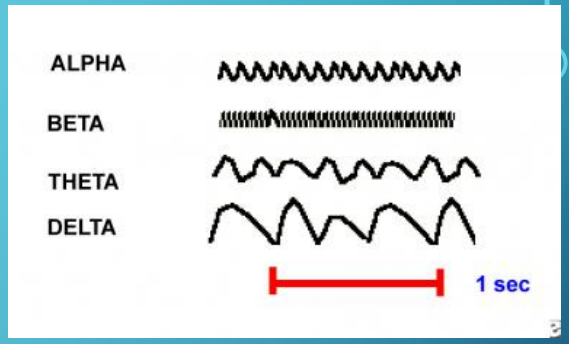
ITECHNOLOGY



- 12 % of US are addicted; 30% in China
- Too much - disrupts sleep patterns
- Changes the function and structure of the brain with alpha spiking (over-aroused); 10-20% shrinkage in surface brain area (Swingle, 2015)
- 25 % of young people having sex while texting (Porges, 2014)
- Disrupts social connection and engagement

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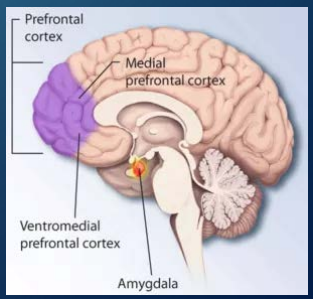
COGNITIVE CHALLENGE/MEDITATION

- Needs to be novel and increasingly challenging
- Builds neuroplasticity: adaptability of the brain; neurogenesis: new neuronal growth
- Negative Bias: brain is good at remembering bad things; bad at remembering good thing
  - Attention must be held for at least 10-20 seconds for positive emotions to remain
  - HRV and diaphragmatic breathing will assist in over arousal.

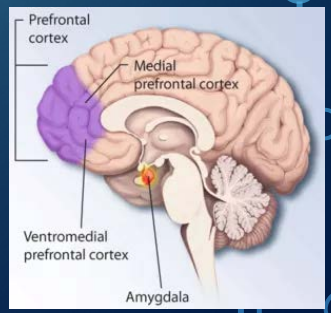
NEUROSCIENCE OF ATTENTION

- Alerting-entire brain/body that begins with V, A, T, O, G: the wake-up call goes to the brainstem to produce necessary norepinephrine (Ivey, et al, 2016)
- Orienting-navigation occurs by either bottom-up or top-down through goal directions
- Self-regulation requires many brain connections: prefrontal cortex, insula and anterior cingulate cortex (ACC)



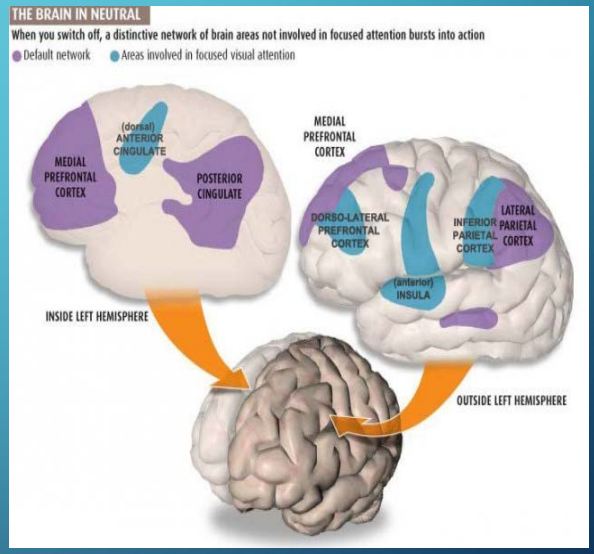
EMPATHY AND REFLECTIVE SKILLS

- Reflections Skills: meta-analysis by Fan et al. (2011) and Engen and Singer (2013) showed affective empathy with increased activity in the insula while the right supramarginal gyrus works to correct lack of empathy and autocorrects
- Cognitive empathy is associated with higher activity in the midcingulate cortex and the dorsomedial prefrontal cortex.
- When we observe others in pain, the insula and ACC are activated but not the somatosensory cortex.
- Active listening actually "lights" up the brain in fMRI studies (Kawamichi et al, 2015).

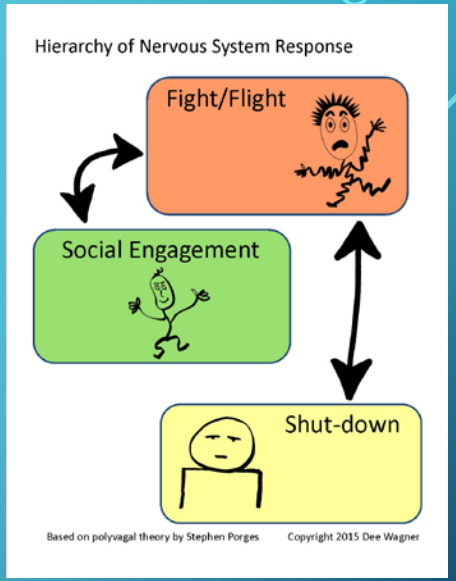


SO WHEN COUNSELORS WHEN WE LISTEN…..

- Abstract positive regard, such as attending behaviors, activates ventral striatum (Ivey, 2016).
- Therapeutic alliance is critical in creating safety needs through the vagal nerve (Porges, 2011).
- Summarizations are associated with the Default Mode Network (DMN) and reflection of self and others.
- Being present (here and now) with immediacy needs involves executive functions, limbic HPA hormones, the amygdala, memory in the hippocampus using a holistic brain.
- For neuroplasticity to occur, positive reflections must be maintained for 10-20 seconds…deepen responses (Hansen, 2011).



