

Post-Concussion Syndrome: The Facts and Psychology

Peter J. Economou, PhD, ABPP



What to Expect



DIAGNOSING IN
PSYCHOLOGY



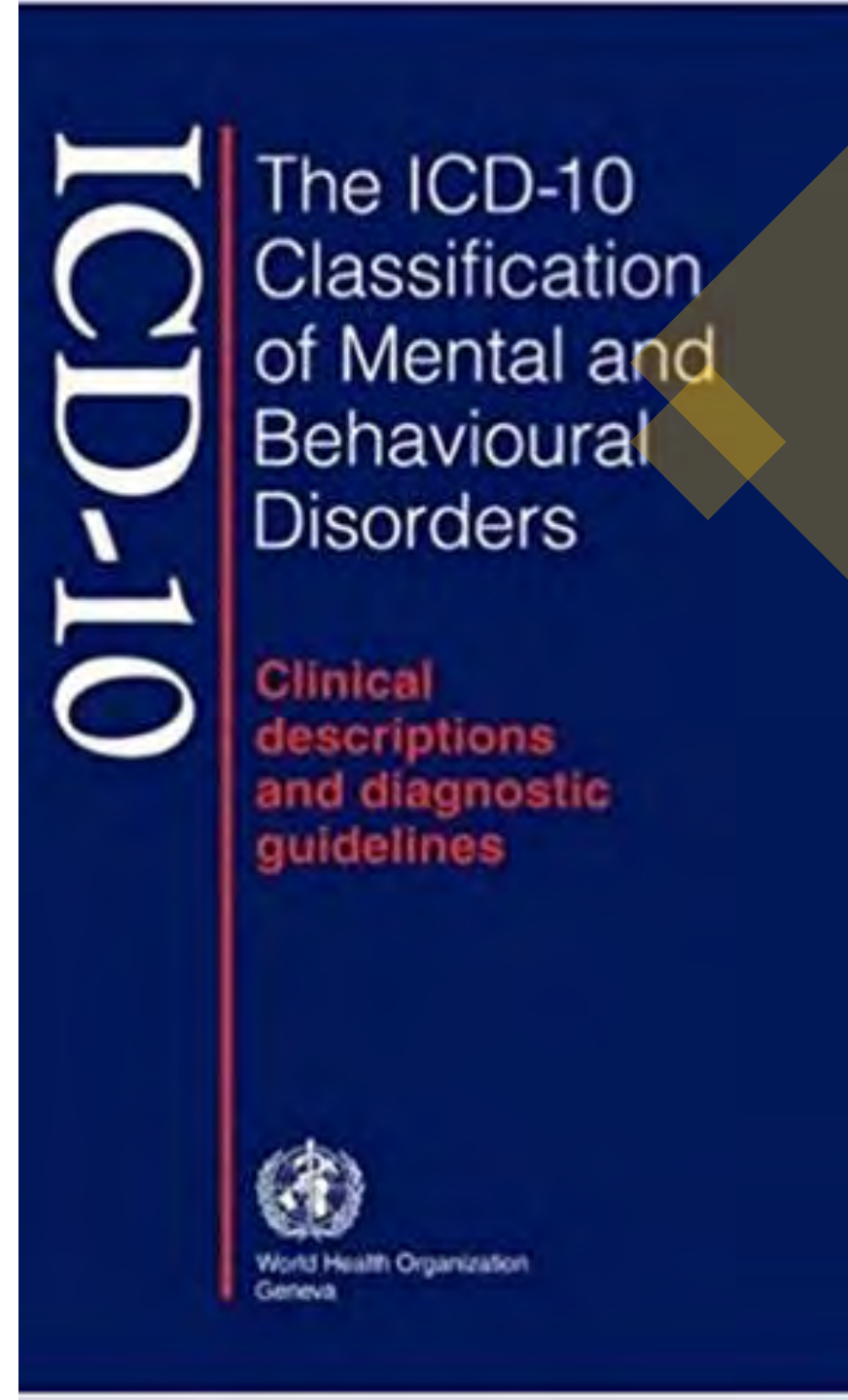
THE PSYCHOLOGY OF
CONCUSSIONS



TREATMENT
IMPLICATIONS

Post-Concussion Syndrome

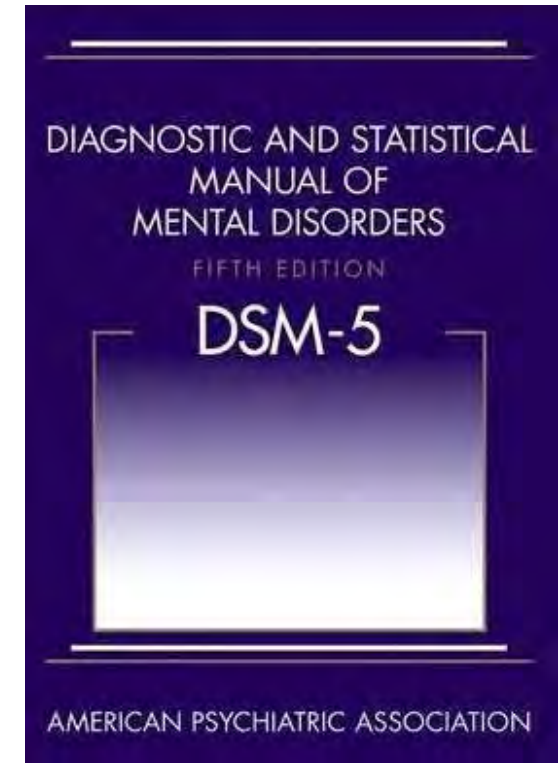
- **ICD-10:** syndrome occurs following head trauma (usually sufficiently severe to result in LOC).
 - Headache, dizziness, fatigue, irritability, difficulty in concentrating and performing mental tasks, impairment of memory, insomnia, and reduced tolerance to stress, emotional excitement, or alcohol. These symptoms may be accompanied by feelings of depression or anxiety, resulting from some loss of self-esteem and fear of permanent brain damage.
- Present with at least three of the features **within a month** following injury.



