

1

Introduction to neuroscience

Contact

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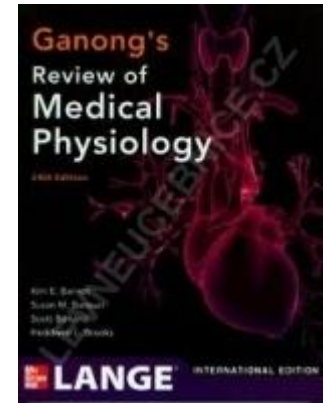
kduris@med.muni.cz

The objectives

Basic understanding of the role and function of nervous system

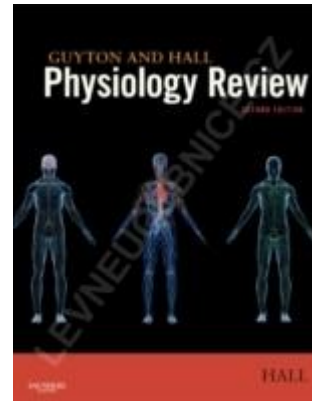
Literature

- Ganong's Review of Medical Physiology



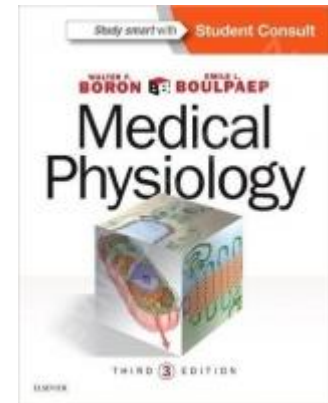
<https://www.levneucebnice.cz/p/ganong-s-review-of-medical-physiology-9781259009624/>

