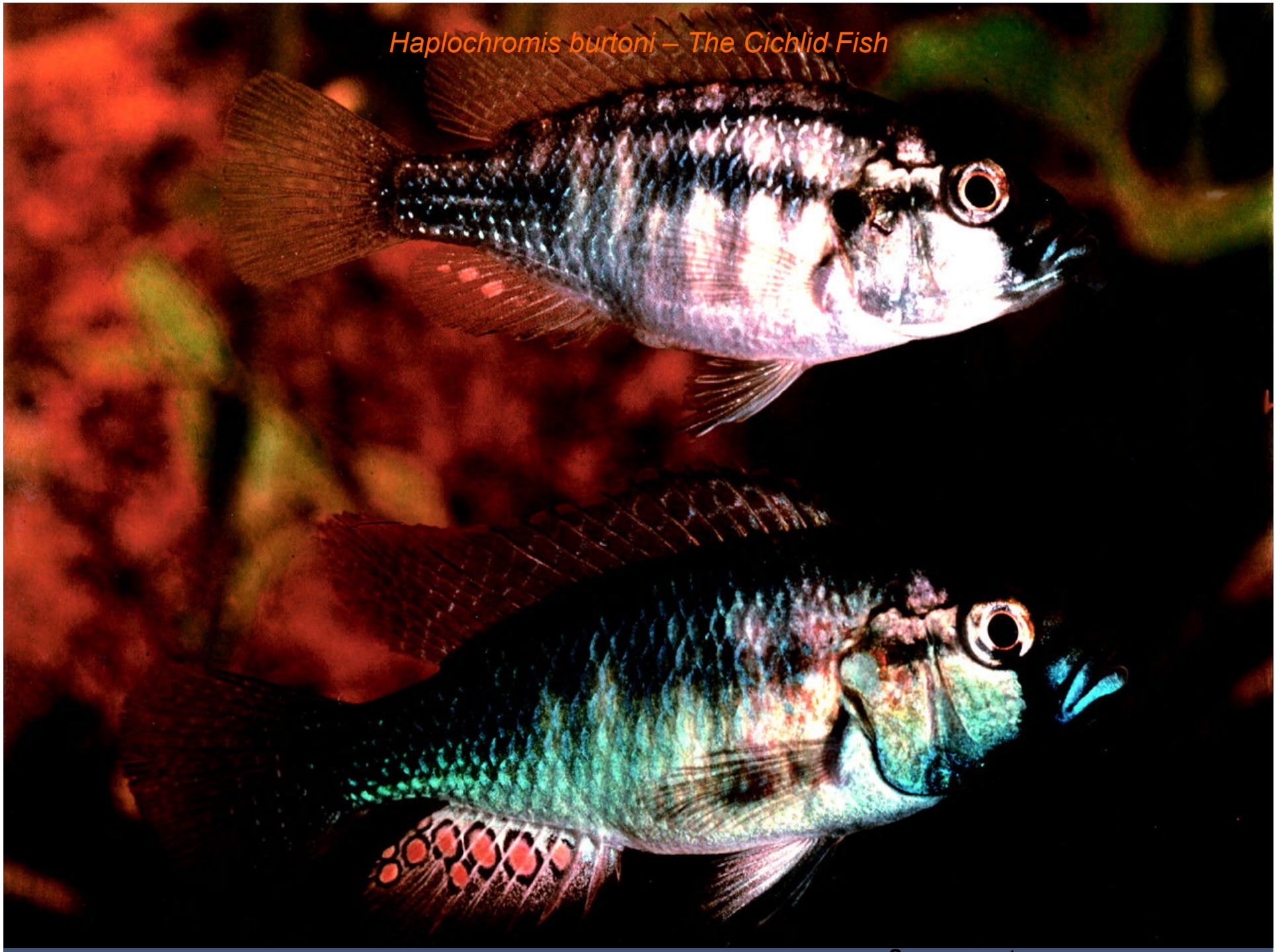


# **The Brain and Environment**

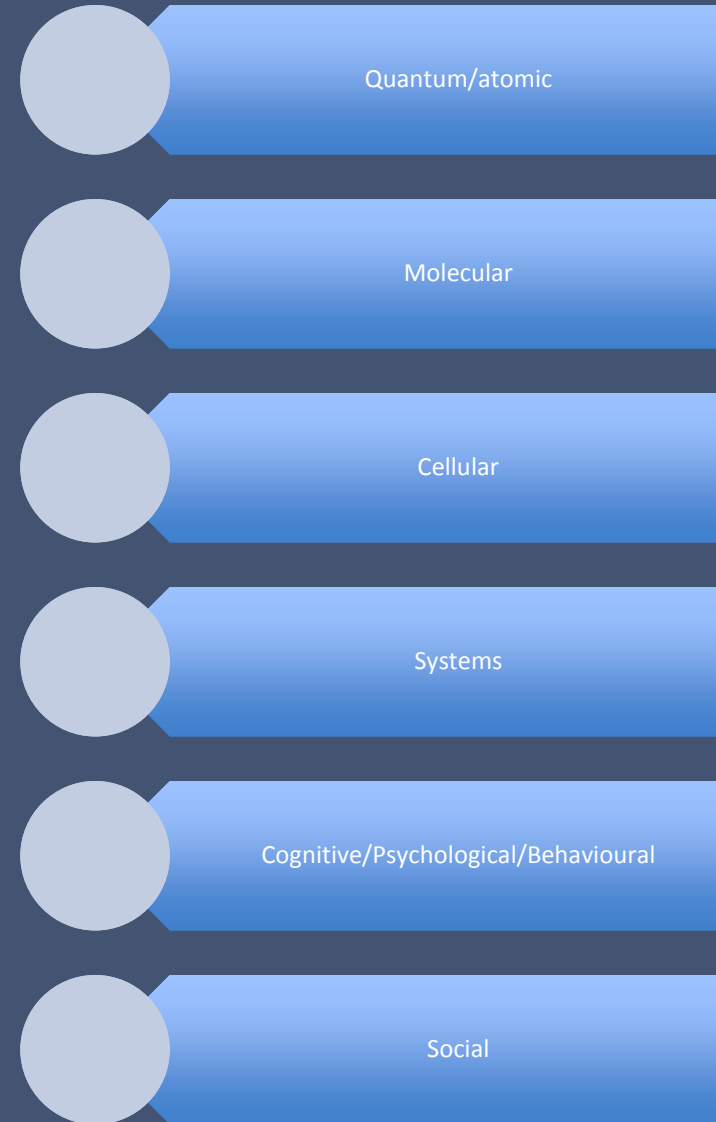
*Haplochromis burtoni* – The Cichlid Fish