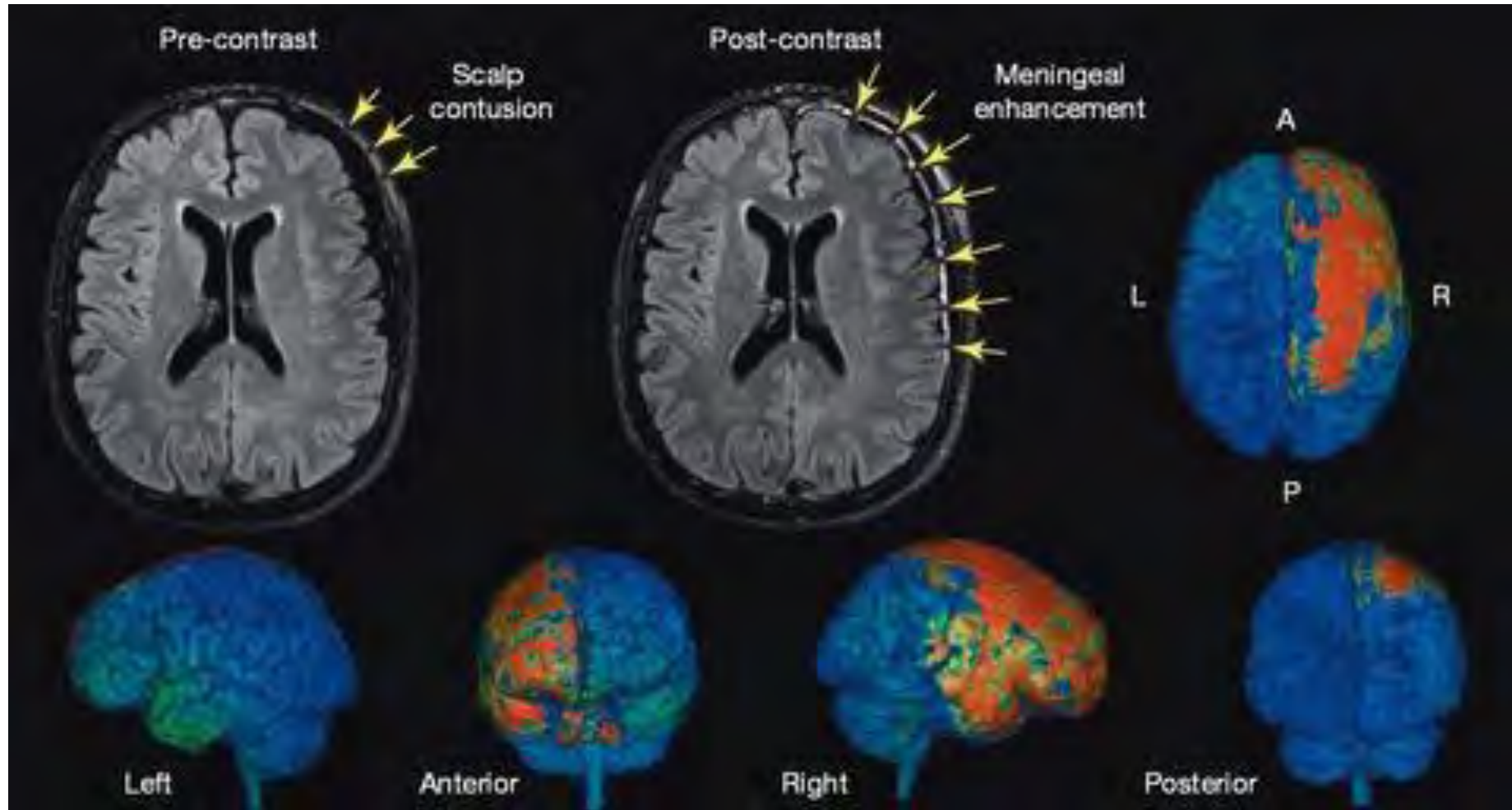
Mild/Major Neurocognitive Disorders (NCD)

No longer use term Post-Concussion Syndrome, instead Mild/Major NCD

- Meet the following criteria:
 - Significant cognitive decline (attention, executive function, learning and memory, perceptual-motor, or social cog) from premorbid function
 - Cognitive deficits interfere with daily life
 - Not due to other medical condition
 - Occurs after a traumatic brain injury and persists
 - Must have been evidence of TBI – LOC, PTA, disorientation, confusion or neurological signs
 - Symptoms start after injury and persist past acute post-injury phase
- **Note: severity of NCD not always consistent with severity of TBI**



Concussion & Psychology



a gray matter

Concussion and its consequences are complex, but fear has surged ahead of science. To catch up, researchers funded by the NCAA and the U.S. Department of Defense teamed up in the largest concussion study in history. They hope to turn anxiety into answers.

Story by Brian Burnsed

NCAA CHAMPION

From scientist to salesman

How Bennet Omalu, doctor of 'Concussion' fame, built a career on distorted science

The Washington Post

Democracy Dies in Darkness



Laying the groundwork

More than 100 schools applied to take part in the CARE study. Thus far, testing is underway at 21 campuses, including four schools where athletes undergo advanced imaging tests and blood draws.