- Guyton - Physiology Review



<https://www.levneucebnice.cz/p/guyton-and-hall-physiology-review/>

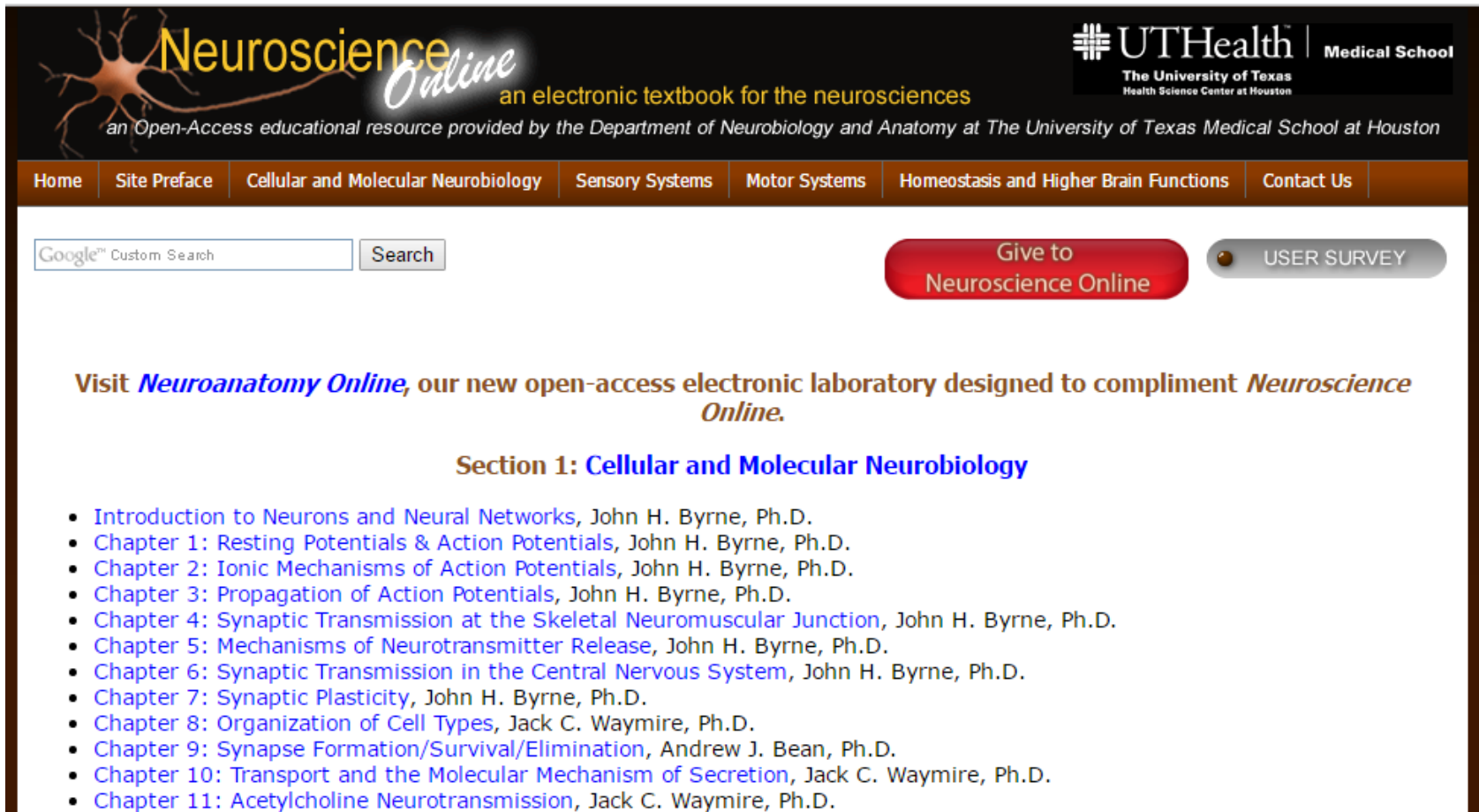
- Boron - Medical Physiology



<https://www.levneucebnice.cz/p/medical-physiology-3rd-ed/>

The other sources

- Neuroscience Online
- <http://neuroscience.uth.tmc.edu/toc.htm>



The screenshot shows the Neuroscience Online website. At the top left is a logo of a neuron with the text "Neuroscience Online" and "an electronic textbook for the neurosciences". Below this is the text "an Open-Access educational resource provided by the Department of Neurobiology and Anatomy at The University of Texas Medical School at Houston". On the top right is the "UTHealth Medical School" logo with "The University of Texas Health Science Center at Houston" below it. A navigation bar contains links: Home, Site Preface, Cellular and Molecular Neurobiology, Sensory Systems, Motor Systems, Homeostasis and Higher Brain Functions, and Contact Us. Below the navigation bar is a Google Custom Search box with a "Search" button, a red "Give to Neuroscience Online" button, and a grey "USER SURVEY" button. The main content area features a promotional message: "Visit *Neuroanatomy Online*, our new open-access electronic laboratory designed to compliment *Neuroscience Online*." Below this is a section header "Section 1: Cellular and Molecular Neurobiology" followed by a list of 11 chapters with their authors.

Neuroscience Online
an electronic textbook for the neurosciences
an Open-Access educational resource provided by the Department of Neurobiology and Anatomy at The University of Texas Medical School at Houston

UTHealth Medical School
The University of Texas Health Science Center at Houston

Home | Site Preface | Cellular and Molecular Neurobiology | Sensory Systems | Motor Systems | Homeostasis and Higher Brain Functions | Contact Us

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Give to Neuroscience Online USER SURVEY

Visit *Neuroanatomy Online*, our new open-access electronic laboratory designed to compliment *Neuroscience Online*.

Section 1: Cellular and Molecular Neurobiology

- [Introduction to Neurons and Neural Networks](#), John H. Byrne, Ph.D.
- [Chapter 1: Resting Potentials & Action Potentials](#), John H. Byrne, Ph.D.
- [Chapter 2: Ionic Mechanisms of Action Potentials](#), John H. Byrne, Ph.D.
- [Chapter 3: Propagation of Action Potentials](#), John H. Byrne, Ph.D.
- [Chapter 4: Synaptic Transmission at the Skeletal Neuromuscular Junction](#), John H. Byrne, Ph.D.
- [Chapter 5: Mechanisms of Neurotransmitter Release](#), John H. Byrne, Ph.D.
- [Chapter 6: Synaptic Transmission in the Central Nervous System](#), John H. Byrne, Ph.D.
- [Chapter 7: Synaptic Plasticity](#), John H. Byrne, Ph.D.
- [Chapter 8: Organization of Cell Types](#), Jack C. Waymire, Ph.D.
- [Chapter 9: Synapse Formation/Survival/Elimination](#), Andrew J. Bean, Ph.D.
- [Chapter 10: Transport and the Molecular Mechanism of Secretion](#), Jack C. Waymire, Ph.D.
- [Chapter 11: Acetylcholine Neurotransmission](#), Jack C. Waymire, Ph.D.

The other sources

- MIT - Brain Structure and Its Origins
- <http://ocw.mit.edu/courses/brain-and-cognitive-sciences/9-14-brain-structure-and-its-origins-spring-2014/#>

[Home](#) » [Courses](#) » [Brain and Cognitive Sciences](#) » [Brain Structure and Its Origins](#)

Brain Structure and Its Origins

[COURSE HOME](#) <

[SYLLABUS](#)

[THIS COURSE AT MIT](#)

[READINGS AND STUDY QUESTIONS](#)

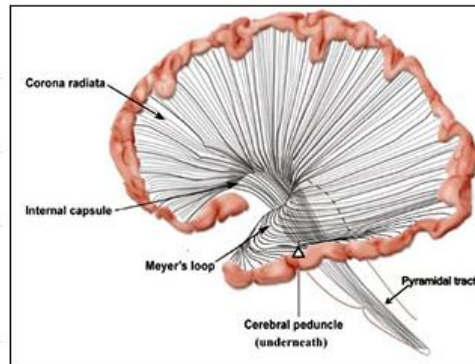
[LECTURE NOTES](#)

[AUDIO LECTURES](#)

[ASSIGNMENTS](#)

[EXAMS](#)

[STUDY MATERIALS](#)



Instructor(s)

Prof. Gerald E. Schneider

MIT Course Number

9.14

As Taught In

Spring 2014

Level

Undergraduate

[CITE THIS COURSE](#)

Drawing of the left hemisphere of the human brain together with the brainstem, dissected to reveal the course of axons that descend to the brainstem and spinal cord. (Courtesy of MIT Press. Used with permission. Figure 22.8 from Schneider, G. E. [Brain Structure and its Origins: In the Development and in Evolution of Behavior and the Mind](#). MIT Press, 2014.)

