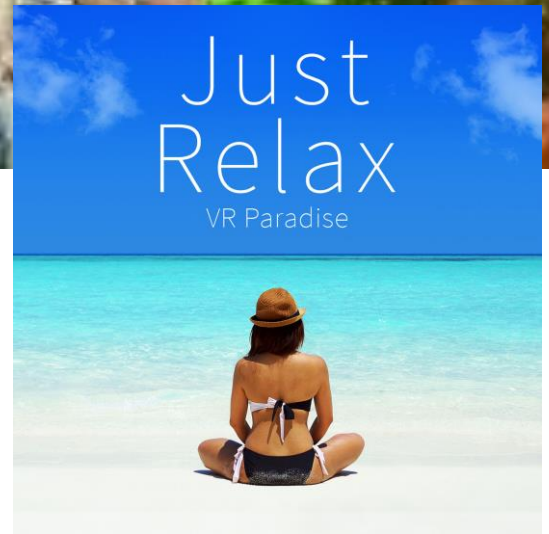
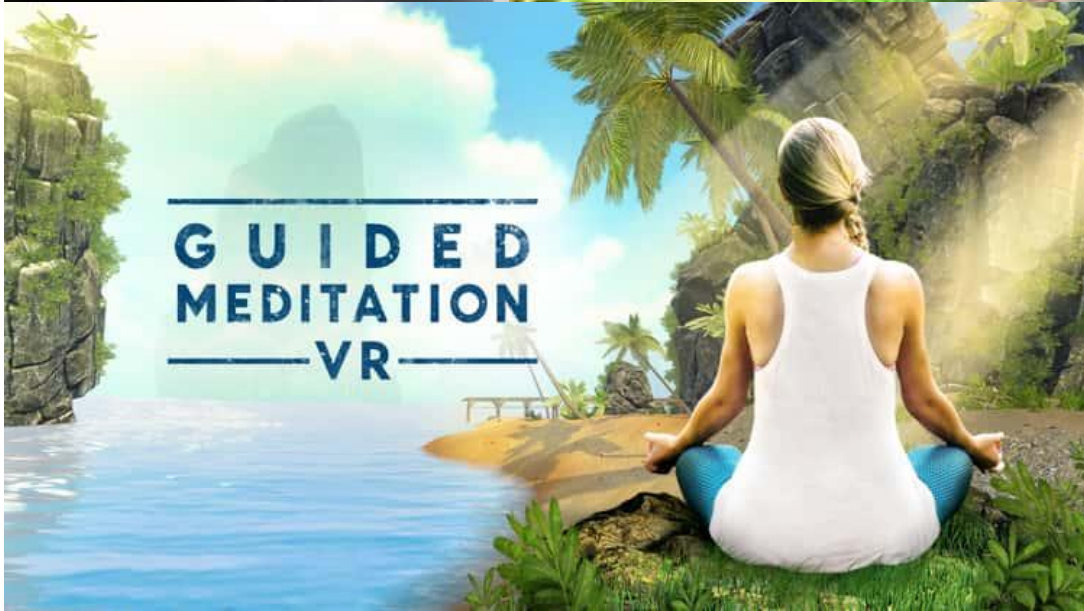
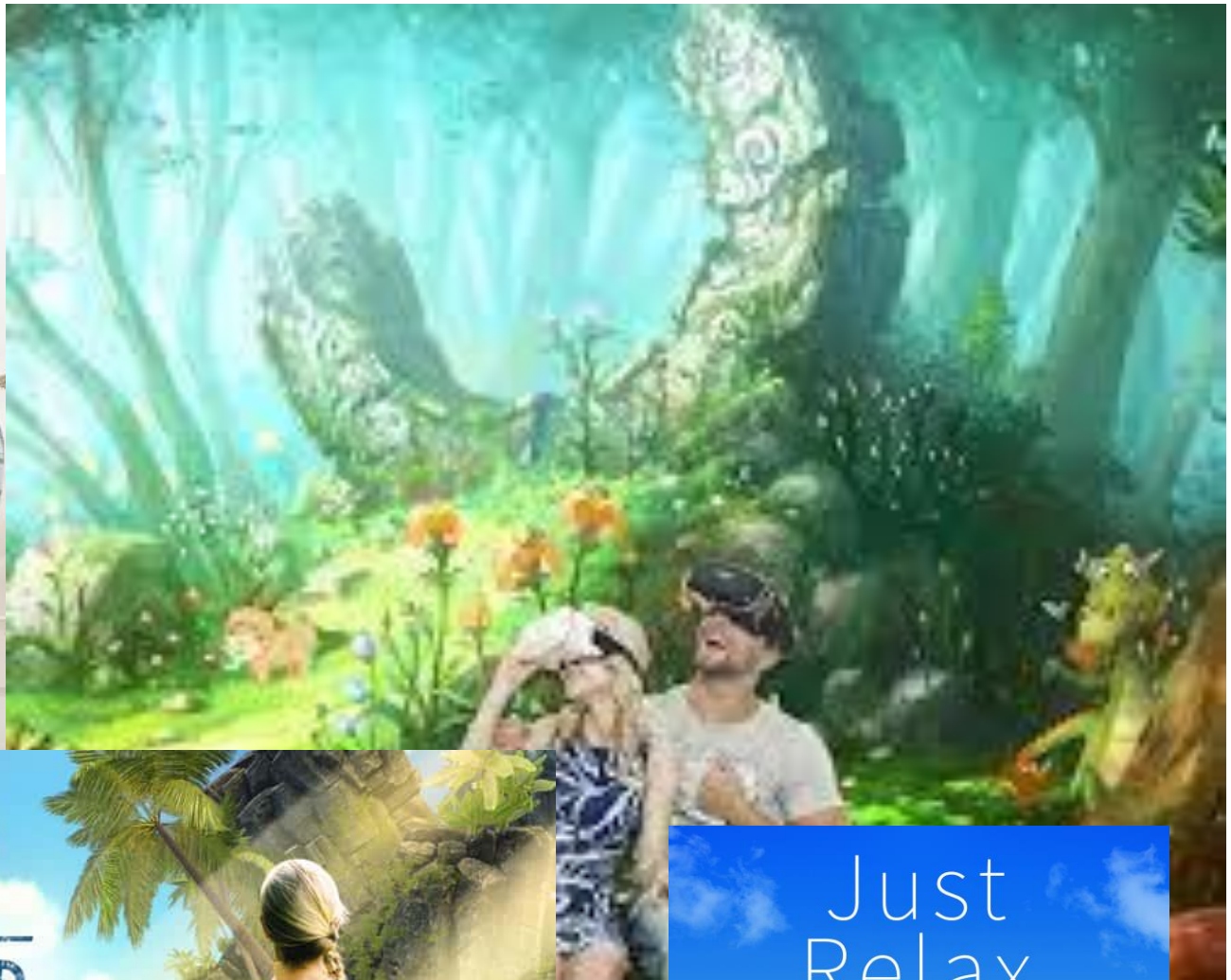


# VR History



# Anxiety Disorders and Specific Phobia





# VR Experience for Diagnosis

Challenge Room Without Distractors<sup>a</sup>



Challenge Room With Distractors<sup>a</sup>



Delay Room<sup>b</sup>

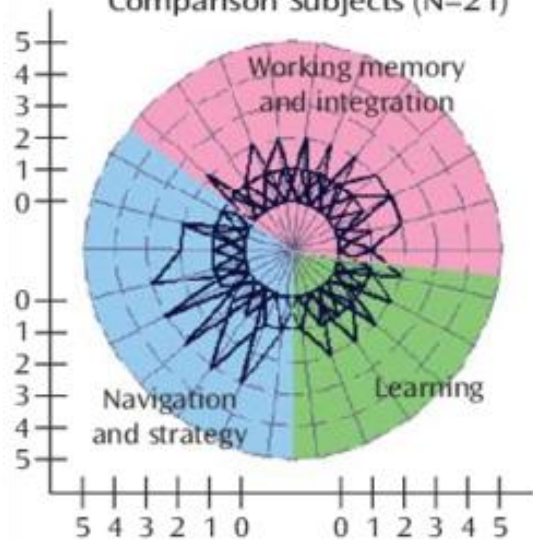


Feedback Image for Correct Door Choice

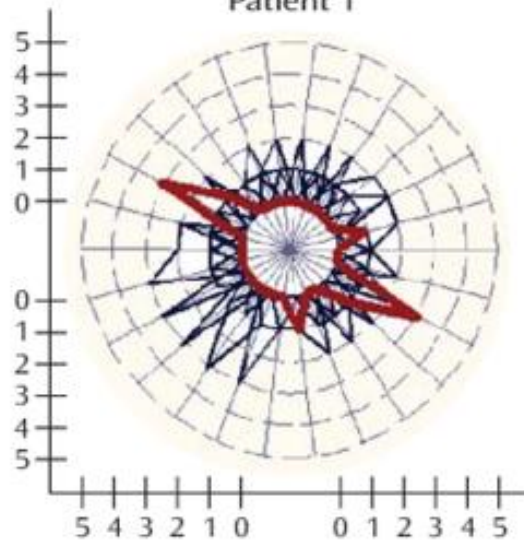


— Comparison subjects — Patient

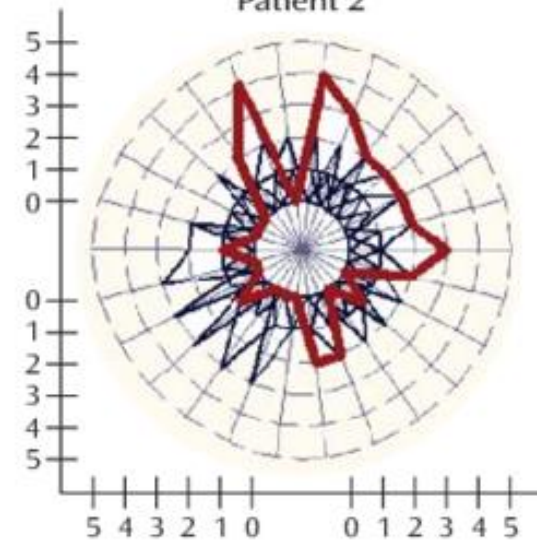
Comparison Subjects (N=21)