Advanced research core:

- | | |
|--------------|-------------------|
| 1. UCLA | 3. Virginia Tech |
| 2. Wisconsin | 4. North Carolina |

Longitudinal clinical study:

- | | |
|---------------|--------------------|
| 1. Oklahoma | 10. Rochester (NY) |
| 2. Georgia | 11. Azusa Pacific |
| 3. Florida | 12. Humboldt St. |
| 4. Michigan | 13. Cal Lutheran |
| 5. Nebraska | 14. Air Force |
| 6. Delaware | 15. Navy |
| 7. Princeton | 16. Army |
| 8. Washington | 17. Coast Guard |
| 9. Pittsburgh | |

Frontal versus Interior

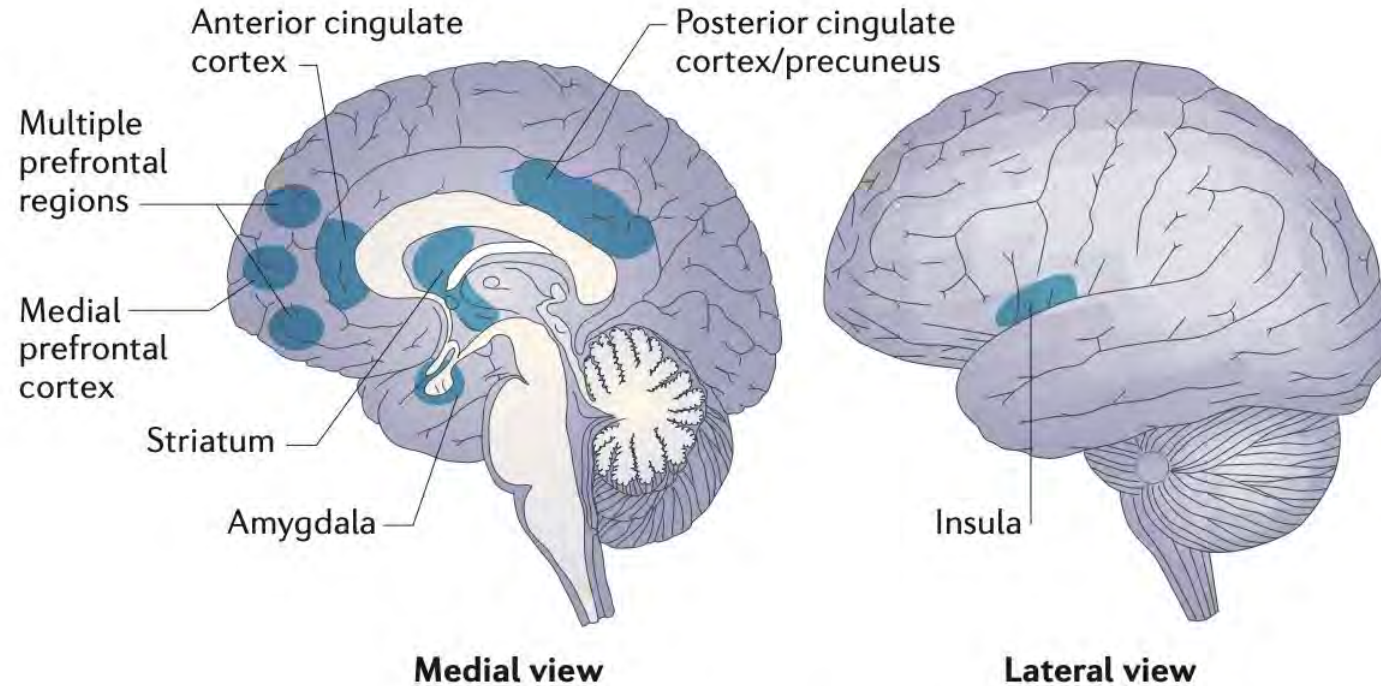


Figure 1 | **Brain regions involved in the components of mindfulness meditation.** Schematic view of some of the brain regions involved in attention control (the anterior cingulate cortex and the striatum), emotion regulation (multiple prefrontal regions, limbic regions and the striatum) and self-awareness (the insula, medial prefrontal cortex and posterior cingulate cortex and precuneus).