Course Features

> [Audio lectures](#)

> [Lecture notes](#)

> [Exams and solutions](#)

> [This Course at MIT](#)

> [Subtitles/transcript](#)

> [Assignments \(no solutions\)](#)

> [Instructor insights](#)

Why and how to **STUDY** neuroscience



Neuroscience: Brain

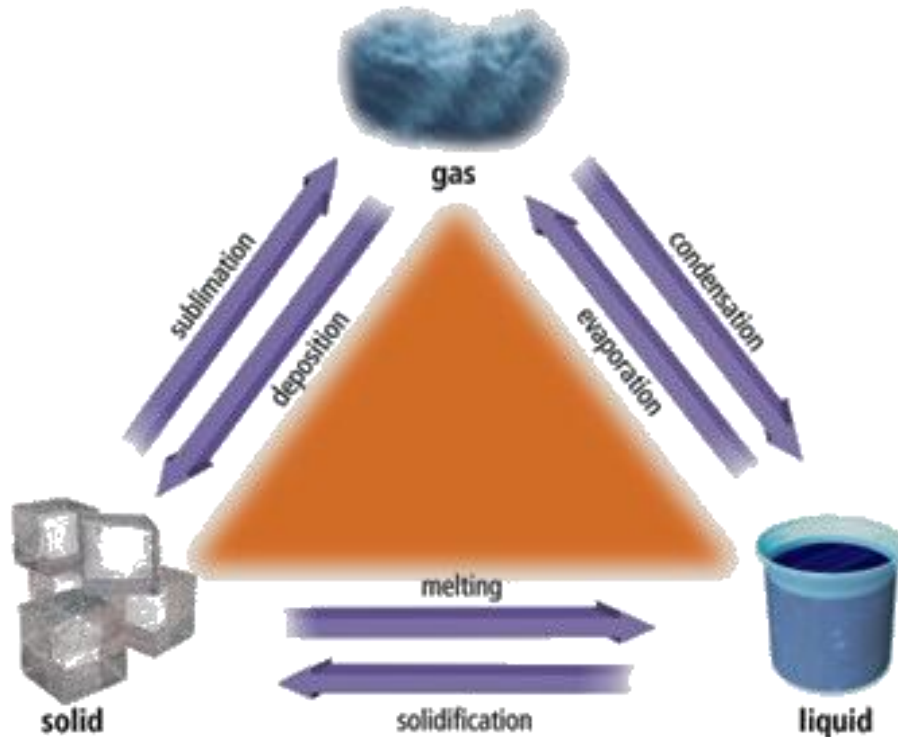
Why and how to **STUDY** neuroscience

Three States of Cognition

Philosophy : Mind behind Mind



PS Deb



Neuroscience: Brain

Psychology : Mind

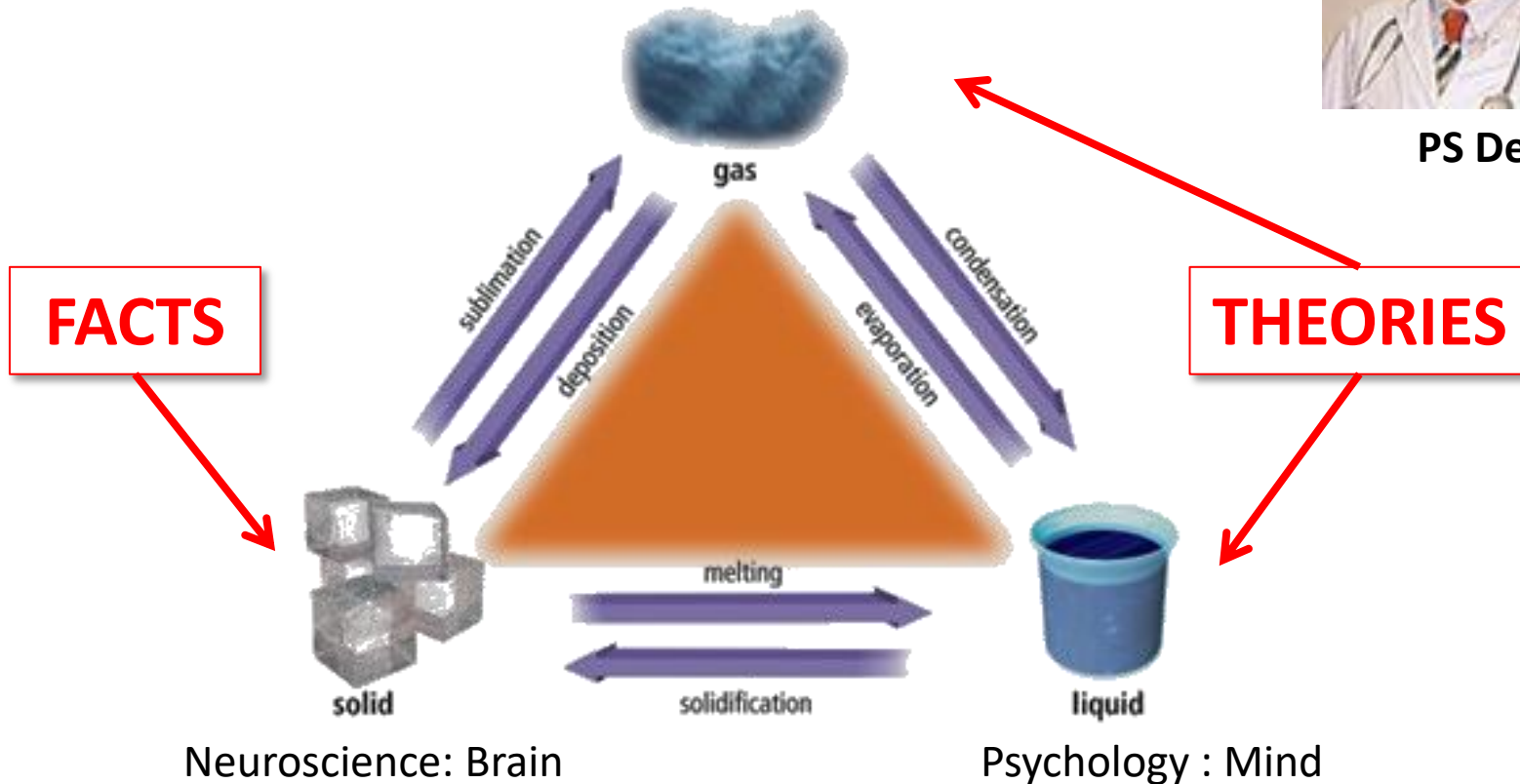
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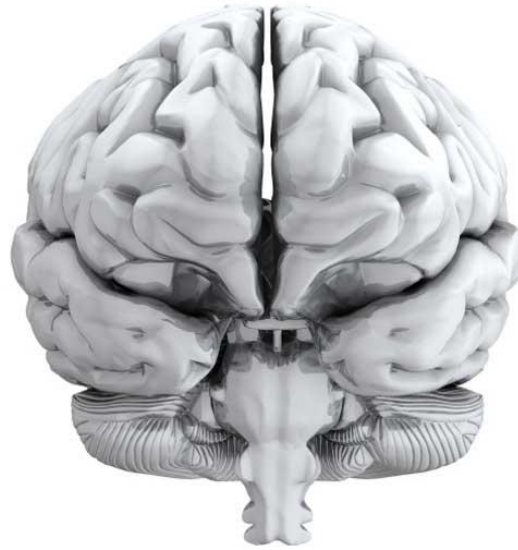