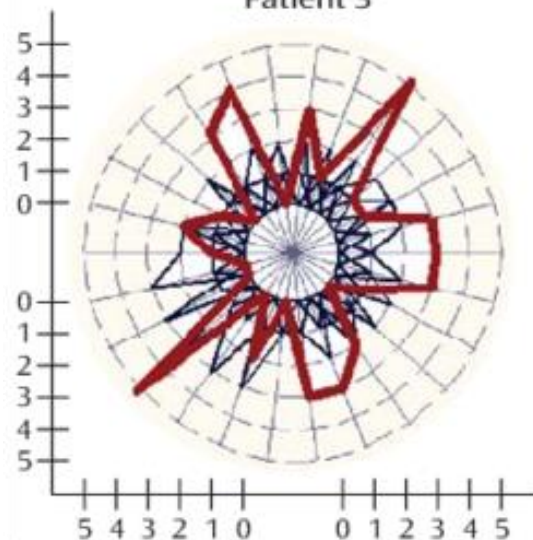
Patient 1



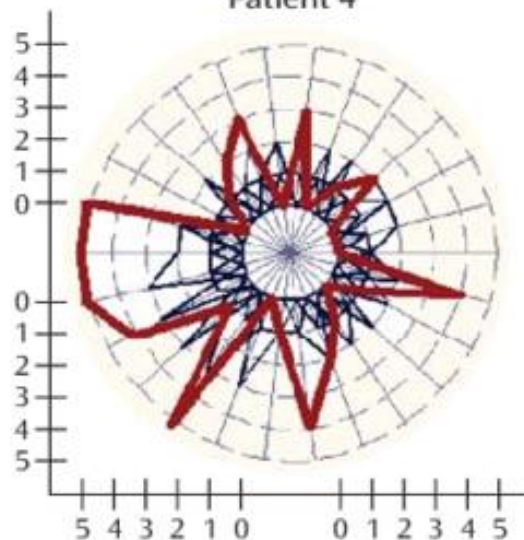
Patient 2



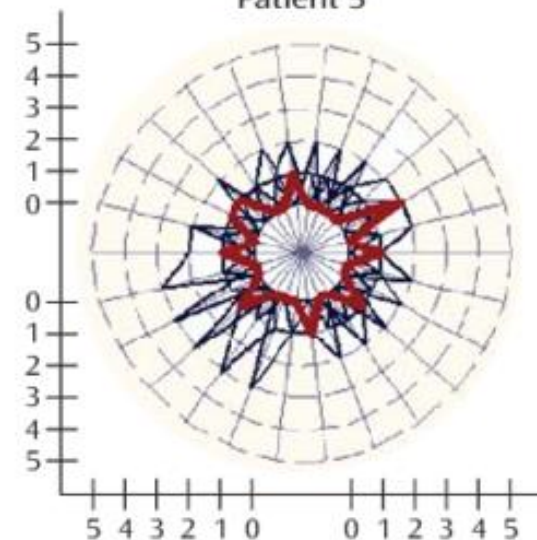
Patient 3



Patient 4



Patient 5





Researchers say virtual reality could help diagnose schizophrenia



2:05 / 5:26

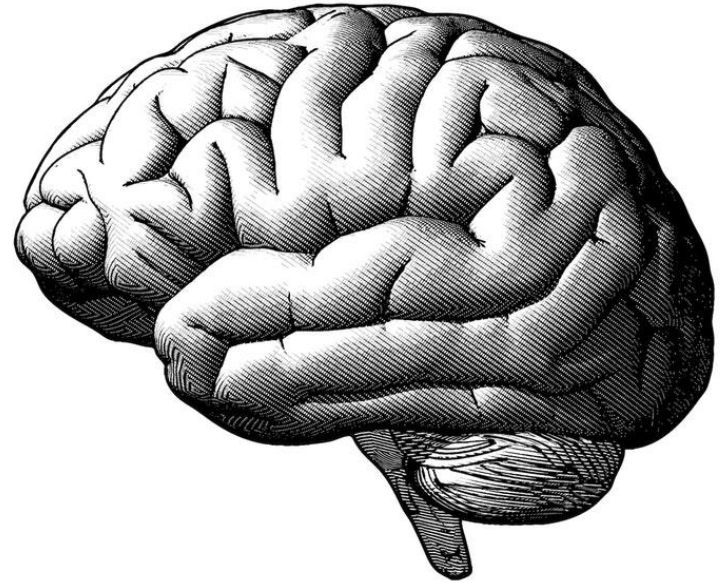
A set of standard video player controls including a play button, a next button, a volume icon, a progress bar, a dropdown arrow, a pause button, a full screen button, a settings gear, and a refresh icon.

# VR Experience for THERAPY

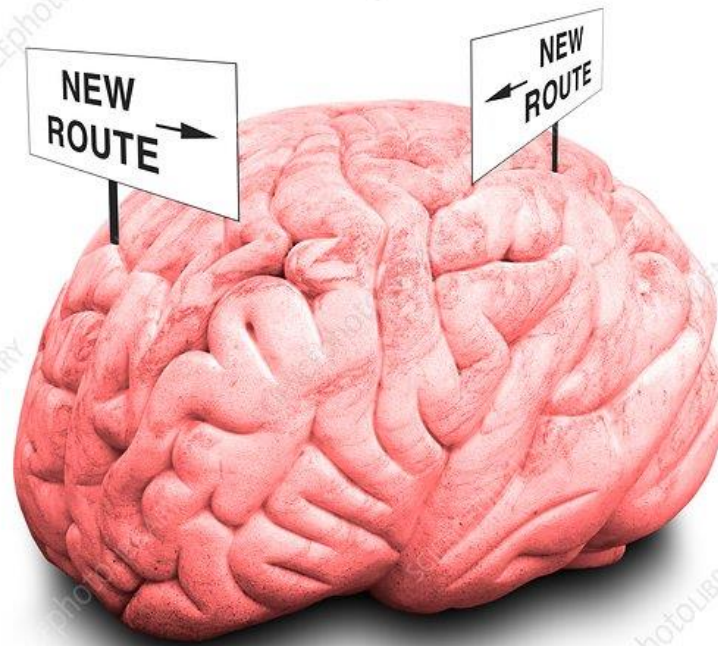




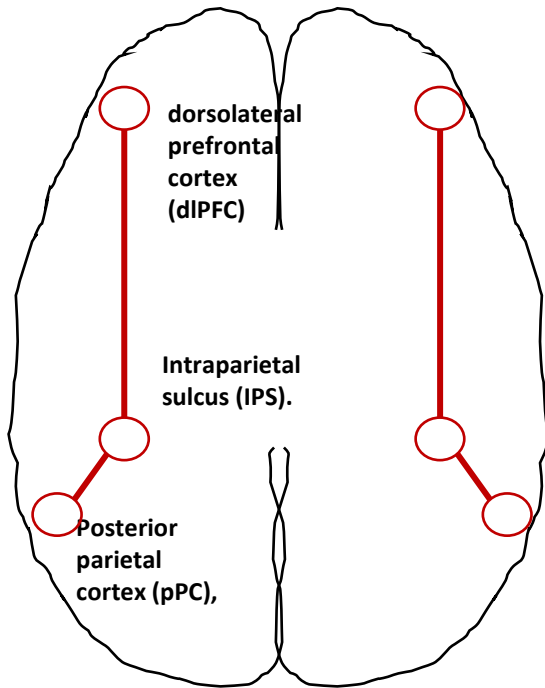
# Experience Dependent Plasticity



# Experience Dependent Plasticity

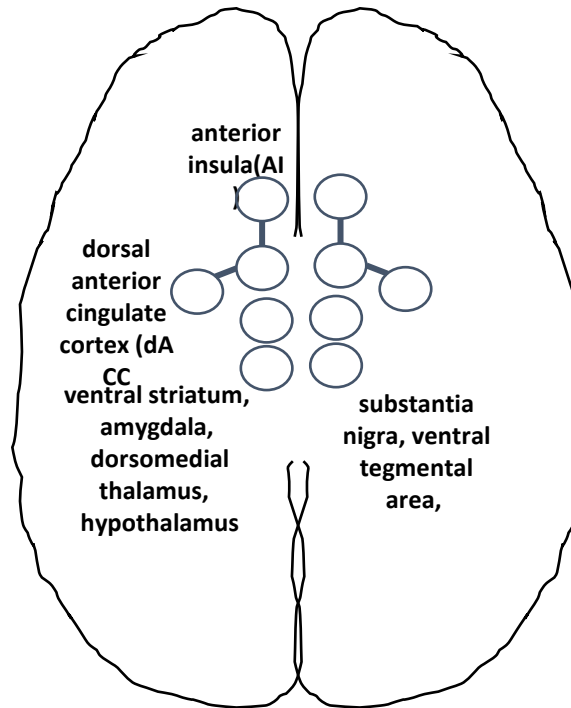


## Central Executive



high level cognitive functions such as maintaining and using information in working memory, problem solving, and decision making executive control tasks IQ

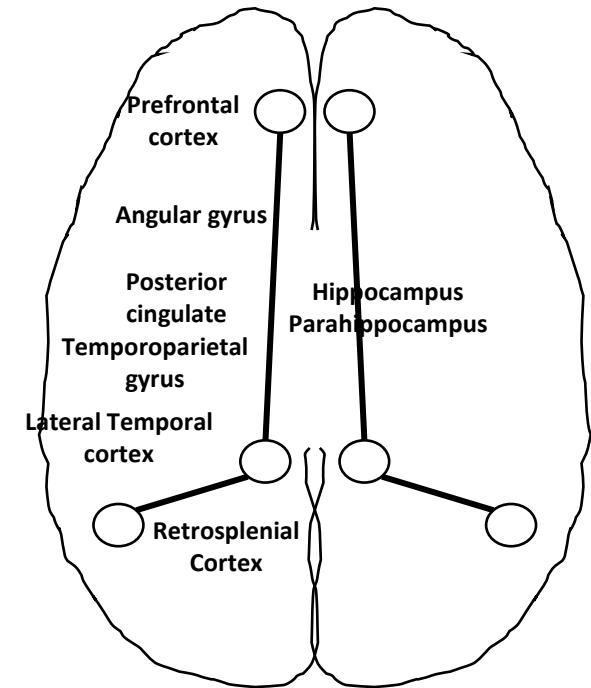
## Salience network



detecting and filtering salient stimuli, variety of complex functions,, social behavior, self-awareness through the integration of sensory, emotional, and cognitive information