Kay, et al (1992)

- Model states that **psychological distress** can create further cognitive compromise by suppressing attention, mental efficiency, learning and memory, thus creating cognitive symptoms above and beyond those accounted for by the concussion.

2019

The Influence of Psychological Factors on the Incidence and Severity of Sports-Related Concussions

A Systematic Review

Lily N. Trinh,^{*} BS, Symone M. Brown,[†] MPH, and Mary K. Mulcahey,^{†‡} MD

Investigation performed at Tulane University School of Medicine, New Orleans, Louisiana, USA

Symptoms

- Headaches
- Nausea
- Dizziness
- Fatigue
- Noise sensitivity
- Light sensitivity
- Vomiting

- Cognitive difficulties
- Confusion
- Difficulties concentrating
- Slowed thinking
- Short term memory
- Irritability
- Mood changes
- Depression and anxiety

Psychological Symptoms and Cognitive Deficits

- **ICD-10:** *difficulty in concentrating and performing mental tasks, impairment of memory, insomnia, reduced tolerance to stress, emotional excitement ... accompanied by feelings of depression or anxiety..*
- **DSM-5:** *Evidence of significant cognitive decline (attention, executive function, learning and memory, perceptual-motor, or social cog) from premorbid function....*
- **Pathology:** Mixed...
 - Neural basis – cellular or functional changes
 - Environment, psychosocial, fear

Trinh, et al (2019)

TABLE 2
Traits Measured by the Post-concussion Symptoms Scale

Characterized by	
Cognitive	Feeling slowed down, feeling mentally “foggy,” difficulty concentrating, difficulty remembering
Physical	Nausea, vomiting, balance problems, dizziness, sensitivity to light, sensitivity to noise, visual problems
Emotional	Irritability, sadness, nervousness, feeling more emotional
Sleep	Fatigue, trouble falling asleep, sleeping less than usual, drowsiness

Trinh, et al (2019)

TABLE 3
Traits Measured by the Multidimensional
Personality Questionnaire

	Characterized by
Negative emotionality	Propensity to experience and respond with negative emotions
Meanness	Callousness and cruelty
Psychoticism	Aggressiveness and interpersonal hostility
Alienation	Loss or lack of sympathy or estrangement

Trinh, et al (2019)

TABLE 4
Big Five Personality Traits as Measured
by the NEO Five-Factor Inventory

	Characterized by
Extraversion	Sociable, assertive, enthusiastic; seek excitement
Openness to experience	Tendency to have an active imagination, an intellectual curiosity, and the willingness to consider new ideas
Neuroticism	Anxious, experience higher levels of negative affect, get easily irritated by others, and more likely to turn to inappropriate coping responses, such as interpersonal hostility
Conscientiousness	Hardworking, persistent, neat, well-organized, and goal oriented
Agreeableness	Generally considerate and helpful toward others

Trinh, et al. (2019)

Increased Incidence of SRC

- Meanness
- Psychoticism
- Aggression

Associations

- Irritability
- Nervousness
- Depression
- Worse symptomology

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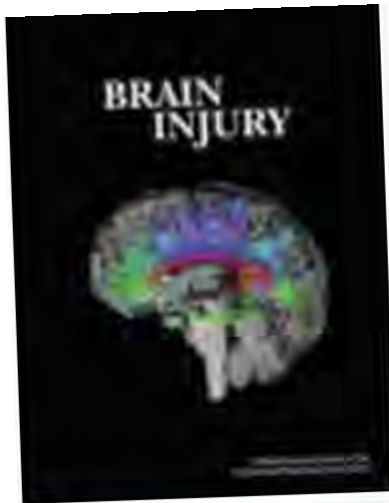
Lily N. Trinh,^{*} BS, Symone M. Brown,[†] MPH, and Mary K. Mulcahey,^{†‡} MD

Investigation performed at Tulane University School of Medicine, New Orleans, Louisiana, US