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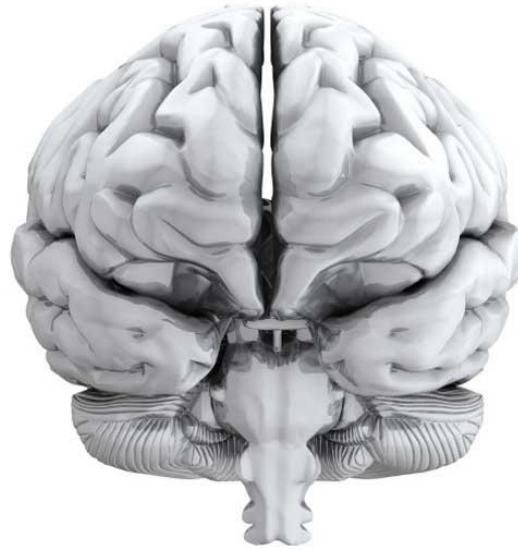
Every brain is a powerful tool...

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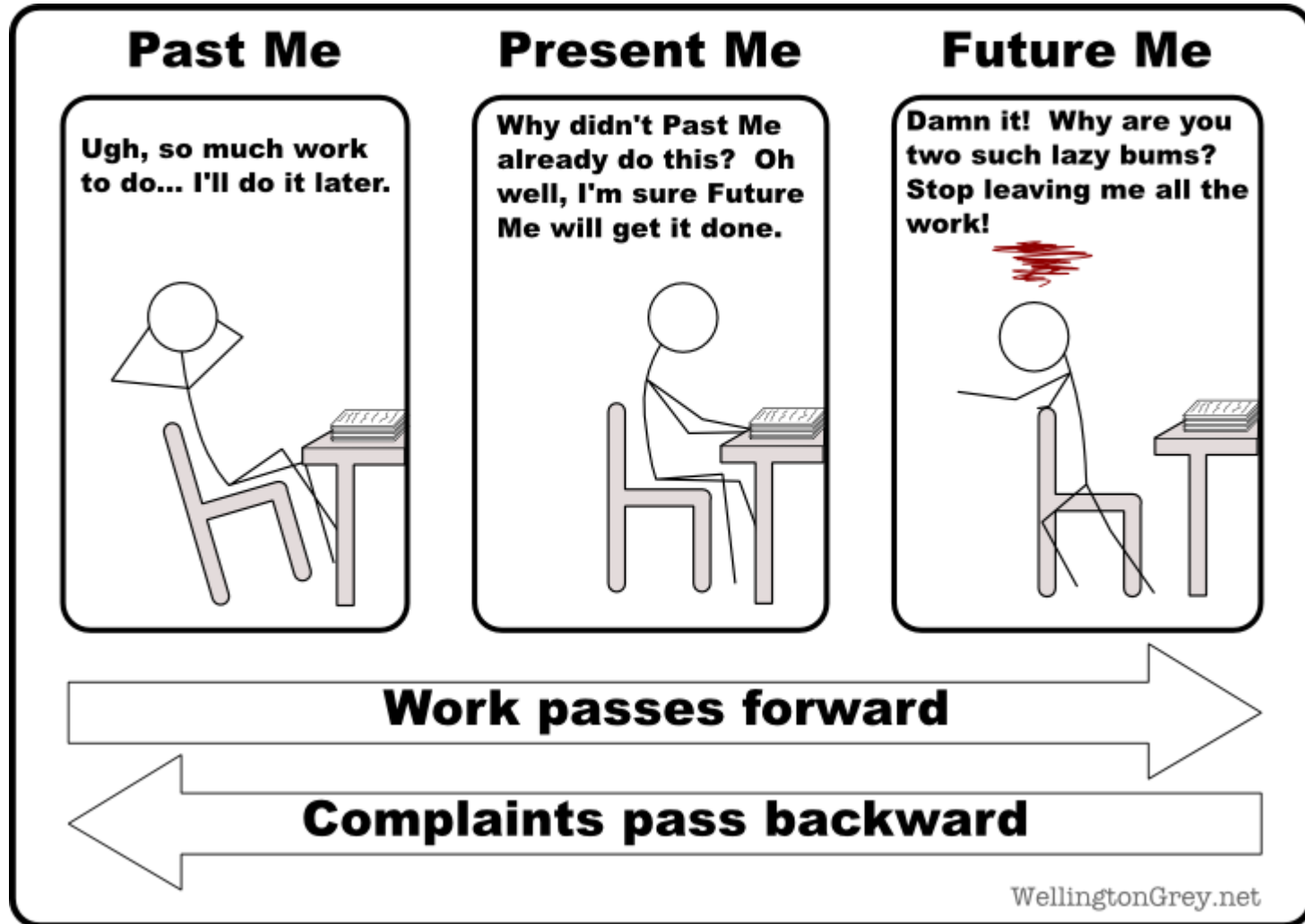
- ✓ The conflict between the limbic system and the neocortex
- ✓ The problem with effective control of the neocortex