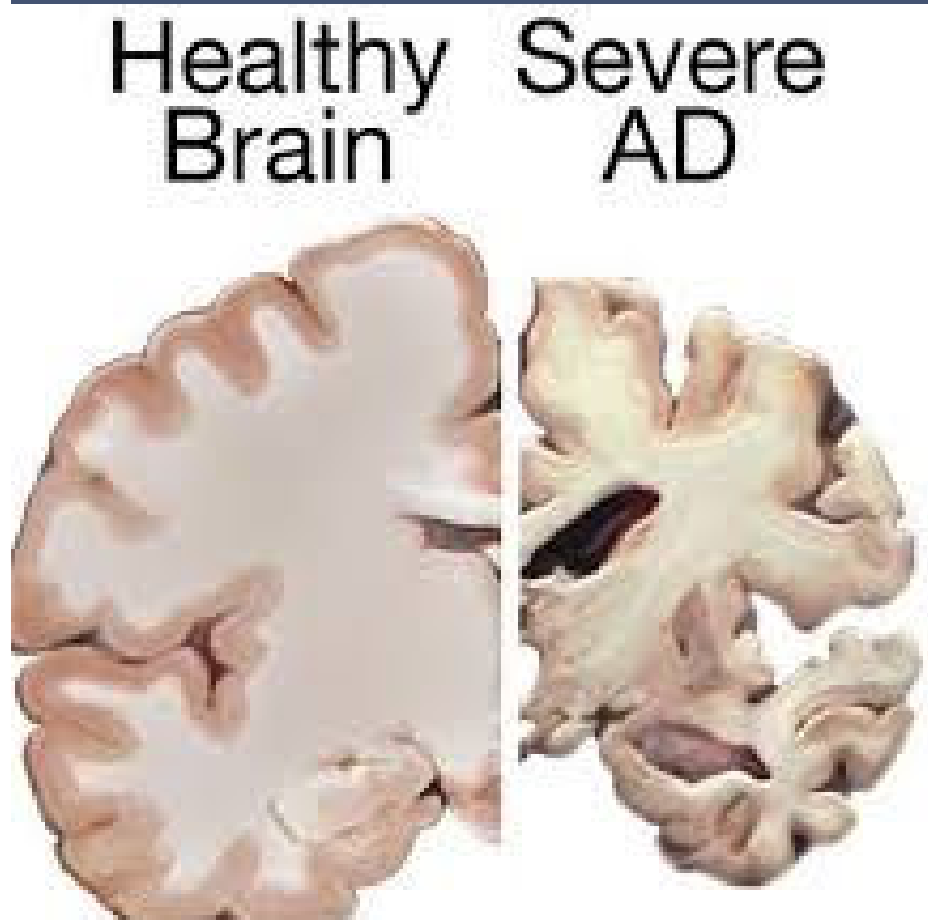


## Levels of Analysis in Mind/Brain Disorders

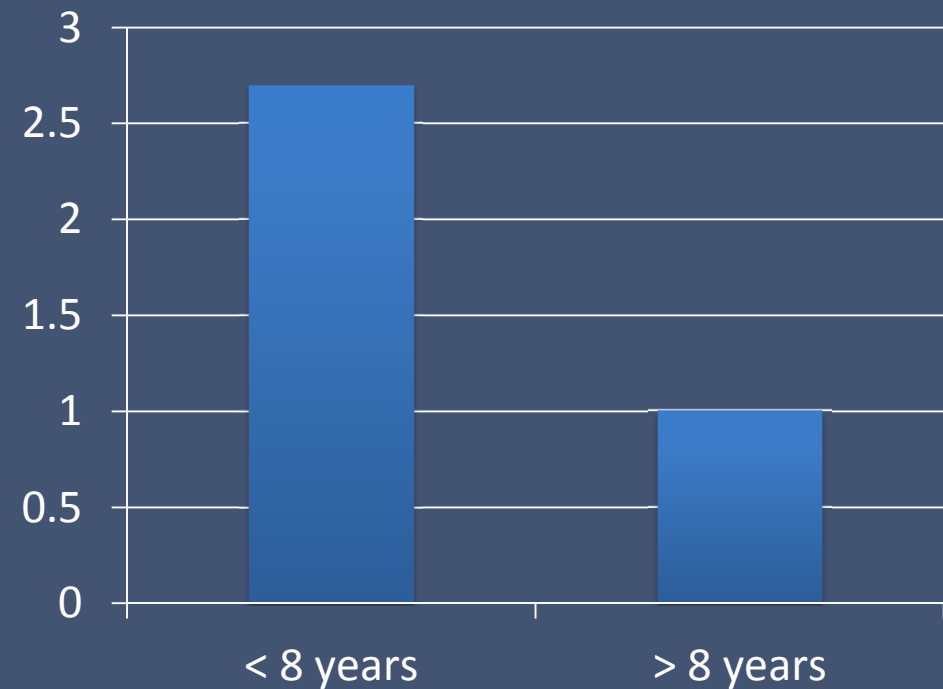


# Cognitive Reserve

# Education Protects Against Alzheimer's Disease?



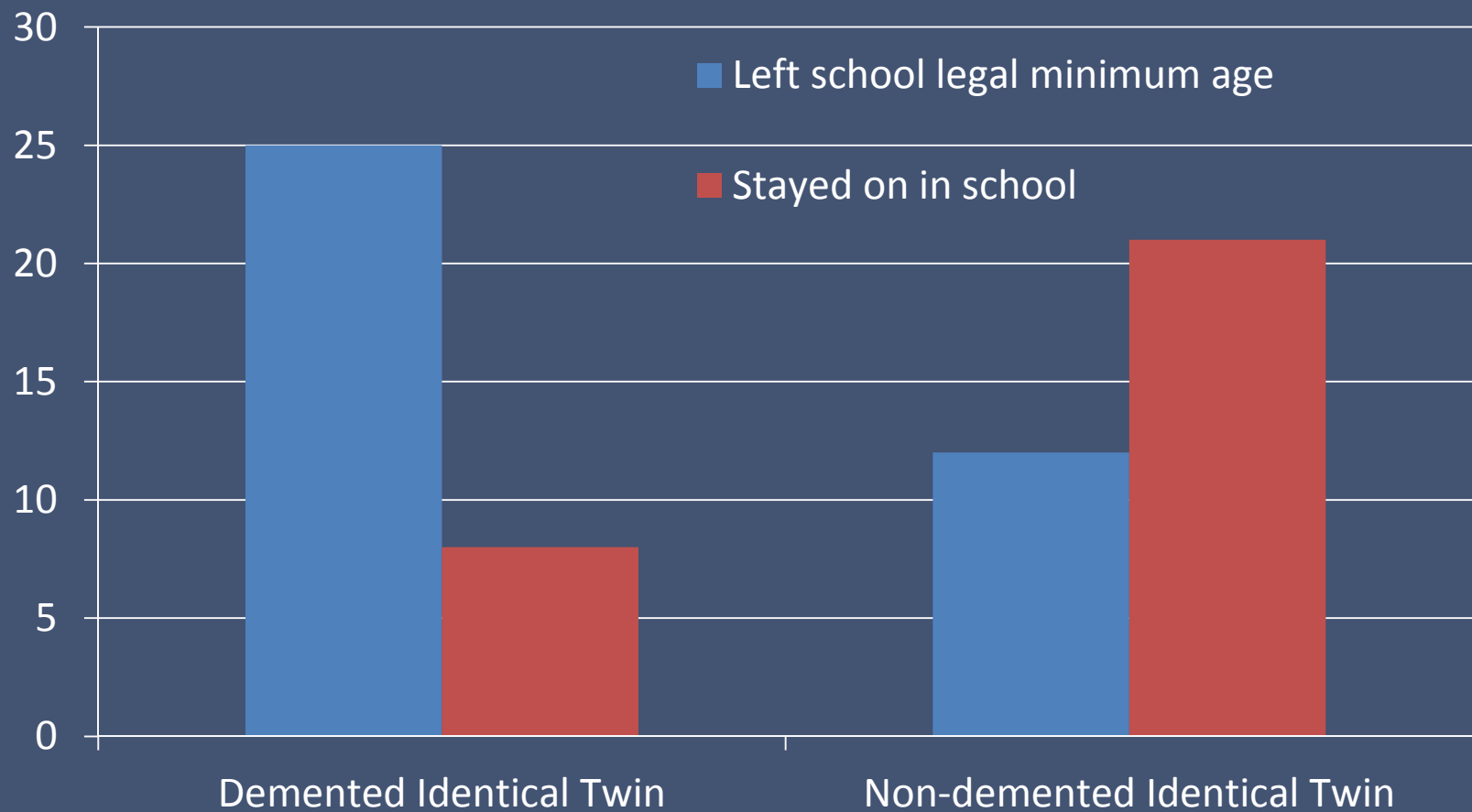
Risk of Alzheimer's Disease by Education Level



Common Genetic Factor Causing  
Both Independently?

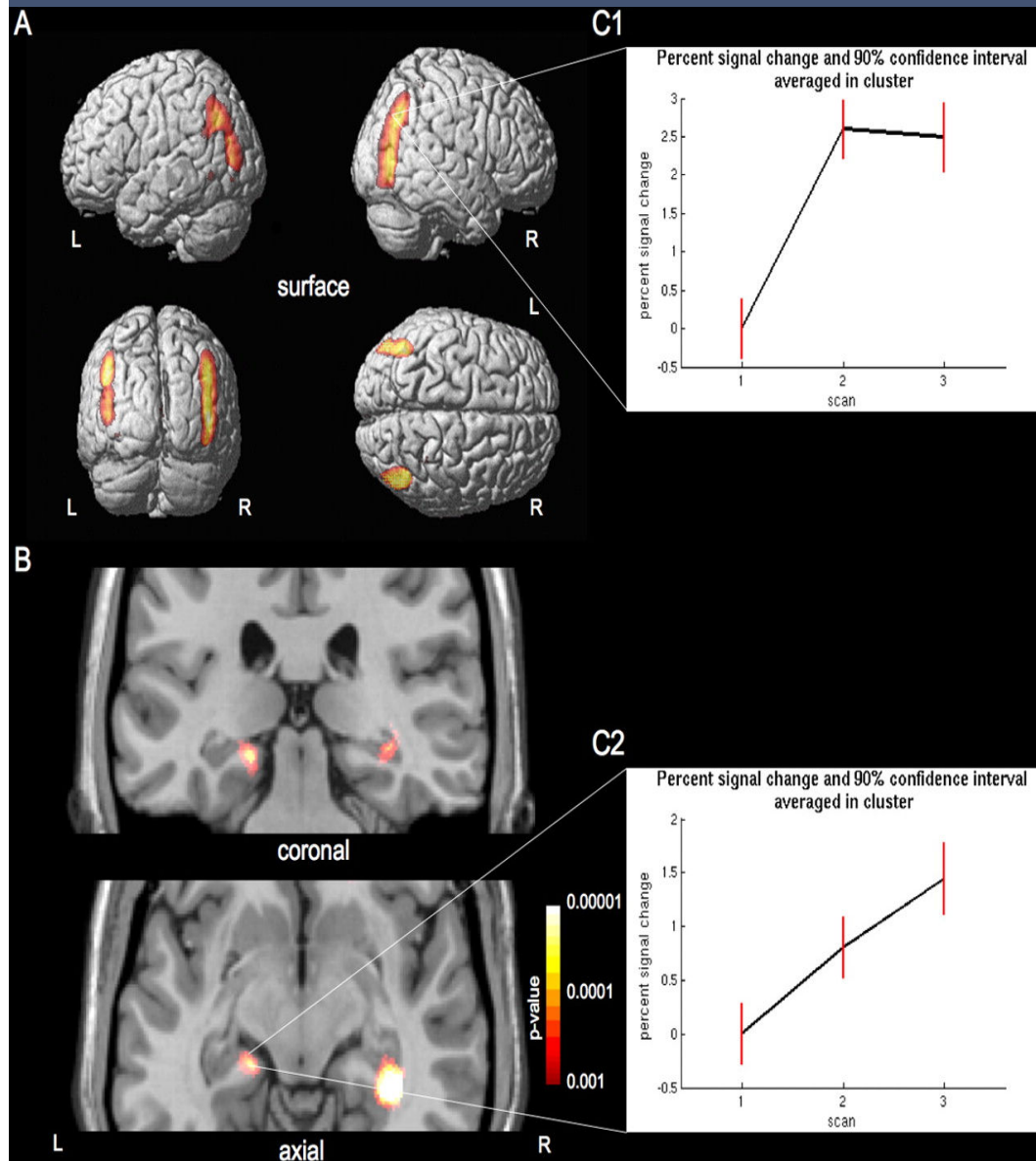
Correlation, not cause?