Predictors of clinical recovery from concussion: a systematic review

Grant L Iverson,^{1,2} Andrew J Gardner,³ Douglas P Terry,^{1,2} Jennie L Ponsford,⁴
Allen K Sills,⁵ Donna K Broshek,⁶ Gary S Solomon⁷

- The majority of people with concussion recover well, typically within 10 days
 - ~10-14 days in adults
 - \leq 1 month in children



Brain Injury

ISSN: 0269-9052 (Print) 1362-301X (Online) Journal homepage: <https://www.tandfonline.com/loi/ibij20>

A review of post-concussion syndrome and psychological factors associated with concussion

Donna K. Broshek, Anthony P. De Marco & Jason R. Freeman

Case Study: Mr. Mike



—

So what do we do?

What to Look for After a Concussion

When patients return to class after a concussion, students, faculty and staff should watch for increased challenges with attention or concentration.

- Increased problems learning or remembering new information
- Longer time needed to complete tasks or assignments
- Difficulty organizing tasks or shifting between tasks
- Inappropriate or impulsive behavior in class
- Greater irritability
- Decreased ability to cope with stress
- More emotional than usual
- Fatigue
- Difficulties handling a stimulating academic environment (light, noise, etc.)
- Physical symptoms (headache, nausea, dizziness, etc.)

Every student is different and may present a variety of symptoms.

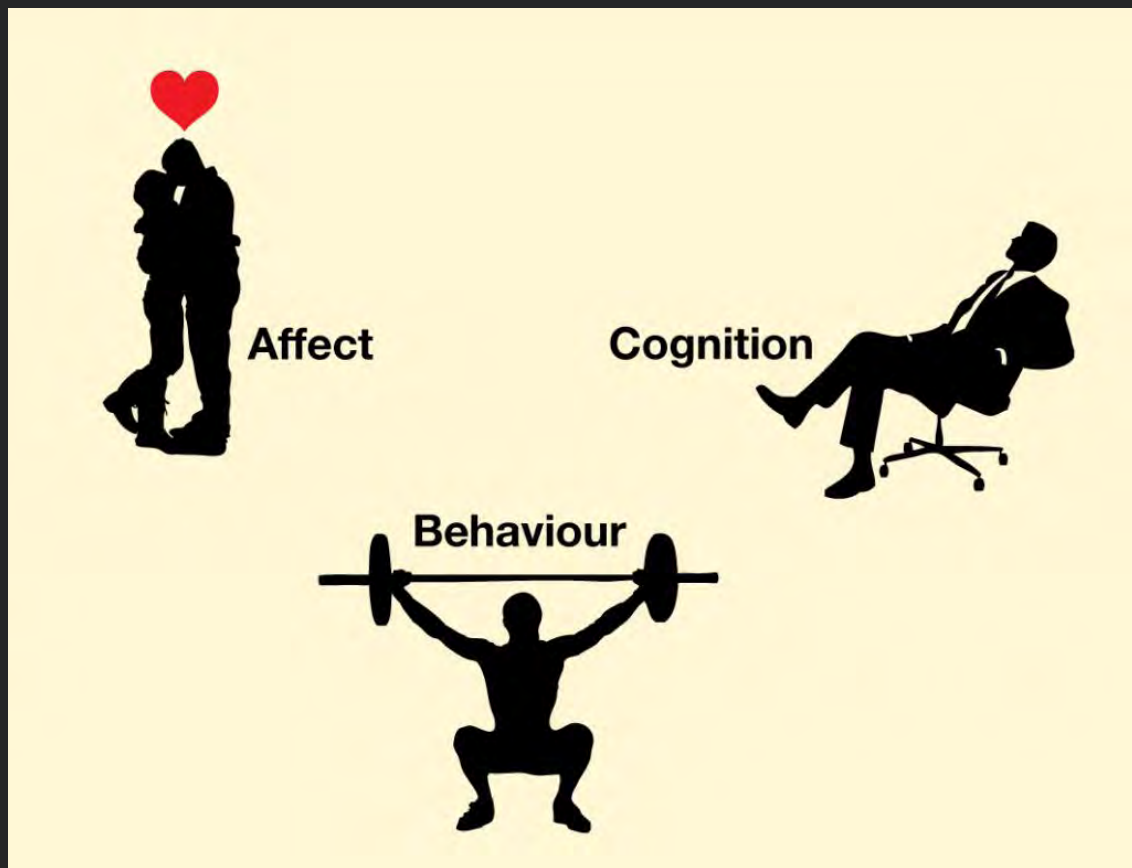
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Neuropsychology and Cognitive psychology