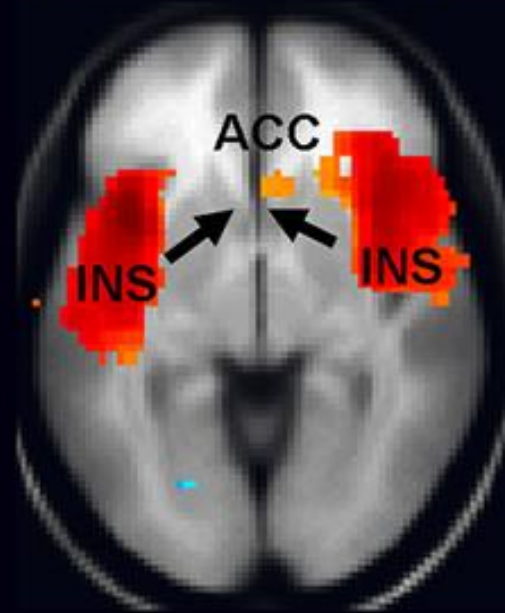
Integration of emotional and sensory stimuli, as well as in modulating the switch between the internally directed cognition of the default mode network and the externally directed cognition of the central executive network.<sup>1</sup>

## Default mode

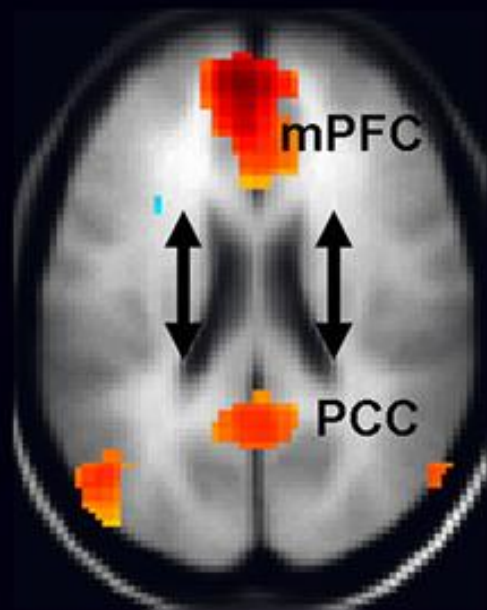


wakeful rest internal focus daydreaming and mind-wandering. But it is also active when the individual is thinking about others, thinking about themselves, remembering the past, and planning for the future theory of mind Retrieval of social semantic and conceptual knowledge Autobiographical memory and future simulations

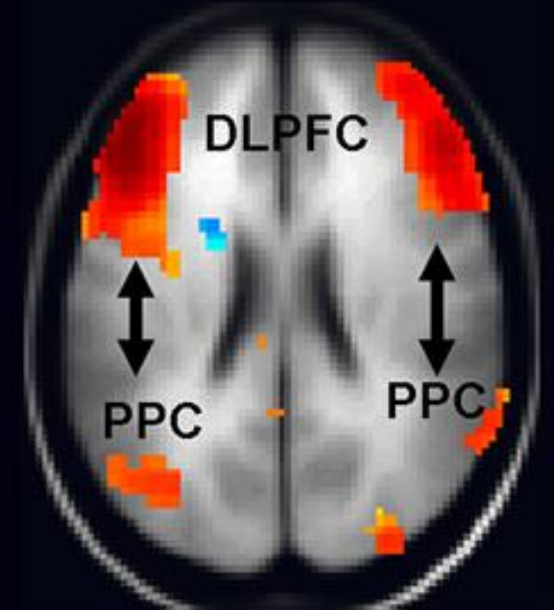
### Saliency network



### Default mode network



### Central executive network



Anticorrelation



# Network Plasticity & Functions

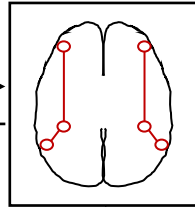
## Fast Millisecond-range Plasticity (FP)

High level cognitive functions working  
memory, problem solving, and decision  
making executive control tasks IQ

### Environment



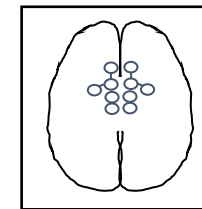
### Executive



### Slow Intermediate Weeks-range Plasticity (SP)

integration of  
sensory, emotional,  
and cognitive  
information  
modulating the switch  
between the  
internally directed  
cognition of  
the default mode  
network

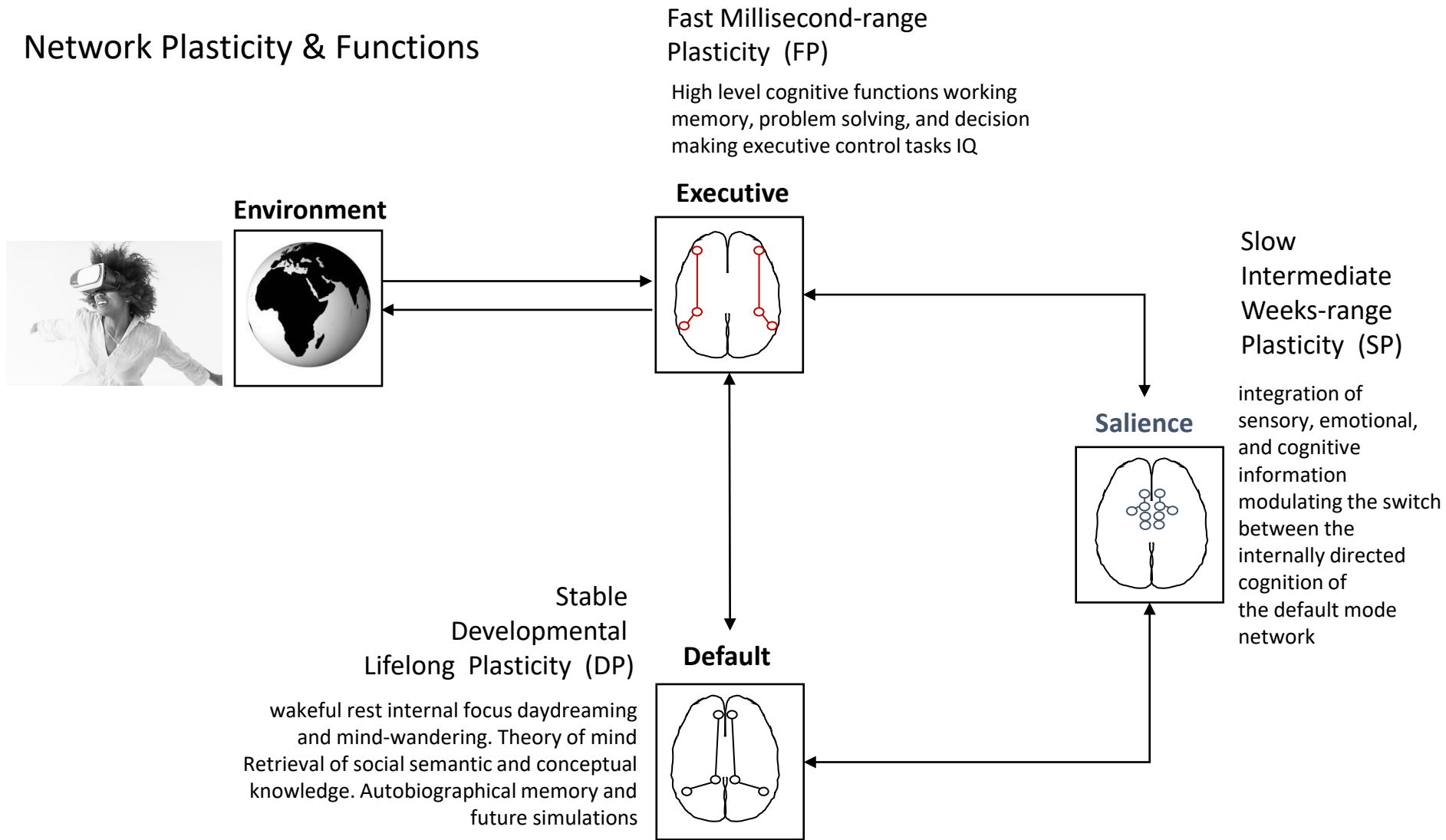
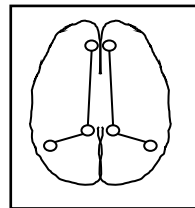
### Saliency