# Wrong



Gatz et al, Physiology and Behaviour, 2007

# EDUCATION BUILDS BRAIN STRUCTURE



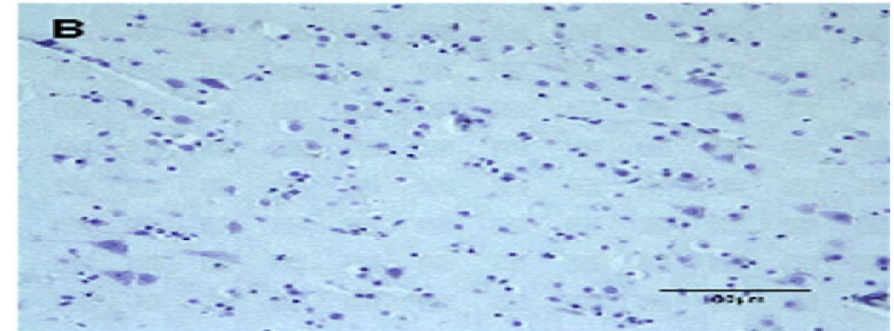
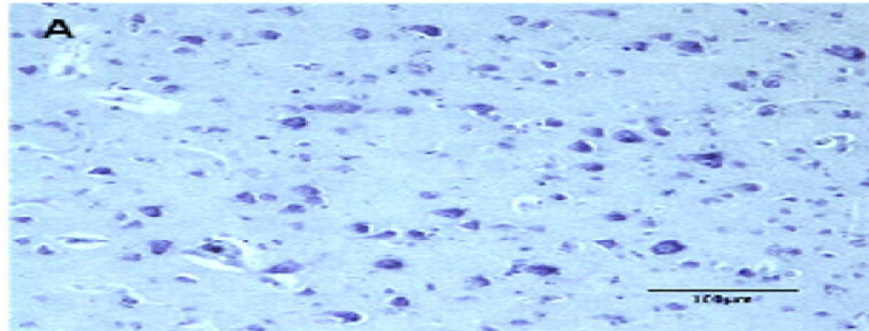
- Time 1 – pre study
- Time 2 – after 3 months daily study
- Time 3 – 3 months after exam
- gray matter increase in posterior parietal cortex (PPC) and inferior parietal cortex bilaterally.
- continuous gray matter increase in the posterior hippocampus throughout the three examined time points
- Draganski et al 2006 J Neuroscience



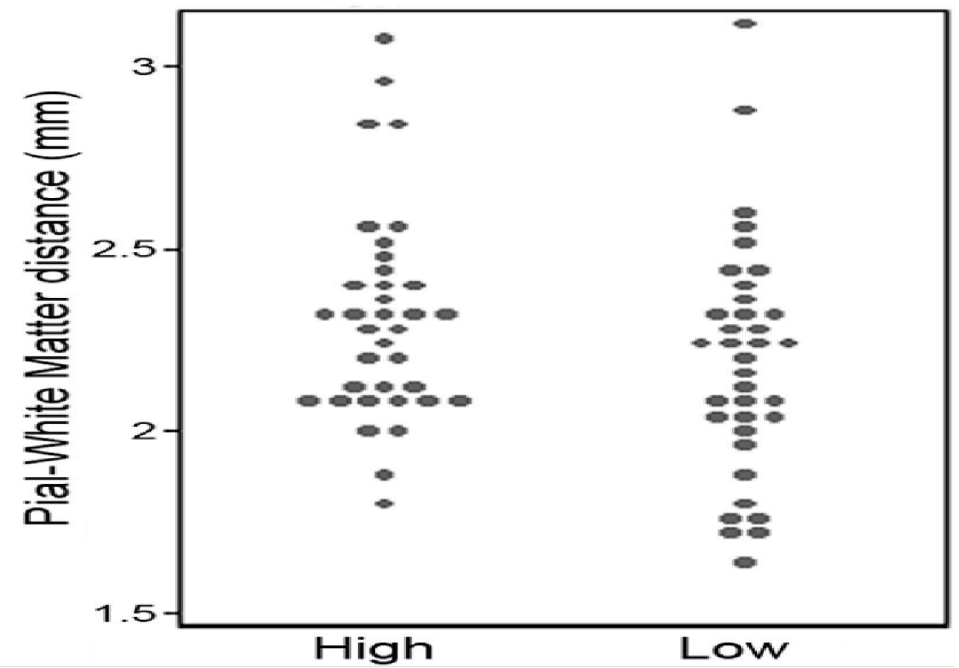
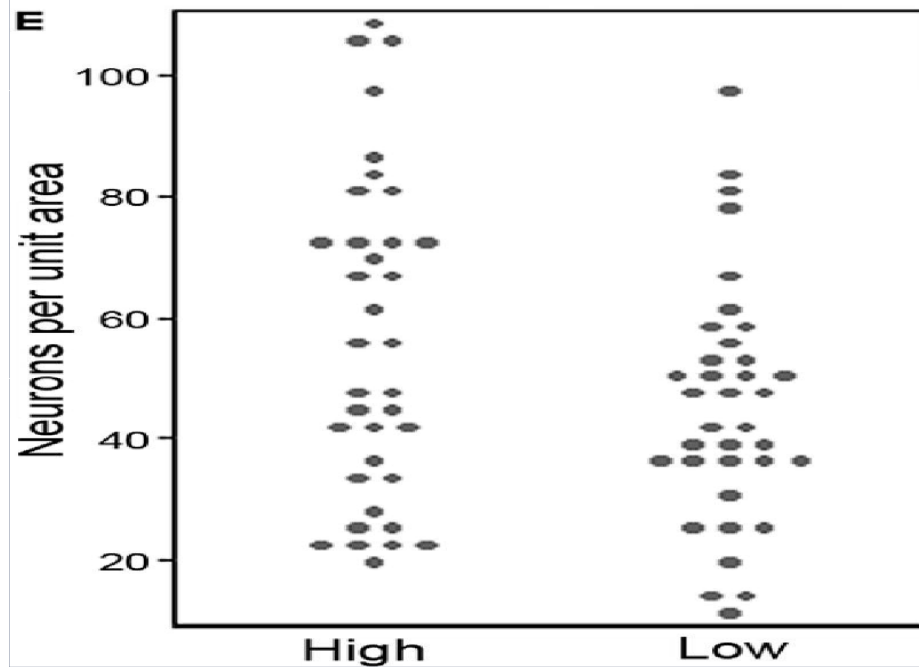
## High Cognitive Lifestyle