The conflict between the limbic system and the neocortex

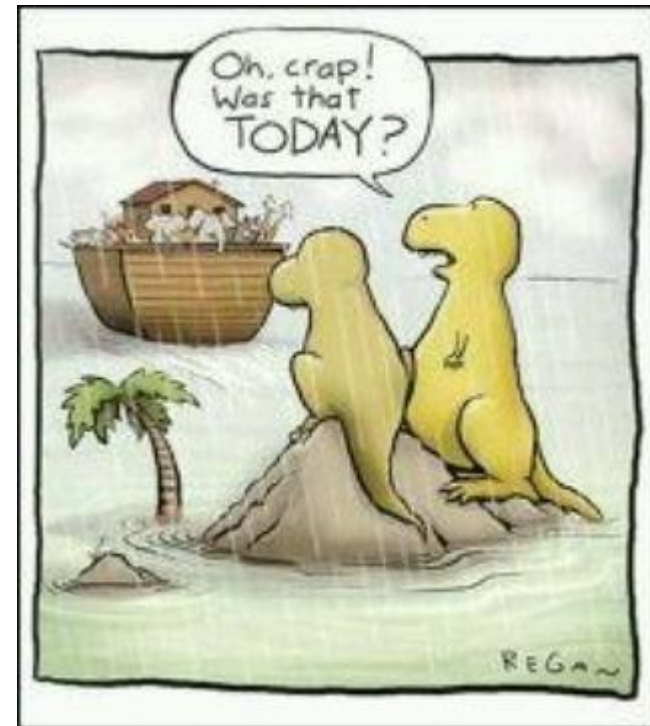


The problem with effective control of the neocortex



Procrastination

- Putting off an action to later time
- It is not a laziness!



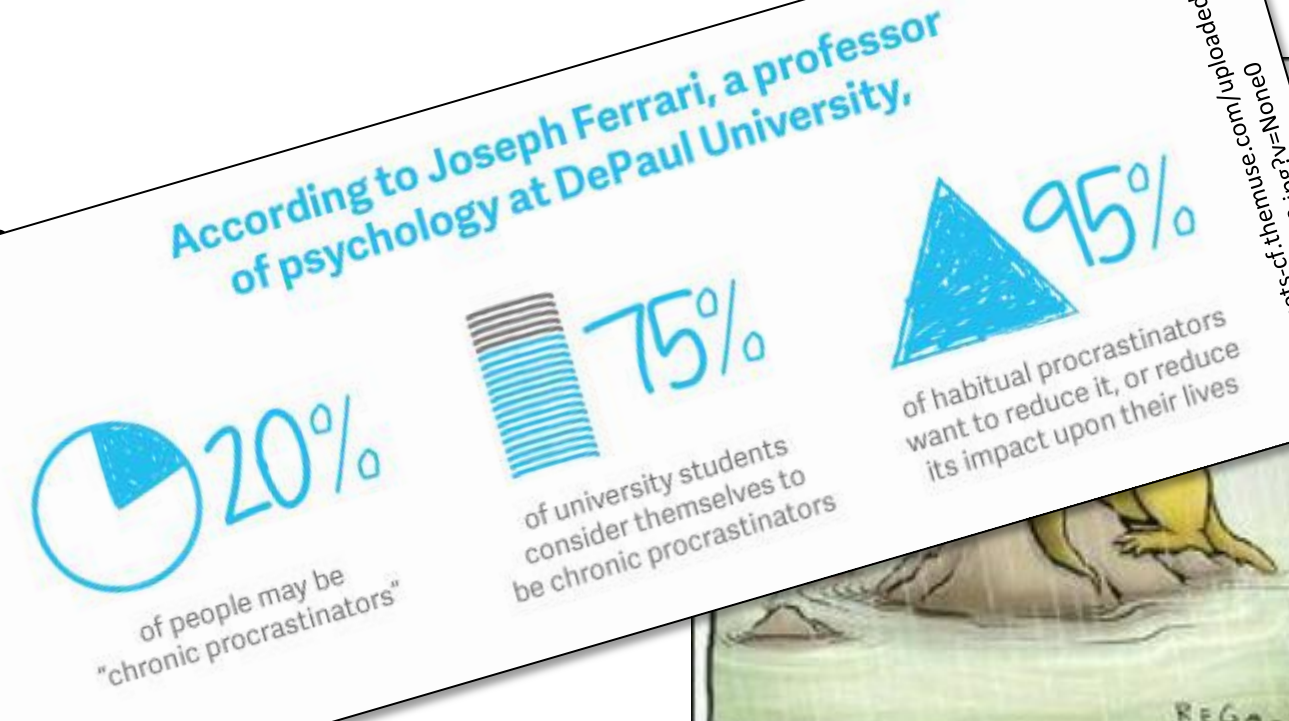
http://68.media.tumblr.com/7dc8ae528d3b8732ffd837ef94536423/tumblr_nvanv5R3oJ1tdi9a1o1_400.jpg

