


Brain Rules!

Brian McKiernan, PT, PhD

Regarding neuroscience...

- n The question always comes up..

Why do I have to study this??



Because I said so, that's why!!



But this is so cool...



But this is so cool...



N1.22A

But this is so cool...



p. 193

But this is so cool...

The book...

n Brain Rules

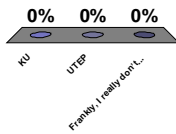
... 12 Principles for Surviving and Thriving at Work, Home and School

n John Medina

The clickers...

Who will win tonight's football game?

1. KU
2. UTEP
3. Frankly, I really don't care

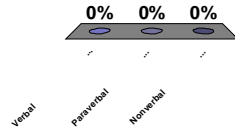


So, let's get started...

n I didn't say you were stupid

If we accept that there are three components to interpersonal communication, which do you think has the most influence on how the message is received?

1. **Verbal**
(the words we say)
2. **Paraverbal**
(how we say those words)
3. **Nonverbal**
(body language and facial expressions while we say those words)



The message...

- n Verbal 7%
- n Paraverbal 55%
- n Nonverbal 38%

Silent Messages: Implicit Communication of Emotions and Attitudes by Albert Mehrabian (1980)

The paraverbal...

- n I didn't say you were stupid
- n I **didn't** say you were stupid
- n I didn't **say** you were stupid
- n I didn't say **you** were stupid
- n I didn't say you **were** stupid
- n I didn't say you were **stupid**

Get up...

n Brain Rule #1 – Exercise boosts brain power

“The benefits of exercise seem nearly endless because its impact is systemwide, affecting most physiological systems. Exercise makes your muscles and bones stronger, for example, and improves your strength and balance. It helps regulate your appetite, changes your blood lipid profile, reduces your risk for more than a dozen types of cancer, improves the immune system, and buffers against the toxic effects of stress. By enriching your cardiovascular system, exercise decreases your risk for heart disease, stroke and diabetes. When combined with the intellectual benefits exercise appears to offer, we have in our hands as close to a magic bullet for improving human health as exists in modern medicine.”

Final thoughts...

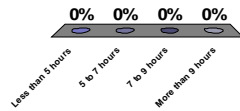
- n Recess twice a day
- n Treadmills in cubicles and classrooms



I'm tired...

On average, how many hours of sleep do you get on "school nights"?

1. Less than 5 hours
2. 5 to 7 hours
3. 7 to 9 hours
4. More than 9 hours



n Brain Rule #7 – Sleep Well, Think Well

“The bottom line is that sleep loss means mind loss. Sleep loss cripples thinking in just about every way you can measure thinking. Sleep loss hurts attention, executive function, immediate memory, mood, quantitative skills, logical reasoning, general math knowledge. Eventually, sleep loss affects manual dexterity, including fine motor control and even gross motor movements, such as the ability to walk on a treadmill.”

n Kelly WE, Kelly KE, Clanton RC. The Relationship Between Sleep Length And Grade-Point Average Among College Students - Statistical Data Included. *College Student Journal*, March, 2001.

n "...A college student sample's self-reported typical sleep length and grade-point averages were explored. It was found that short sleepers reported significantly lower overall grade-point averages than did long sleepers."

n Kronholm E, Sallinen M, Suutama T, Sulkava R, Era P, Partonen T. Self-reported sleep duration and cognitive functioning in the general population. *J Sleep Res.* 2009 Aug 31.

n "Short and long sleep duration, tiredness and fatigue were found to be associated with both objectively assessed and self-reported decreased cognitive functioning."

Let's see if this works...

Therapy for functional improvement...

n Must have activities done with...

- Frequency
- Intensity
- Focus

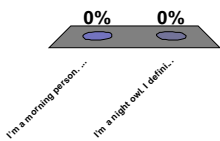
n Langhorne P, Coupar F, Pollock A. **Motor recovery after stroke: a systematic review.** *Lancet Neurol.* 2009 Aug;8(8):741-54.

n "Although the existing evidence is limited by poor trial designs, some treatments do show promise for improving motor recovery, particularly those that have focused on high-intensity and repetitive task-specific practice."

The early bird gets the...