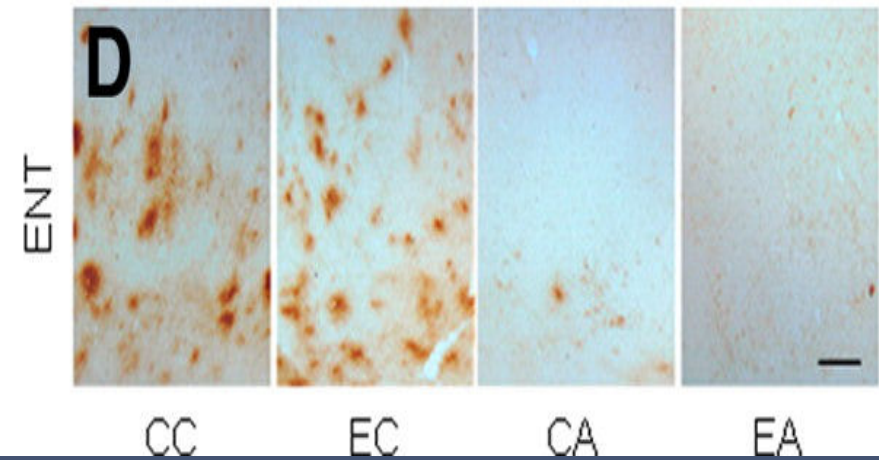
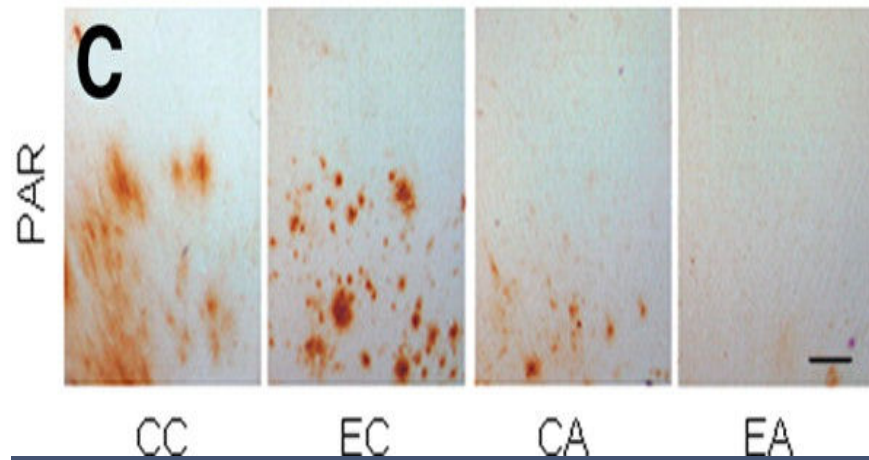
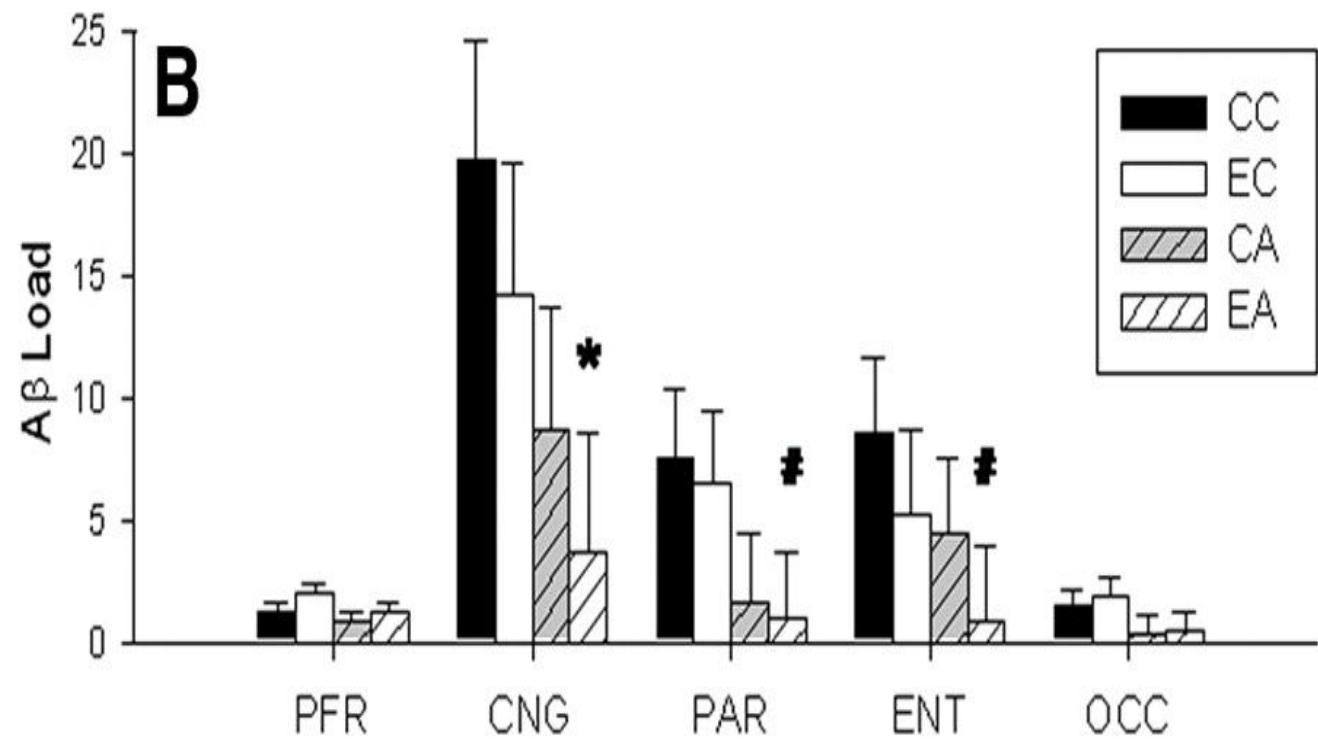
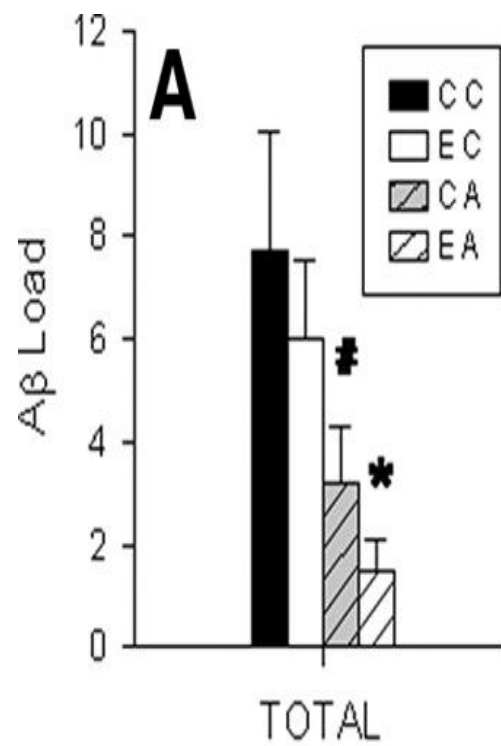
## Low Cognitive Lifestyle