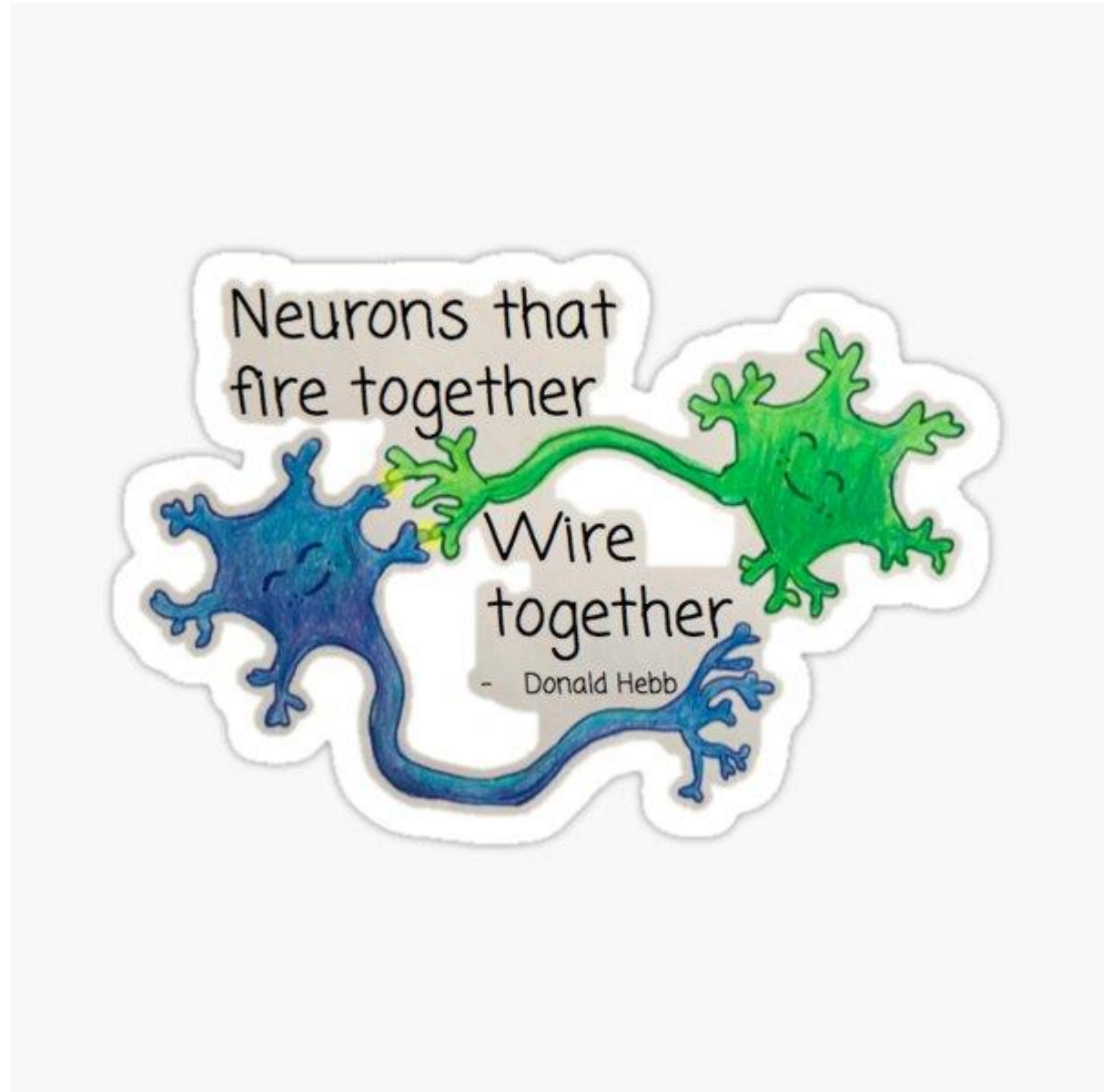


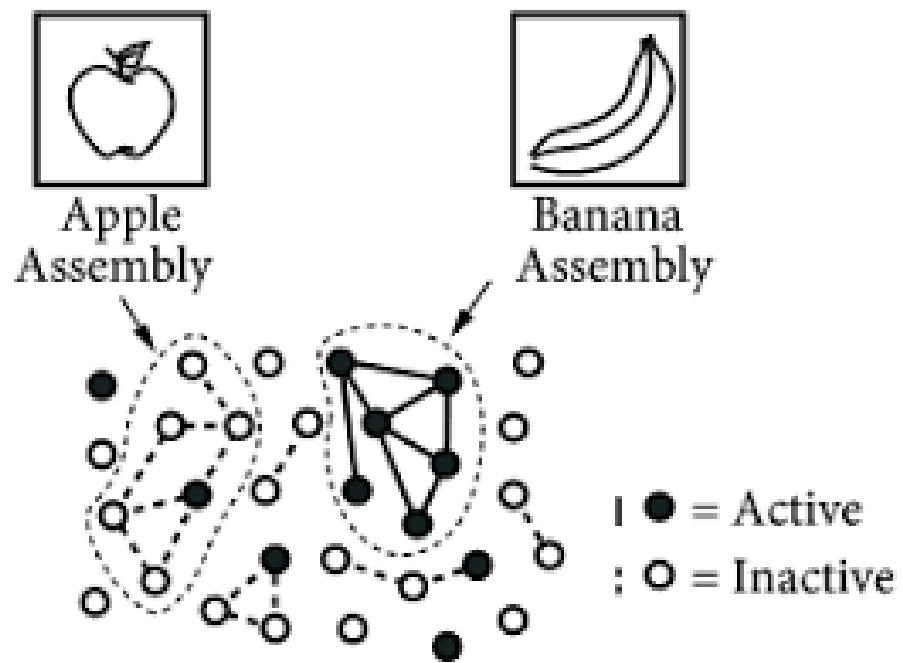
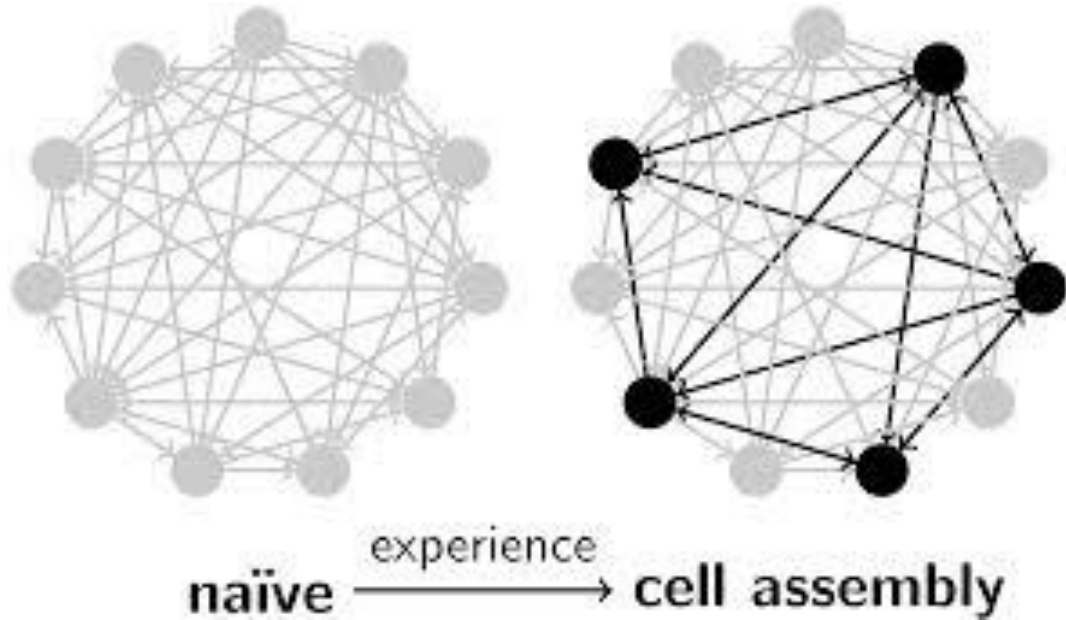
### Stable Developmental Lifelong Plasticity (DP)

wakeful rest internal focus daydreaming  
and mind-wandering. Theory of mind  
Retrieval of social semantic and conceptual  
knowledge. Autobiographical memory and  
future simulations