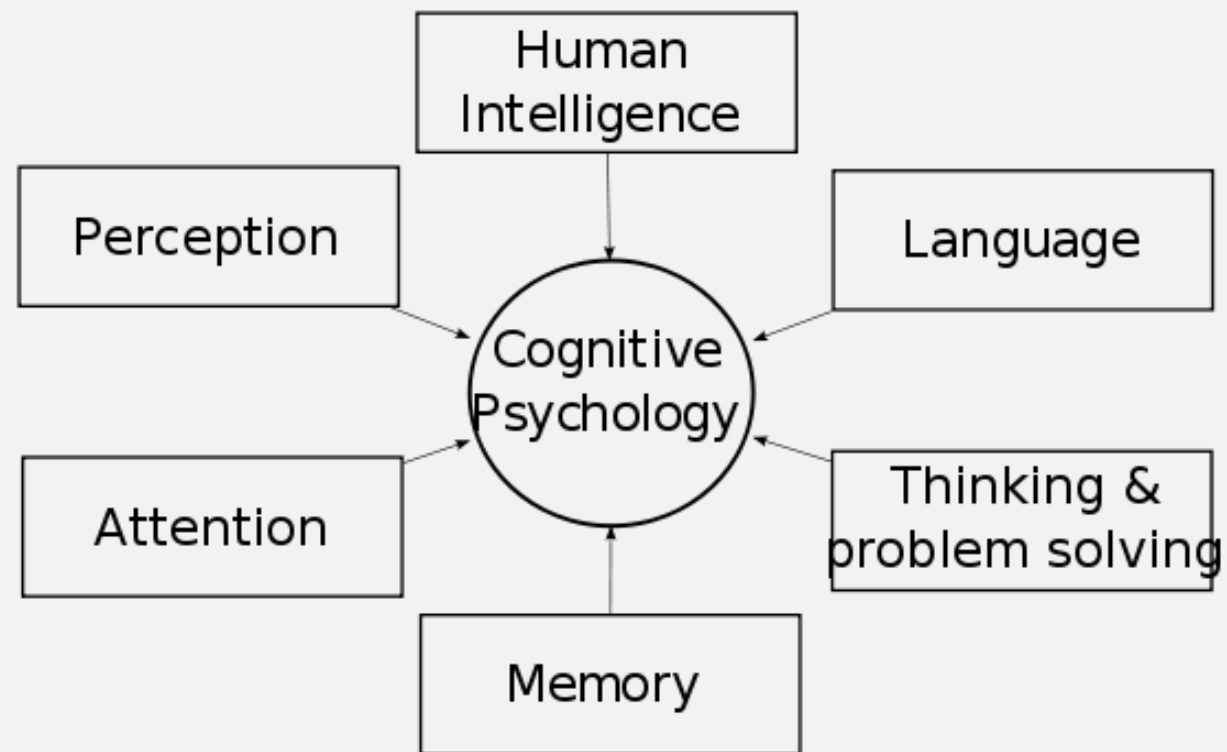


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It's not *hard* to
make **decisions** 
once you know what
VALUES *your are.*

~ Roy E. Disney

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