Neuronal Density



Cortical Thickness

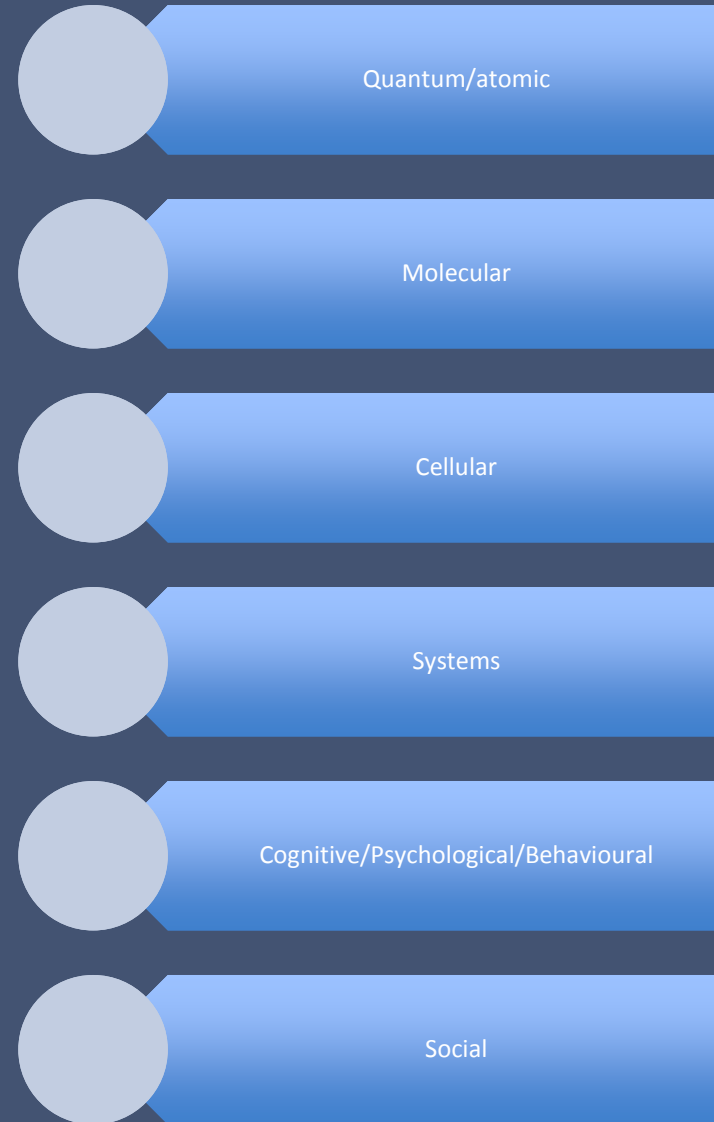








## Levels of Analysis in Mind/Brain Disorders







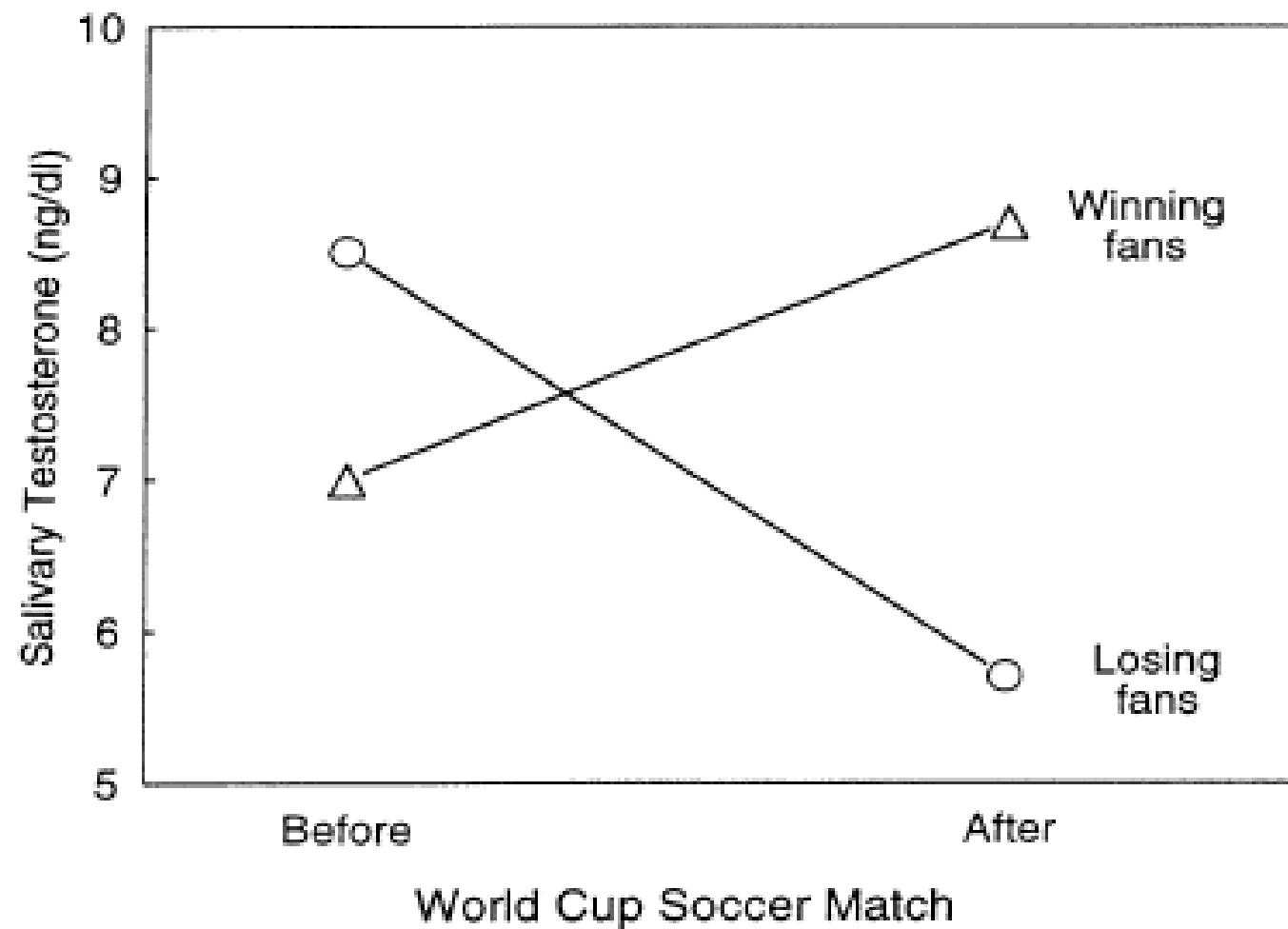
# Testosterone Changes During Vicarious Experiences of Winning and Losing Among Fans at Sporting Events

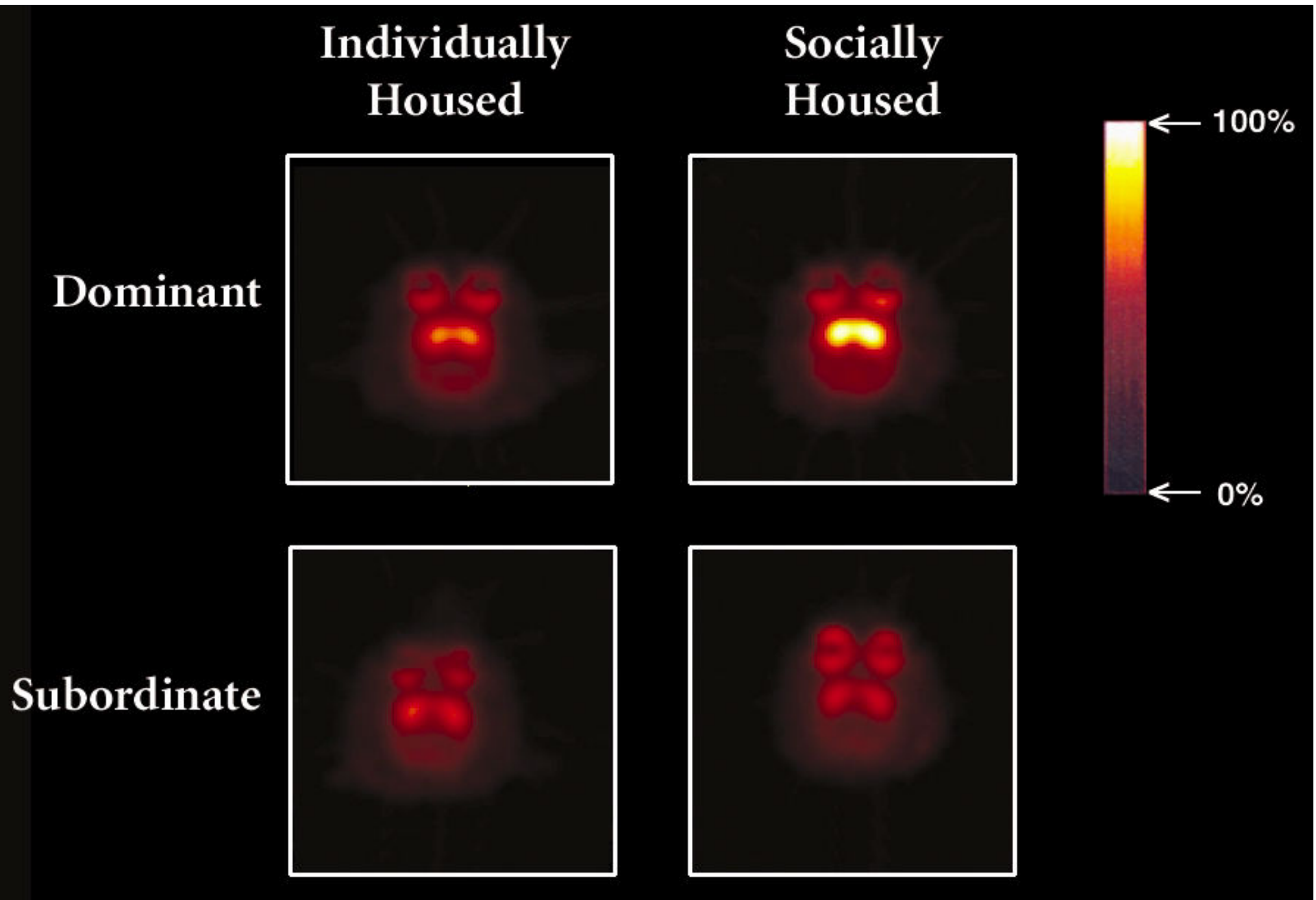
PAUL C. BERNHARDT,\* JAMES M. DABBS, JR.,† JULIE A. FIELDEN†  
AND CANDICE D. LUTTER,†