### Default

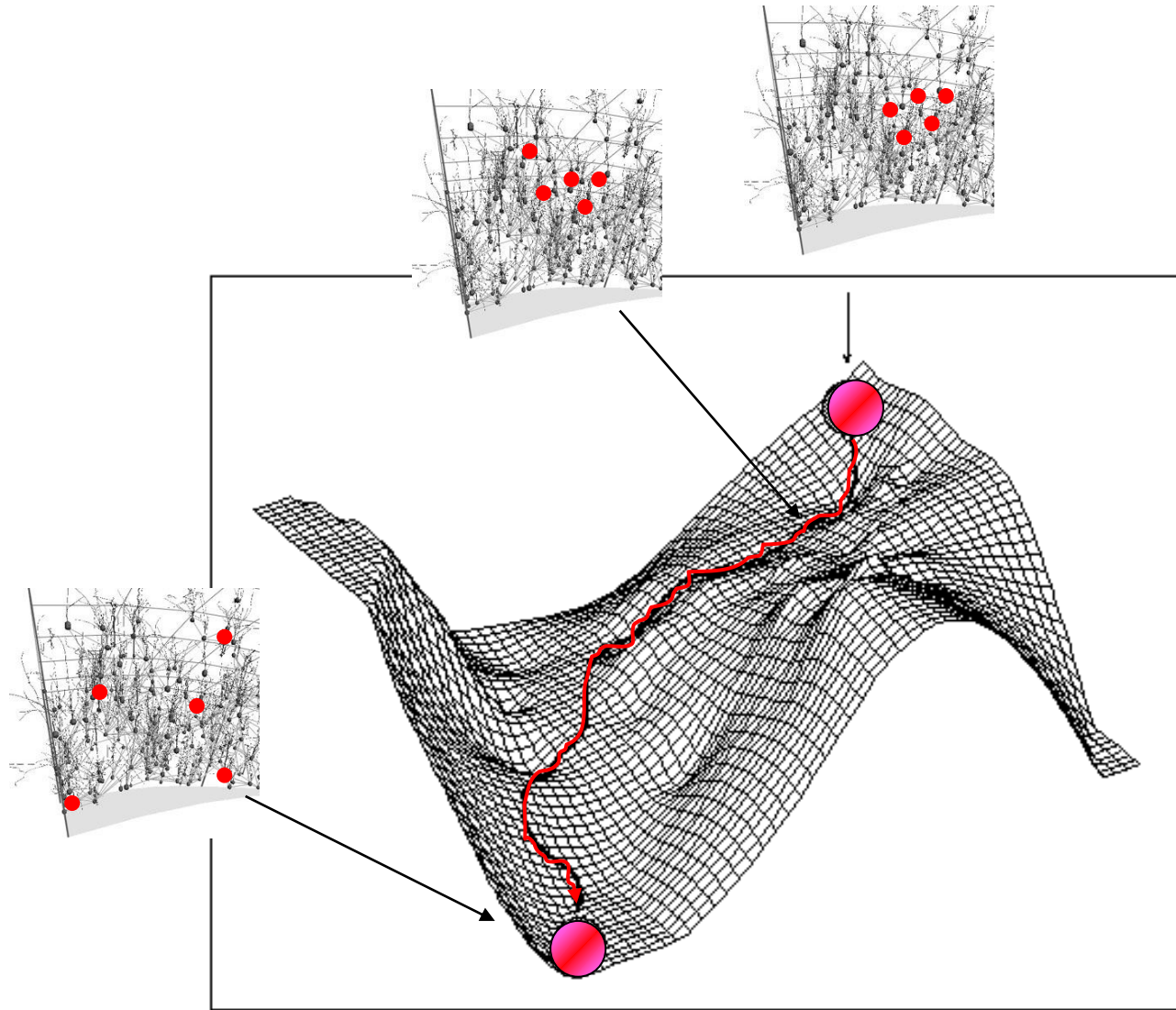




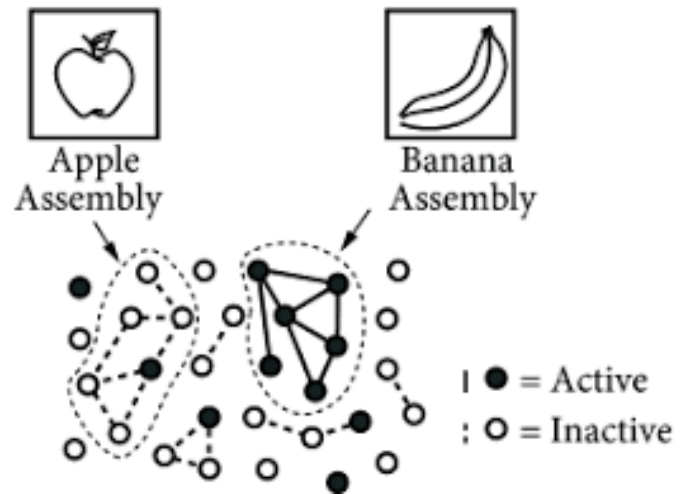
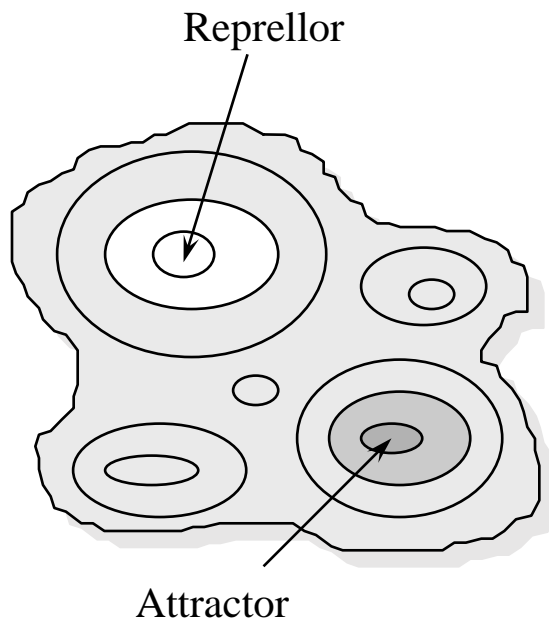
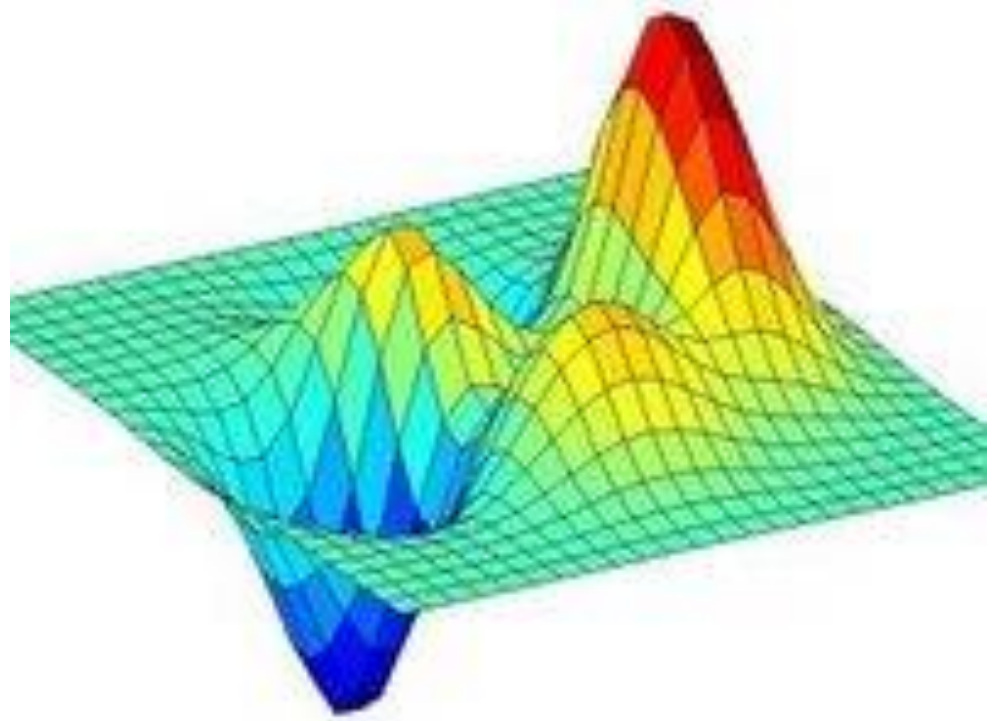


Where are we heading to ?

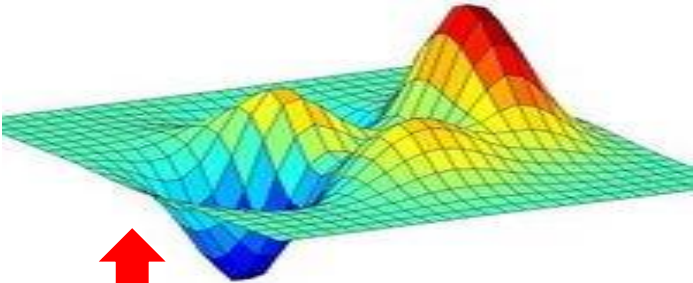
**Formulate brain dynamics as a physical state-space dynamic system**