Procrastination

- Putting

- It is


According to Joseph Ferrari, a professor of psychology at DePaul University,



20% of people may be "chronic procrastinators"

75% of university students consider themselves to be chronic procrastinators

95% of habitual procrastinators want to reduce it, or reduce its impact upon their lives



<https://assets-cf1.tumblr.com/img/2014/08/15/15642.jpg?n=none>

https://68.media.tumblr.com/7dc8ae528d3b8732ffd837ef94536423/tumblr_nvanv5R3oJ1tdi9a1o1_400.jpg

Procrastination

A critical role of the limbic system

Physiologically, it's a struggle between two parts of the brain:

Prefrontal cortex:
controls problem solving and planning

Limbic system:
craves immediate gratification



Why is procrastination such a bad idea?

It can ...

... hurt your health: Chronic procrastinators suffer more illnesses, get less exercise, sleep less and drink more alcohol than non-procrastinators.

... stress you out: The resulting deadline crunch (or a missed deadline) takes a toll on both you and those around you.

... lead to lower salaries and a higher risk of unemployment: No one gets ahead by dropping deadlines.

Why do people procrastinate?



Fear of failure: You won't settle for anything less than perfection.



Skill deficit: You don't know how to complete the task.



Lack of interest or motivation: The task is simply too boring.

Risk factors

- Intelligence
 - A higher intelligence is associated with a better skill of rationalization

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 - Why to do it?
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- A task is frustrating
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- Bad organization
 - I have to do it in a different way
- Lacking in rewards(mainly intrinsic)
 - It does not bring me anything

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Stressors
✓ **Fatigue**
✓ **Hunger**
✓ **Time pressure**

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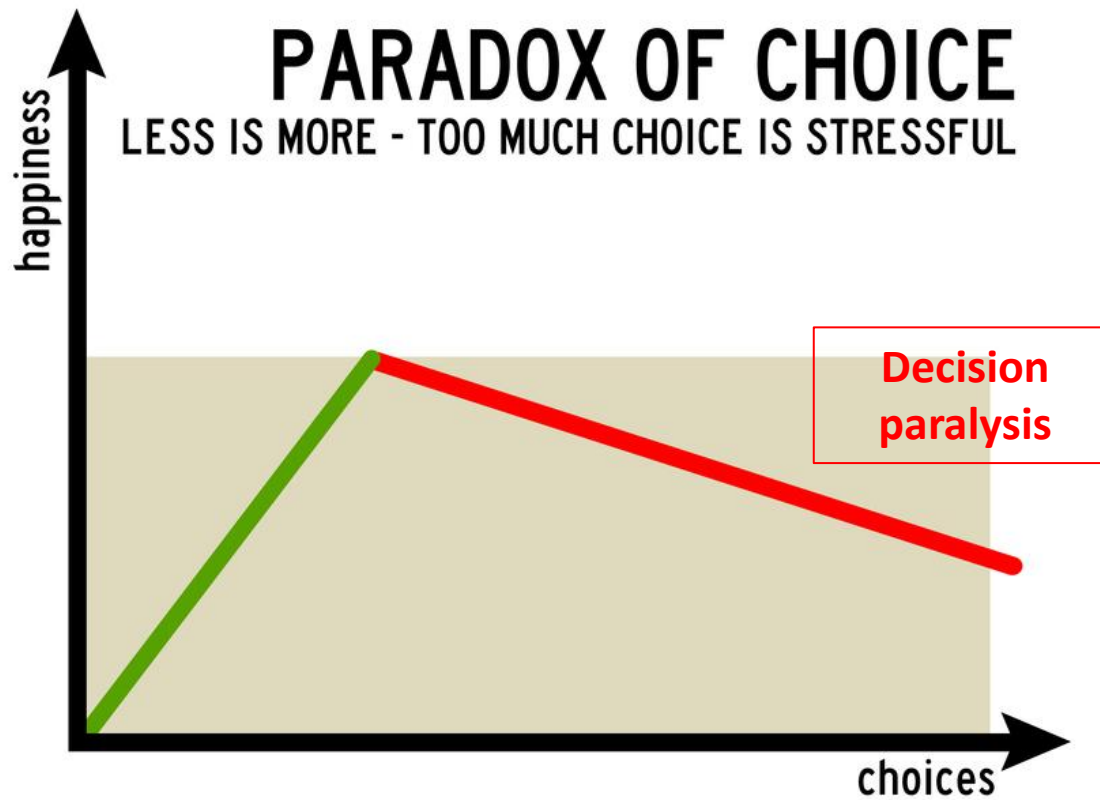


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➤ Decision paralysis
➤ Distraction



<https://11tx7b411ycc3zja3v2vhqz9-wpengine.netdna-ssl.com/wp-content/uploads/2015/07/paradox-of-choice.jpg>