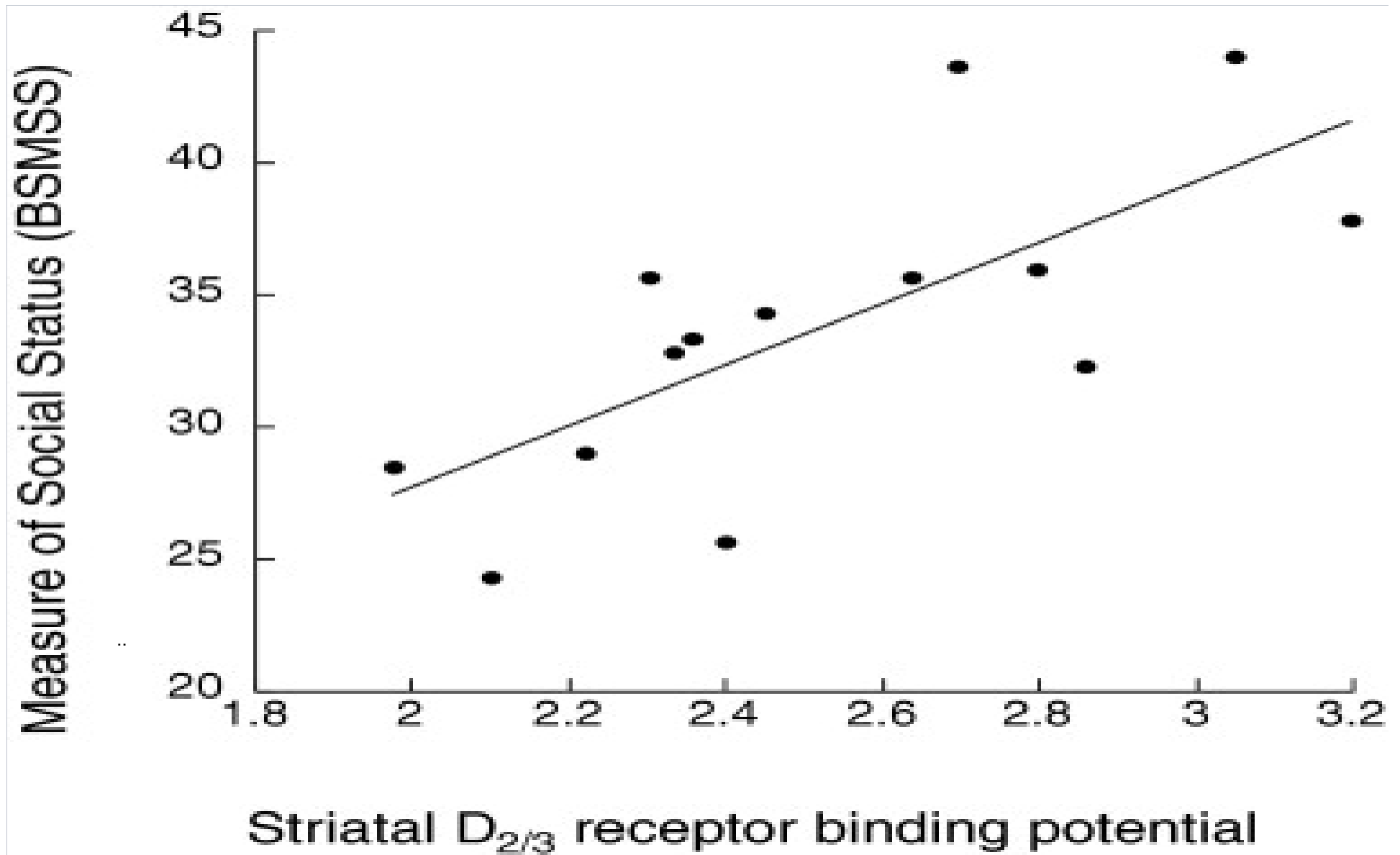
- Brazil – Italy Final, Pasadena, 1994
- One group Italy, other of Brazil fans, in Atlanta Tavern.



# Brazil won on penalty shoot out





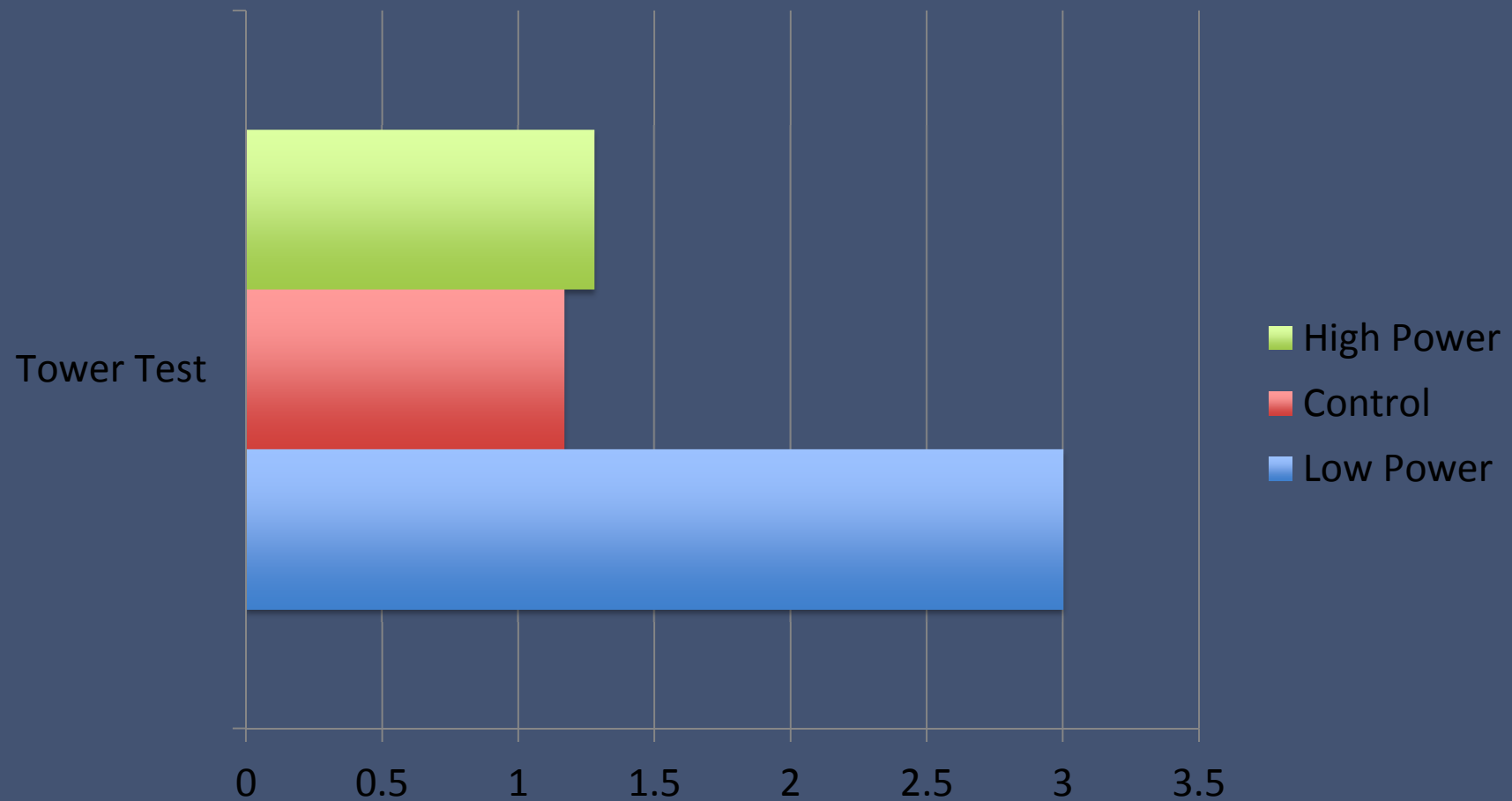


# Powerlessness changes cognitive function

- The powerless live among threat and uncertainty
- They must attempt to discern the goals of the powerful
- They often cannot fully commit to action but must be prepared to change if their superior's goals change
- Experimentally-induced powerlessness –
  - Subordinate or dominant in computer test
  - Write about a time when you had power over someone or when someone had power over you.