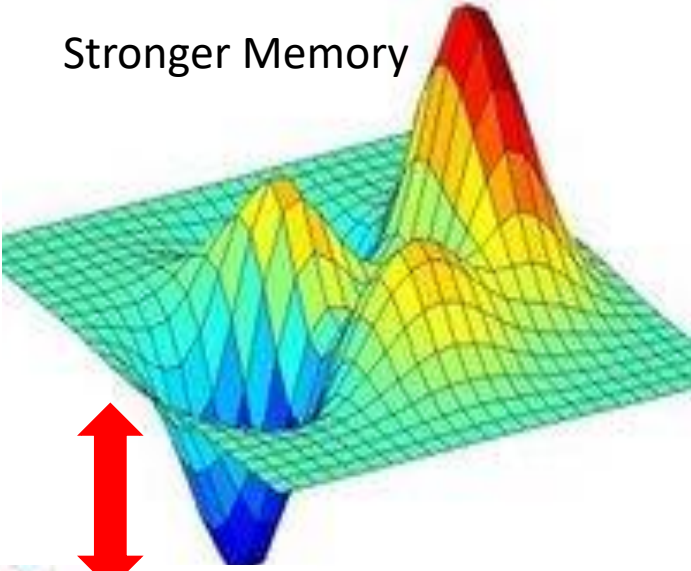




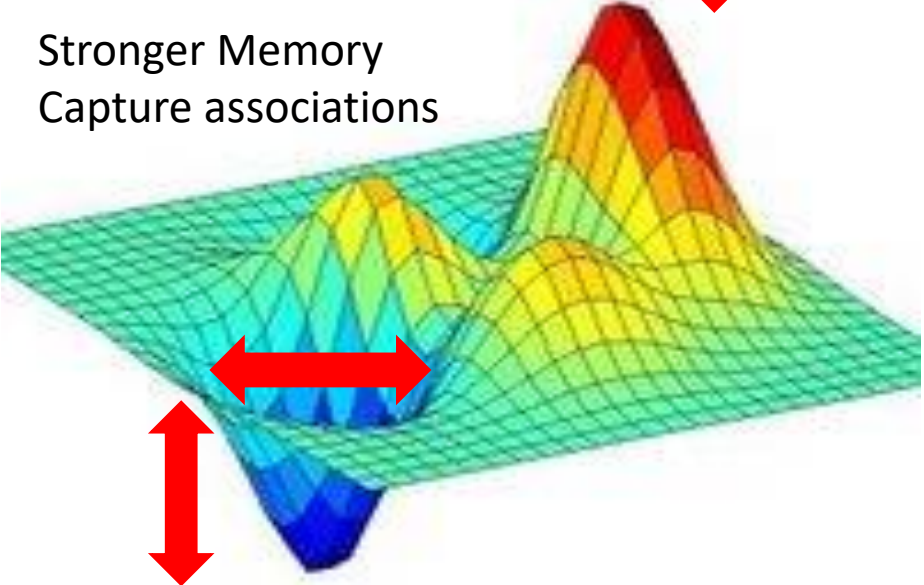
Normal Memory



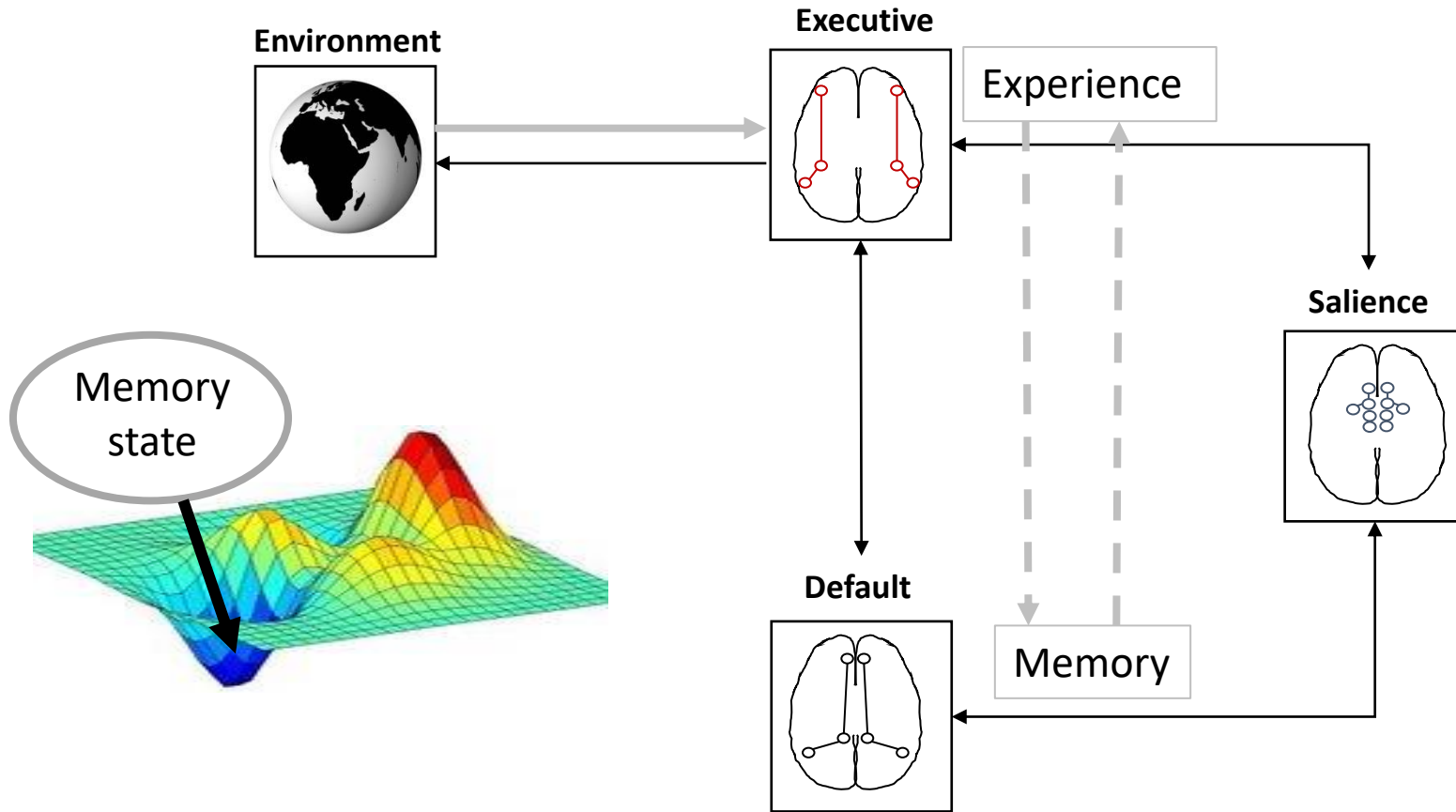
Stronger Memory



Stronger Memory  
Capture associations

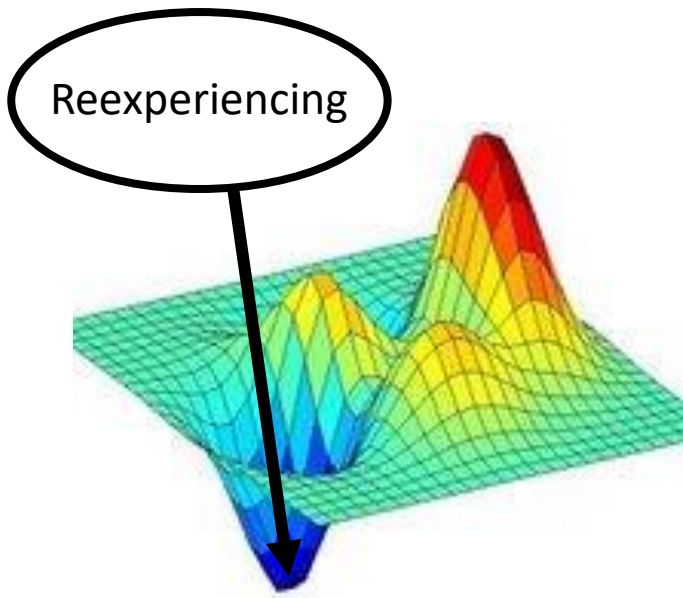
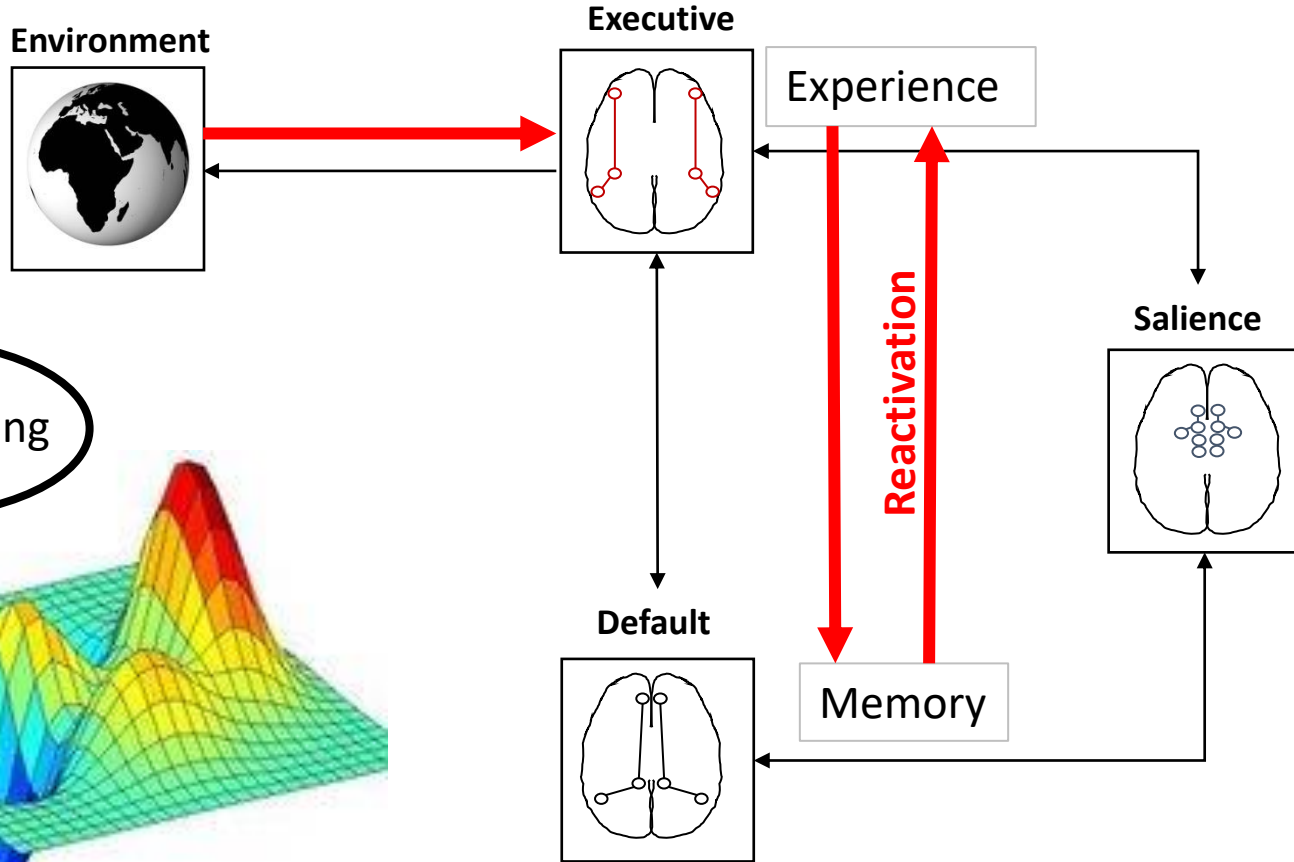


# Normal Network Plasticity & Functions



Memory State Space

# HHCD Network



Memory State Space

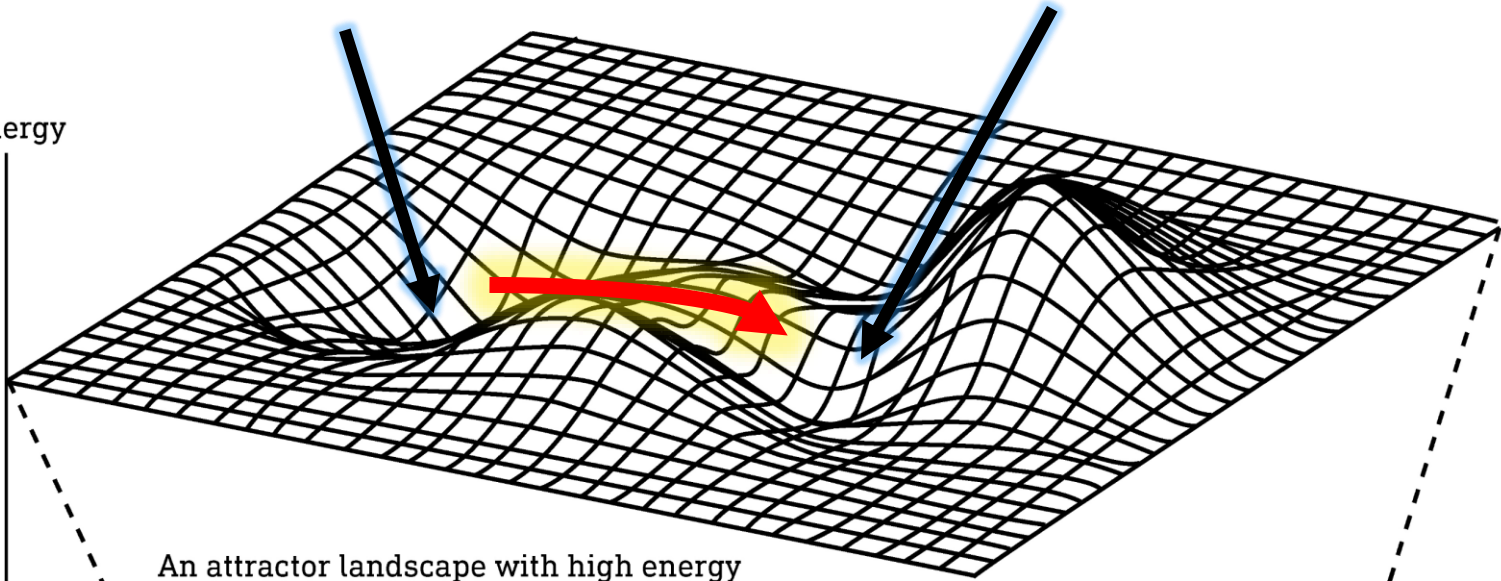
A hand is holding a white rectangular sign against a bright blue sky filled with white, fluffy clouds. A sunburst is visible in the lower right quadrant of the sky. The word "Therapy" is written on the sign in a large, black, cursive font. The hand is positioned on the left side of the sign, with fingers gripping the edge. The overall scene is bright and positive.