Which of the following would best describe you?

1. I'm a morning person. I definitely feel and function better when the sun is coming up.
2. I'm a night owl. I definitely feel and function better after the sun goes down.



Category	Percentage
I'm a morning person...	0%
I'm a night owl. I definitely...	0%

n Paradee CV, Rapport LJ, Hanks RA, Levy JA. Circadian preference and cognitive functioning among rehabilitation inpatients. *Clin Neuropsychol*. 2005 Feb;19(1):55-72.

n "Persons with cognitive impairment showed disproportionate vulnerability to the effects of circadian preference and time of testing, performing more poorly at nonpreferred than preferred times."

Let's walk...

n van Iersel MB, Kessels RP, Bloem BR, Verbeek AL, Olde Rikkert MG. **Executive functions are associated with gait and balance in community-living elderly people.** *J Gerontol A Biol Sci Med Sci.* 2008 Dec;63(12):1344-9.

n "In community-living elderly people, executive functions are associated with gait and balance impairment during a challenging dual-task condition that also depends on executive integrity."

n Brain Rule #4 – **We don't pay attention to boring things**

... "To put it bluntly, research shows that we can't multitask. We are biologically incapable of processing attention-rich inputs simultaneously. [We] must jump from one thing to the next."

If you want to remember...

n **Pay attention** (to one thing at a time)

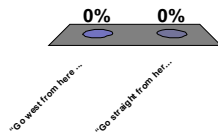
n Brain Rule #5 – **Repeat to remember** (short term)

n Brain Rule #6 – **Remember to repeat** (long term)

I'm lost...

If you were lost and stopped at a gas station to ask for directions, which of these would you find most helpful?

1. "Go west from here about two miles, then turn south and go about a half mile."
2. "Go straight from here until you come to the big red barn, then turn left and go until you see the white picket fence."



n Brain Rule #11 – Male and female brains are different

... "I didn't really want to write about this. Characterizing gender-specific behaviors has a long and mostly troubled history."

n Aubrey JB, Dobbs AR. Age and sex differences in the mental realignment of maps. *Exp Aging Res.* 1990 Autumn;16(3):133-9.

n "Elderly persons made fewer correct choices and took more time to make direction decisions than younger people as did females compared to males. When the map could not be turned, decision times were related to the amount of misalignment between the map and the room. Elderly persons, especially females were influenced more by map misalignment than were young people."

n Eve's Rib: The Groundbreaking Guide to Women's Health

.. Marianne J. Legato, MD

n "Unless they are focusing on the reproductive system, most doctors have a tendency to treat patients as though they were all the same sex: male..."

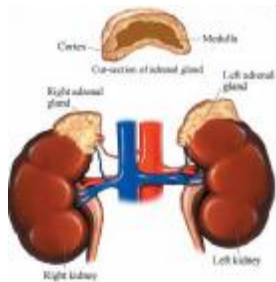
Pick up after yourself...

Brian's Rules

- n Know the basics...
 - ... "Essential components" (Carr, Shepherd)
- n Challenge assumptions...

Stress...

Stress...



Chronic stress...

- n Negative effects on...
 - o Cardiovascular system
 - o Immune system
 - o Brain
 - n Memory
 - n Executive function

Stress...

- n What are we going to do about it?

Stress Reduction Kit

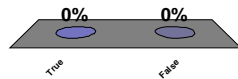


© 2008
The Center for Health and Performance
The University of Michigan
All rights reserved. For more information, visit <http://www.healthandperformance.org>

Finally...

We are born with all the brain cells we're ever going to have and they steadily die (without replacement) throughout our lives.

1. True
2. False



Brain Rule #12 – We are powerful and natural explorers

“Until five or six years ago, the prevailing notion was that we were born with all of the brain cells we were ever going to get, and they steadily eroded in a depressing journey through adulthood to old age. We do lose synaptic connections with age (some estimates of neural loss alone are close to 30,000 neurons per day). But the adult brain also continues creating neurons within the regions normally involved in learning. These new neurons show the same plasticity as those of newborns. The adult brain throughout life retains the ability to change its structure and function in response to experience.”

I'm not lost...I'm exploring