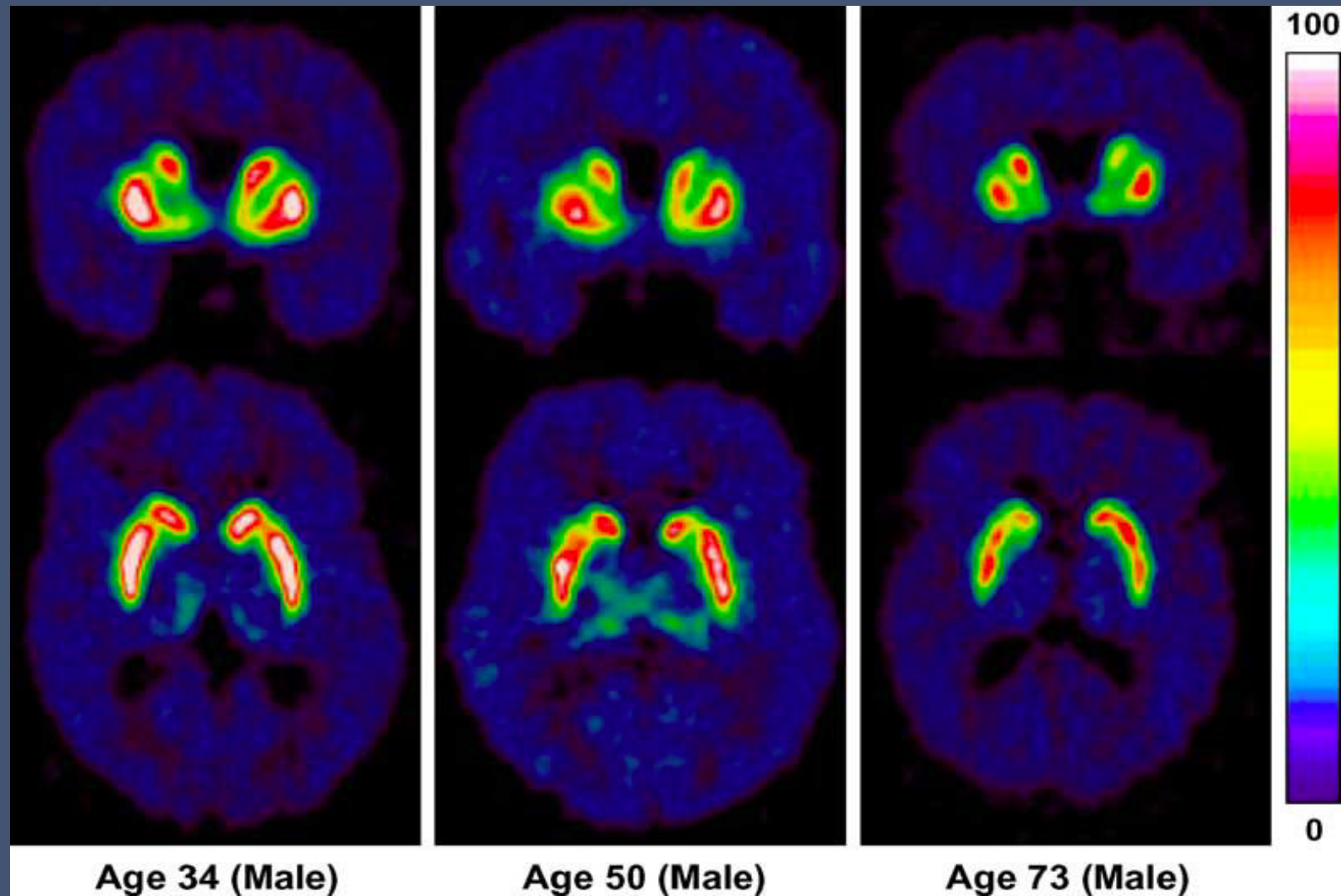
(Smith et al, Psychological Science 2008)