Therapy

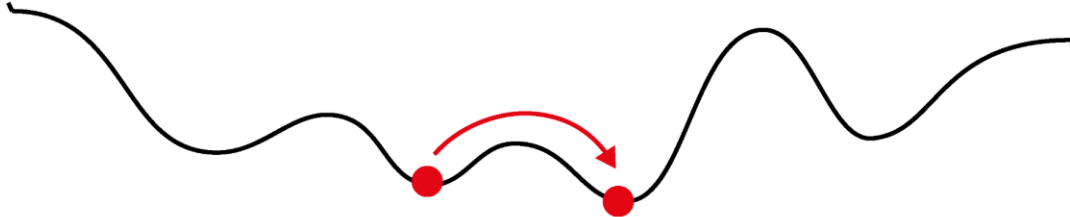
**Traumatic memory**

**Non-traumatic memory**

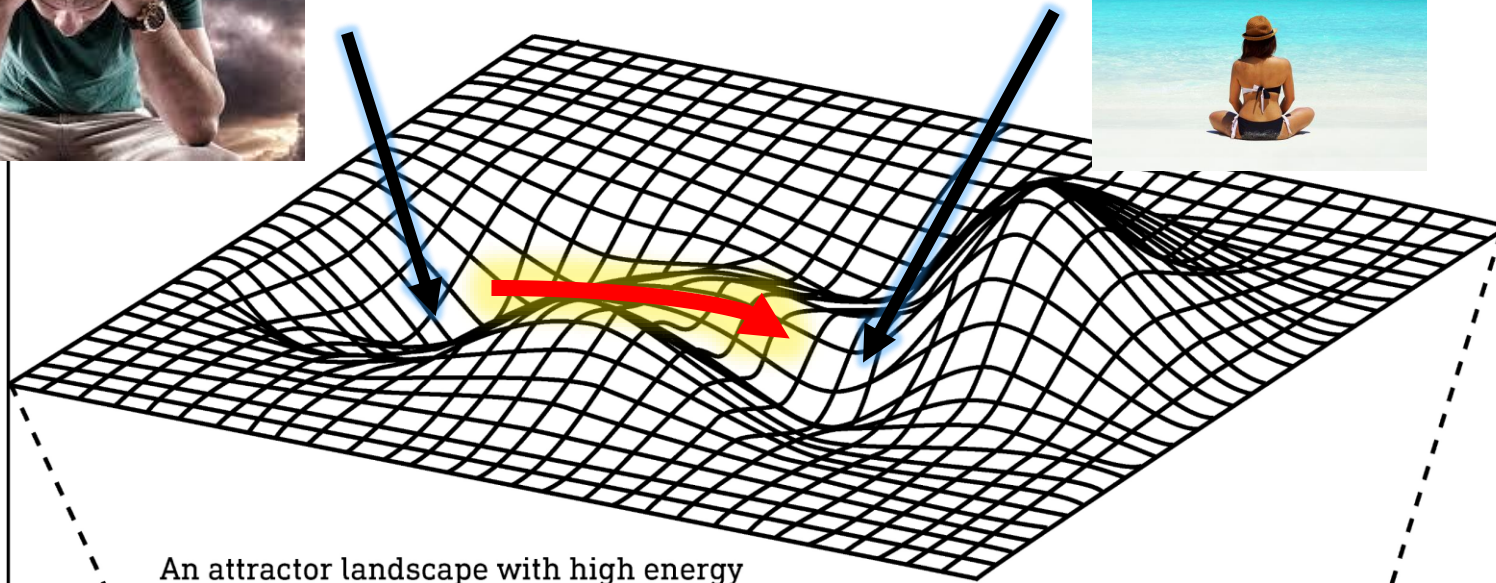
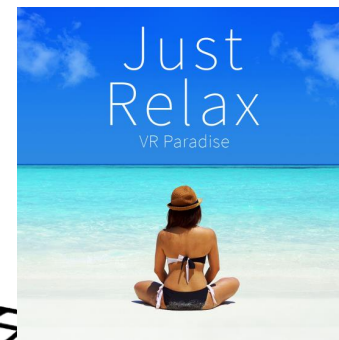
Energy



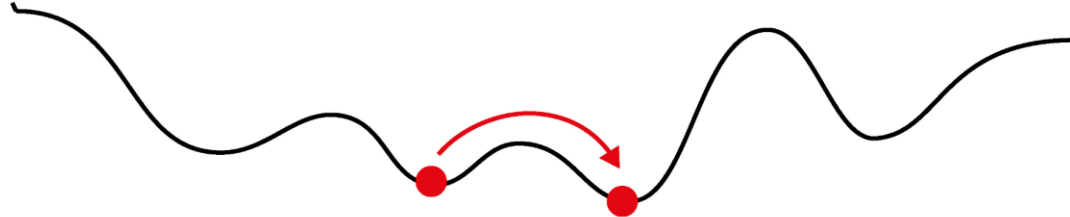
An attractor landscape with high energy hills and low energy basins and valleys.



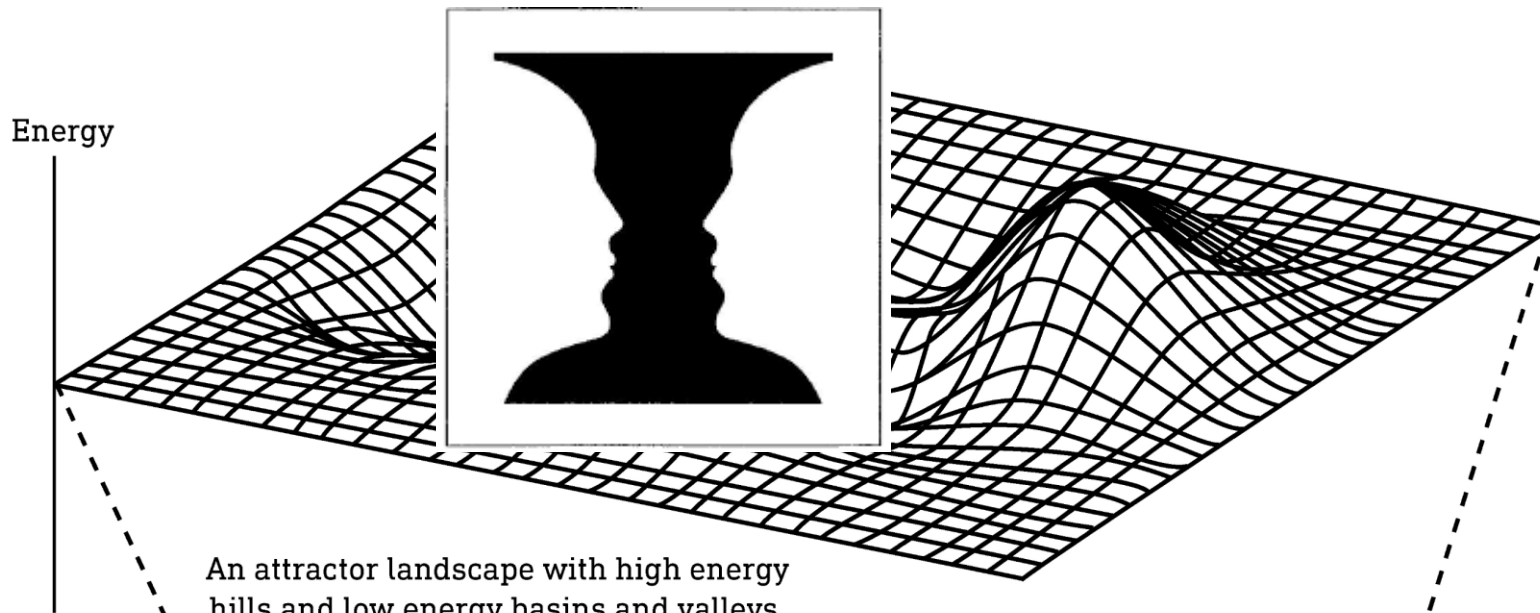
Transition between two states within the state space.



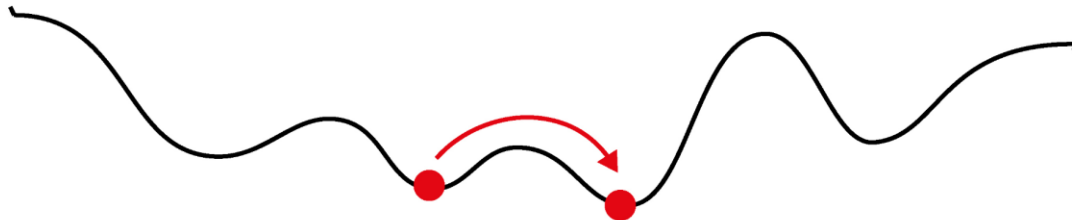
An attractor landscape with high energy hills and low energy basins and valleys.