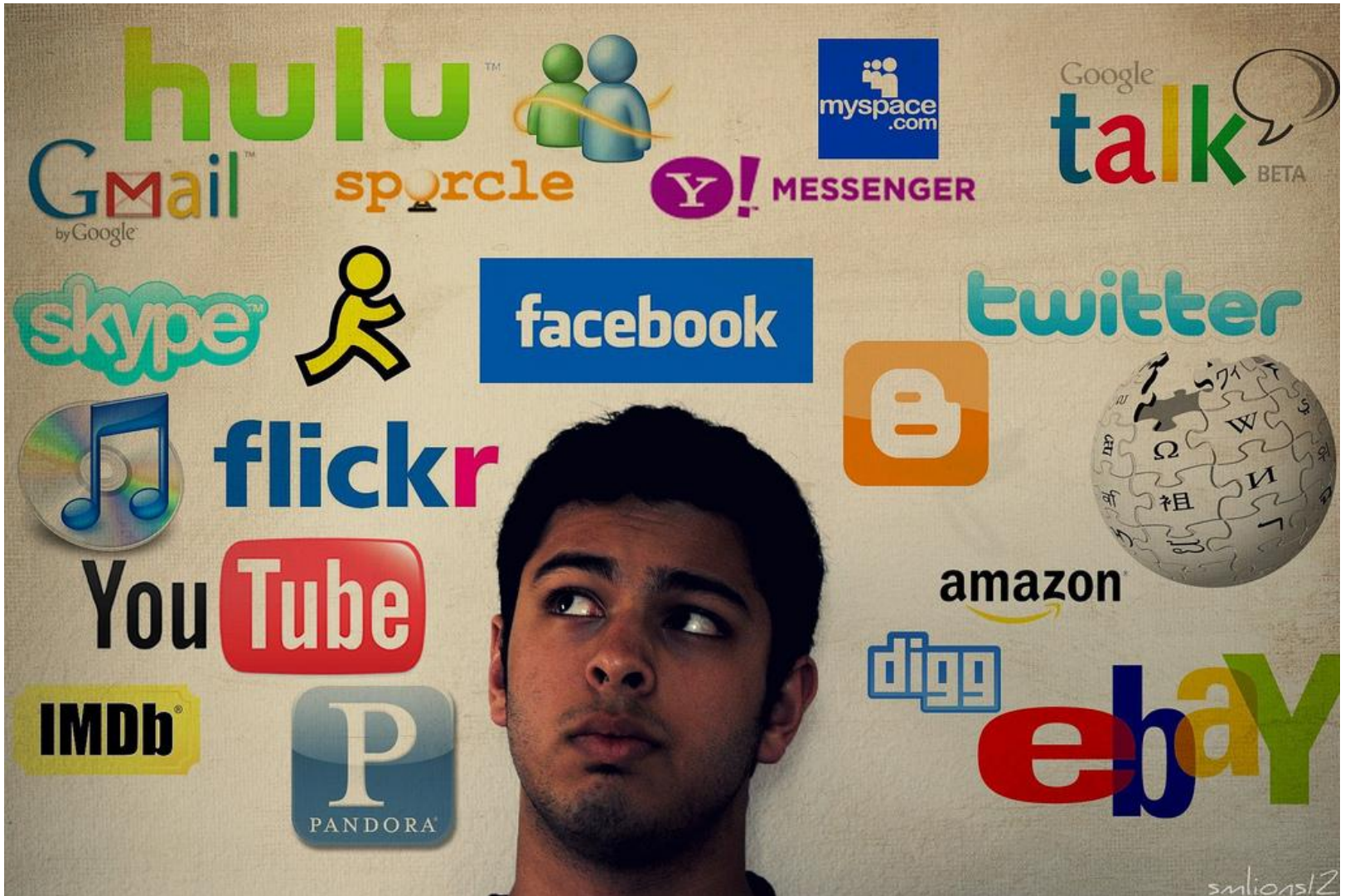


<http://wigan.illarerate.co.uk/wp-content/uploads/2014/01/Empty-supermarket-shelves.jpg>



<https://kristenleoneblog.wordpress.com/2016/04/03/decision-paralysis/>

Distraction



Procrastination



http://howtobehappy.guru/wp-content/uploads/2015/08/imagedit_7_5046245303.jpg

PROCRASTINATION
is like a Credit Card:
it's a lot of Fun
until you get the Bill.

1231 9434 1200 0200

Christopher Parker

Procrastination

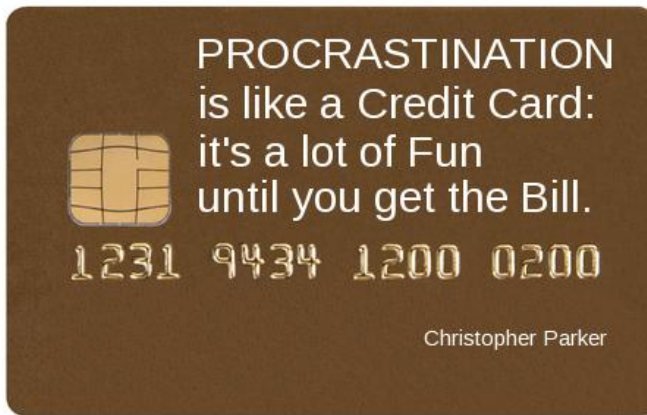
A critical role of the limbic system



SOURCES: <http://serendip.brynmawr.edu/bb/neuro/neuro02/web1/jmaryasis.html>
http://www.mindtools.com/pages/article/newHTE_91.htm
<http://www.marccandangel.com/2010/11/22/7-common-causes-and-proven-cures-for-procrastination/>