# Executive functions impaired by powerlessness

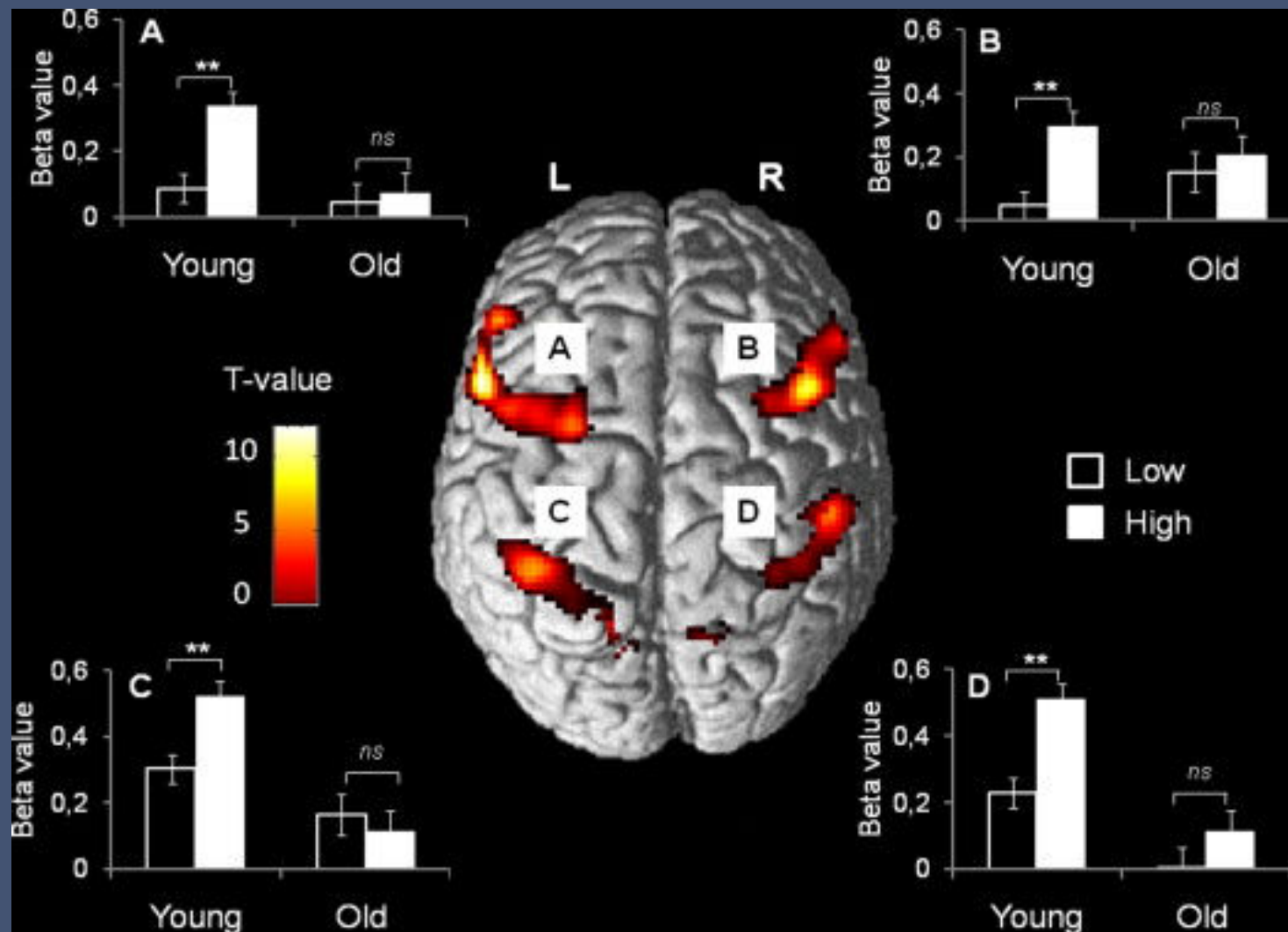




# Aging and Striatal Dopamine



Erixon-Lindroth et al Psychiatry Research 2005

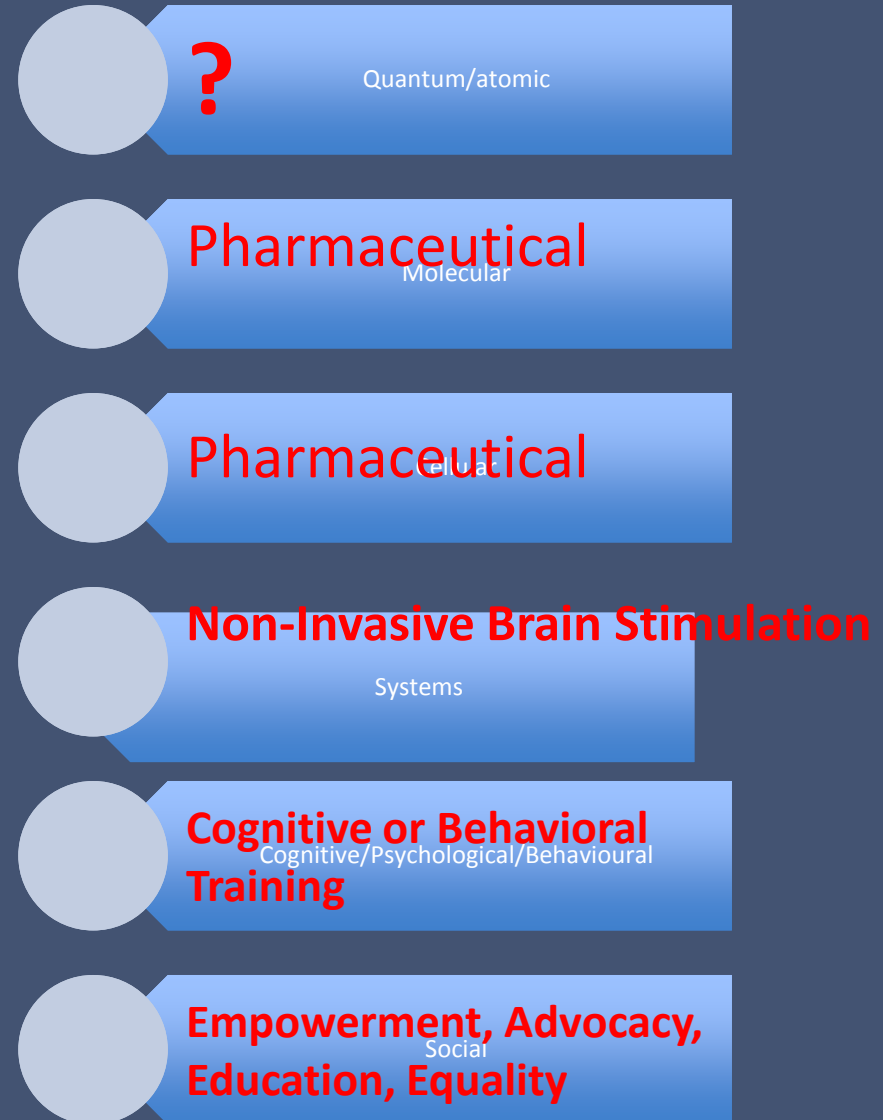


Neurobiology of Aging Volume 32, Issue 10 2011 1849 - 1856

Lars Bäckman, Sari Karlsson, Håkan Fischer, Per Karlsson, Yvonne Brehmer, Anna Rieckmann, Stuart W.S. MacDo...



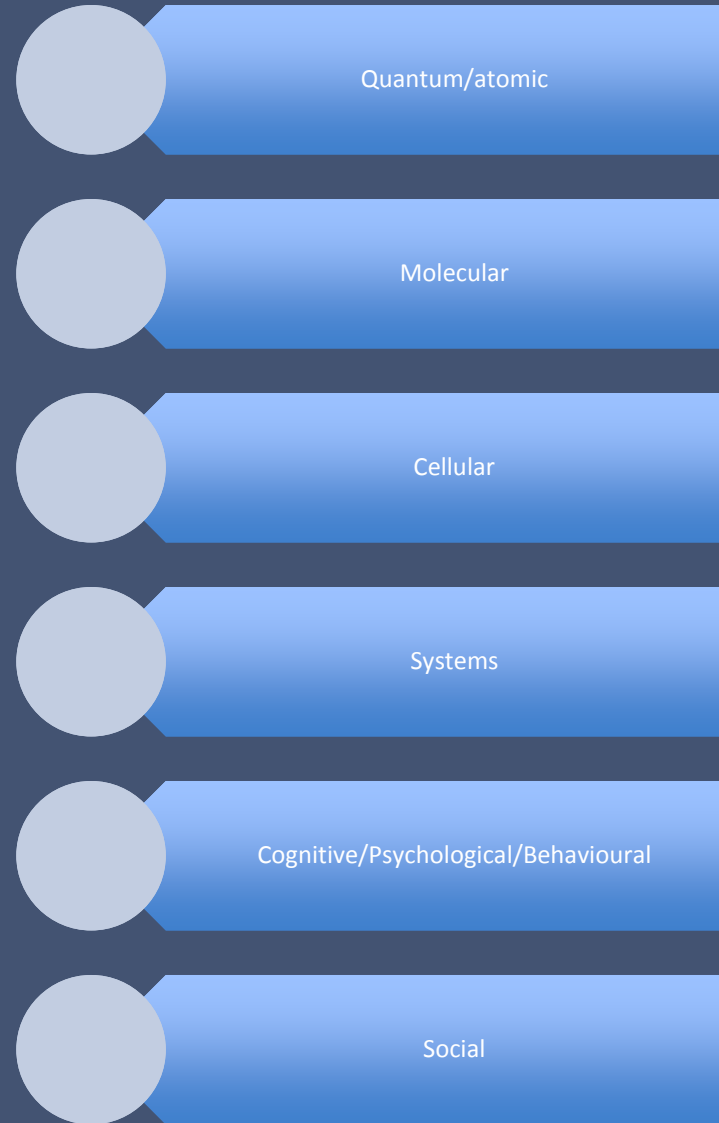
## Levels of Analysis in Mind/Brain Disorders





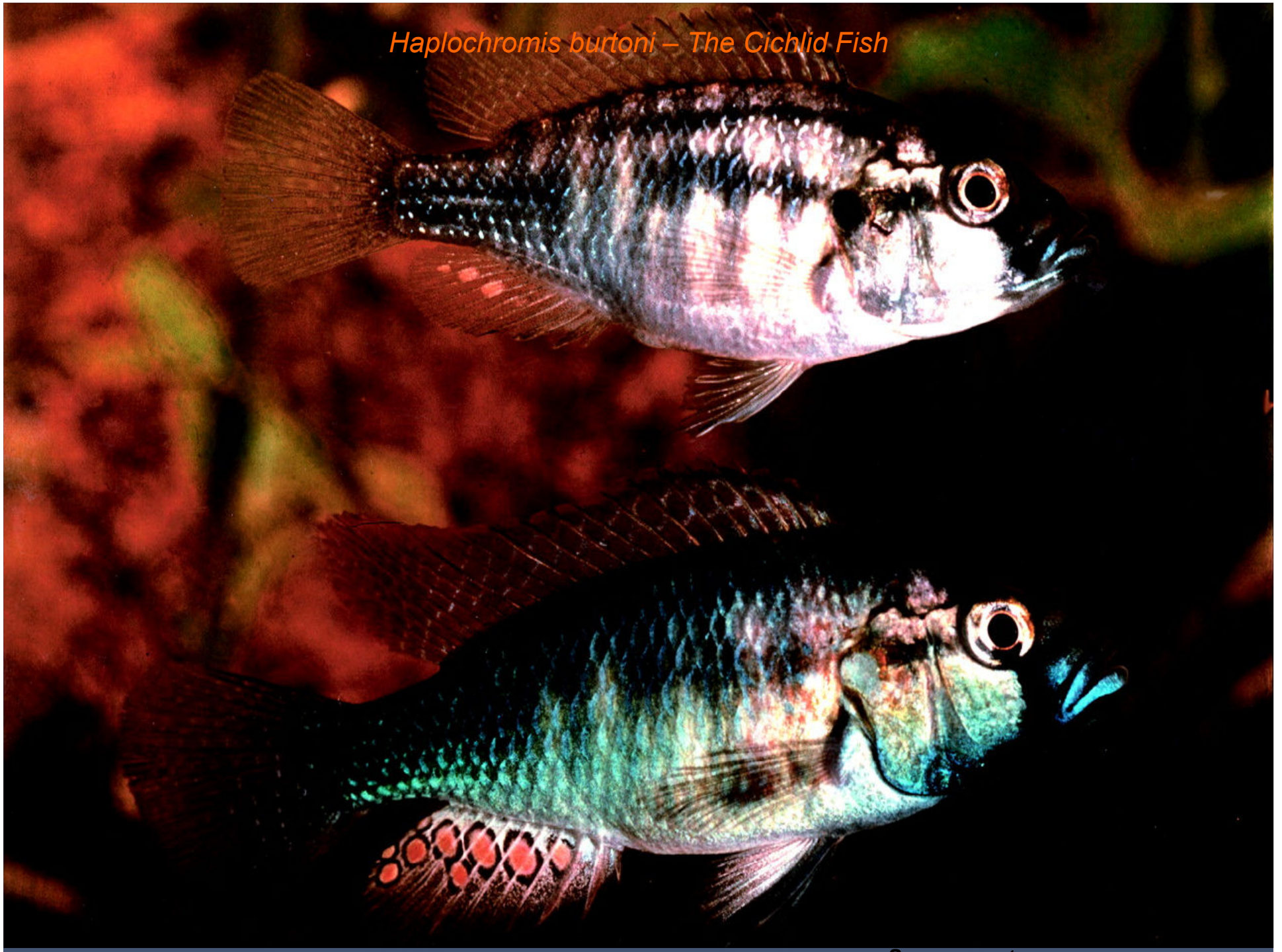


## Levels of Analysis in Mind/Brain Disorders





*Haplochromis burtoni* – The Cichlid Fish





**WHY?.....**