SOCIAL RELATIONSHIPS



- Healthy interactions with others and pets
- Increases levels of oxytocin
- Extends the lifespan with face to face bonding
- May offer "emotional and physiological safety" using the vagal nerve (Porges, 2014)
- Elicits more "bottom-up and top down" communications
- Eases trauma and assists the amygdala to get smaller and makes more global connections in the brain

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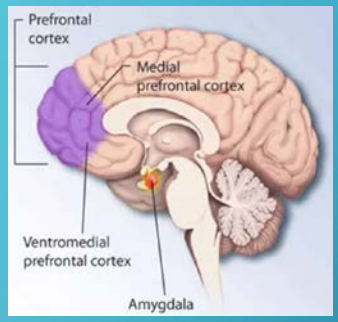
BUILDING RESILIENCY LOADS



- Found that neuroplasticity of the ventromedial prefrontal cortex (VmPFC) is essential to resiliency while coping and dealing with stress (Sinha et al., 2016).
- 30 young adults with no previous physical/psychiatric disorders; conducted fMRIs to assess the stress response and active coping by exposing each to a block of highly aversive visual images
- The control group received no stress, neutral images.
- The VmPFC signals emotional and behavioral control.
- Teaching the skills of reframing and reappraisal help in adaptive coping.

OUR GOAL: PROFESSIONALLY AND PERSONALLY

Encourage neuroflexibility.

Remember the plasticity paradox.

Engage in learning, life and fun!

The strongest oak of the forest is not the one that is protected from the storm and hidden from the sun. It is the one that stands in the open where it is compelled to struggle for its existence against the winds, rains and the scorching sun.

- Napolean Hill

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REFERENCES

Chapin, T. & Russell-Chapin, L. (2014). *Neurotherapy and Neurofeedback: Brain-based treatment for psychological and behavioral problems*. Routledge, NY:NY.

Doidge, N. (2016). *The brain's way of healing: Remarkable discoveries and recoveries from the frontiers of neuroplasticity*. Penguin Books, NY:NY.

Engen, H.G., & Singer, T. (2013). Empathy circuits. *Current Opinion in Neurobiology, 23*, 275-282. Doi:10.1016/j.conb.2012.11.003

Fan, Y., Duncan, N., de Greck, M., & Northoff, G. (2011). Is there a core neural network in empathy? An fMRI based quantitative meta-analysis. *Neuroscience and Biobehavioral Reviews, 35,* 903-911.

Ivey, A., Ivey, M., & Zalaquett, C. (2016). The Neuroscience of listening, empathy, and microskills. *Counseling Today, 59(2), 18-21* . Alexandria, Virginia: American Counseling Association.

Ivey, A.E., Ivey, M.B. & Zalaquett, C.P. (2014). *Intentional interviewing and counseling: Facilitating client development in a multicultural society*. Belmont, CA: Brooks/Cole/Cengage Learning.

Hampton, D. (n.d.). The 10 fundamentals of rewiring your brain [Web log message]. Retrieved from www.thebestbrainpossible.com/the-10-fundamentals-of-rewiring-your-brain/

Hanson, R. (2013). Hardwiring happiness: The new brain science of contentment, calm and confidence. Random House, NY:NY.

Kawamichi, H., Yoshihara, K, Sasaki, A.T., Sugawara, S.K., Tanabe, H.C., Shinohara, R, ...Sadato, N. (2015). Perceiving active listening activates the reward system and improves the impression of relevant experiences. *Social Neuroscience, 10*, 16-26. Doi: 10.1080/17470919.2014.954732.

Merzenich, M. (2013). Soft-wired: How the new science of brain plasticity can change your life. Parnassus Publishing: San Francisco, CA.

REFERENCES CONTINUED

Pandi-Perumal, S.R., Narasimhan, M. & Kramer, M. (2016). (eds). *Sleep and psychosomatic medicine*. Taylor & Francis Group: Boca Raton, Fl.

Porges, S. (2014). *Clinical insights from the polyvagal theory: The transformative power of feeling safe*. W.W. Norton & Co: NY, NY.

Porges, S. (2011). The polyvagal theory: Neurophysiological foundations of emotions, attachment, communication and self-regulation. W.W. Norton & Co: NY, NY.

Ratey, J. & Hagerman, E. (2008). *Spark: The revolutionary new science of exercise and the brain*. Little Brown and Co: NY, NY.

Ride the Tiger [DVD] (2016). Detroit Public Television.

Sherlin, L. (2016). Personal communication.

Sinha, R., Lacadie, C.M., Constable, R.T. & Seo, O. (2016). Dynamic neural activity during stress signals resilient coping. *Professional National Academy of Sciences*, July. doi: 10.1073/pnas.1600965113.

Swingle, M. K. (2015). *i-Minds: How cell phones, computers, gaming and social media are changing our brains, our behavior and evolution of our species*. Inkwater Press: Portland, OR.

Xie, L., Kang, H., Xu, Q., Chen. M., Liao, Y., Thiyagarajan, M., O'Donnell, J., Christensen, D., Nicholson,C., Iliff, J., Takano, T., Deane, R. & Nedergaard, M. (2013). Sleep drives metabolite clearance from the adult brain. Science, v342(6159), pp.373-377. doi10.1126/science.1241224.