http://howtobehappy.guru/wp-content/uploads/2015/08/imageddit_7_5046245303.jpg



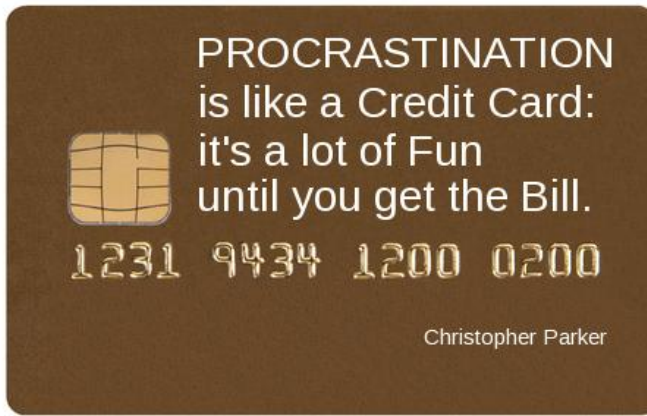
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Procrastination

A critical role of the limbic system



We often speak about time management, but we cannot manage the time at all, because the time is running independently of us. The problem is with self-management and task-management...

SOURCES: <http://serendip.brynmawr.edu/bb/neuro/neuro02/web1/jmaryasis.html>
http://www.mindtools.com/pages/article/newHTE_91.htm
<http://www.marccandangel.com/2010/11/22/7-common-causes-and-proven-cures-for-procrastination/>



Procrastination

11 THINGS BY DR. TRAVIS BRADBERRY ULTRA-PRODUCTIVE PEOPLE DO DIFFERENTLY

01 THEY NEVER TOUCH THINGS TWICE

02 THEY GET READY FOR TOMORROW BEFORE THEY LEAVE THE OFFICE

03 THEY EAT FROGS

04 THEY FIGHT THE TYRANNY OF THE URGENT

05 THEY STICK TO THE SCHEDULE DURING MEETINGS

06 THEY SAY NO

07 THEY ONLY CHECK E-MAIL AT DESIGNATED TIMES

08 THEY DON'T MULTITASK

09 THEY GO OFF THE GRID

10 THEY DELEGATE

11 THEY PUT TECHNOLOGY TO WORK FOR THEM

E

OVER 15 MILLION SOLD

THE 7 HABITS OF HIGHLY EFFECTIVE PEOPLE

Powerful Lessons
in Personal Change

With a New
Foreword and
Afterword
by the Author

"A wonderful book that could change your life."
- Tom Peters, bestselling author of *In Search of Excellence*

Stephen R. Covey

Stephen Covey – Quadrant system

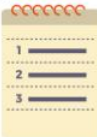
	Urgent	Not Urgent								
Important	Quad I <table border="1"><thead><tr><th>Activities</th><th>Results</th></tr></thead><tbody><tr><td><ul style="list-style-type: none">• Crisis• Pressing Problems• Deadline Driven</td><td><ul style="list-style-type: none">• Stress• Burn-out• Crisis management• Always putting out fires</td></tr></tbody></table>	Activities	Results	<ul style="list-style-type: none">• Crisis• Pressing Problems• Deadline Driven	<ul style="list-style-type: none">• Stress• Burn-out• Crisis management• Always putting out fires	Quad II <table border="1"><thead><tr><th>Activities</th><th>Results</th></tr></thead><tbody><tr><td><ul style="list-style-type: none">• Prevention, capability improvement• Relationship building• Recognizing new opportunities• Planning, recreation</td><td><ul style="list-style-type: none">• Vision, perspective• Balance• Discipline• Control• Few crisis</td></tr></tbody></table>	Activities	Results	<ul style="list-style-type: none">• Prevention, capability improvement• Relationship building• Recognizing new opportunities• Planning, recreation	<ul style="list-style-type: none">• Vision, perspective• Balance• Discipline• Control• Few crisis
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Procrastination



Brain Hacks for beating procrastination

1. Focus on the **PROCESS** not the **Product**.
 Tips: When studying, avoid thinking about how many pages you have to write or problems to solve as that brings on the pain that leads to procrastination. Rather, calmly put the effort into doing the work. No need to grasp or finish everything in one session.
2. Distractions will happen, so accept them and train yourself to move past them quickly.
 Tips: Find a quiet space, use noise-cancelling headphones.
3. Plan: Write down 3-6 tasks you want to accomplish.
 Tips: Do it the night before, so your mind starts working on them while you sleep. Plan your breaks and quitting time too. It's okay if you did not finish all tasks if you gave it your best.
4. Trust in your new system and yourself.
 Tips: Get support when you get stressed out or overwhelmed. Seek out friends who are successful, teachers, school counselors and ask for help.



5. Use The POMODORO Technique



START

SET A TIMER TO 25 MINUTES. Let everyone (Fam, BF, GF etc.) know what you are doing, so they don't interrupt or get upset if you don't respond to them.



CONTINUE

FOCUS ON ONE TASK. Study. Write. Do math. Whatever. **NO INTERRUPTIONS.** No social media, gaming, texting etc.



STOP

REWARD YOURSELF. After successfully completing 25 minutes of hardcore awesomeness (studying, working etc.) do something you enjoy for 5 minutes and repeat the process.

YOU CAN BEAT PROCRASTINATION!