Transition between two states within the state space.

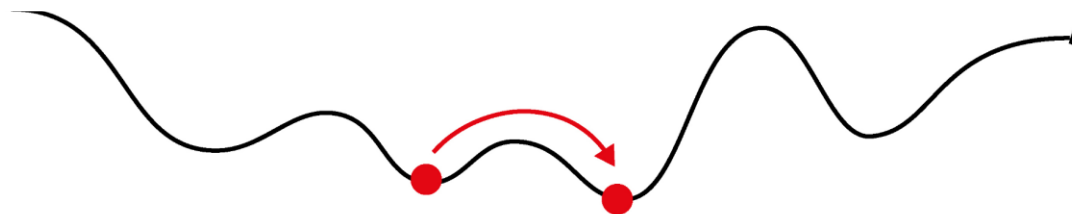
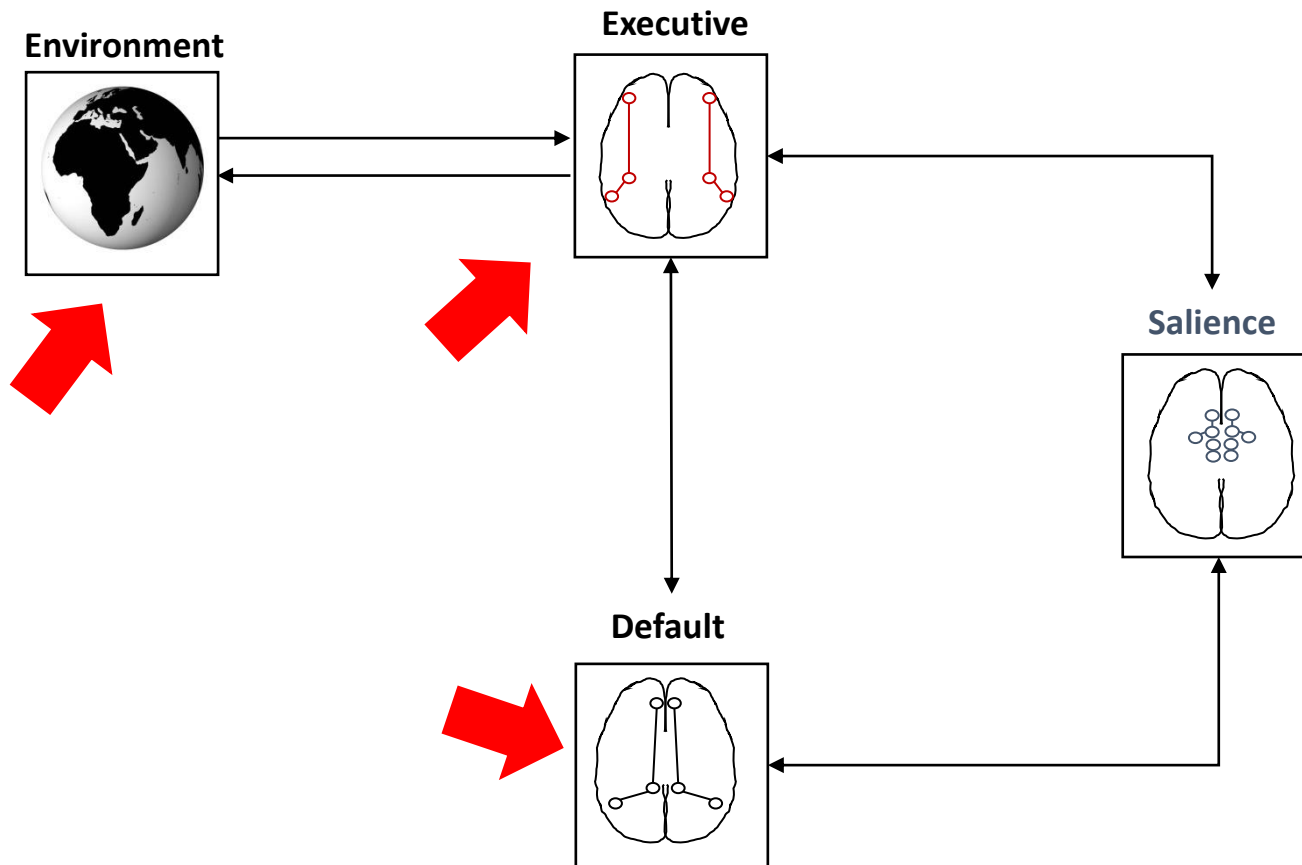


An attractor landscape with high energy hills and low energy basins and valleys.

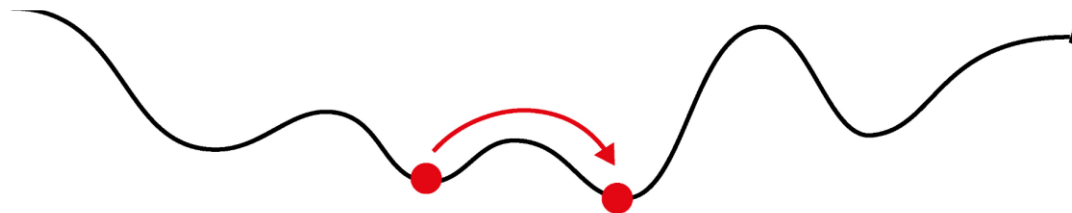
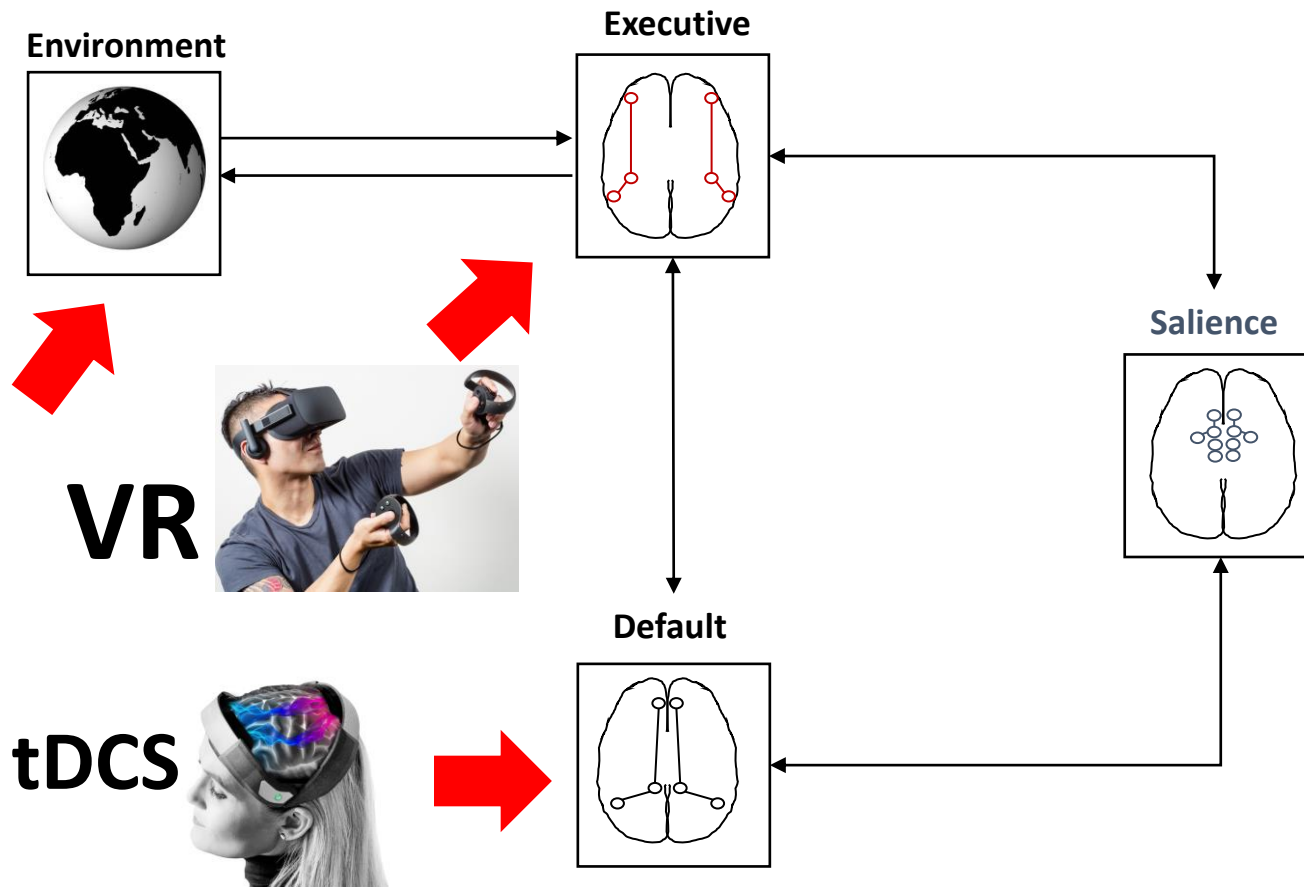


Transition between two states within the state space.





Transition between two states within the state space.

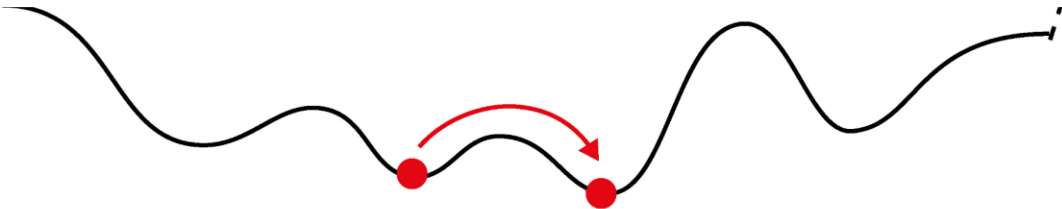


Transition between two states within the state space.





**VR with tDCS go together**



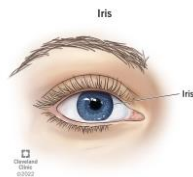
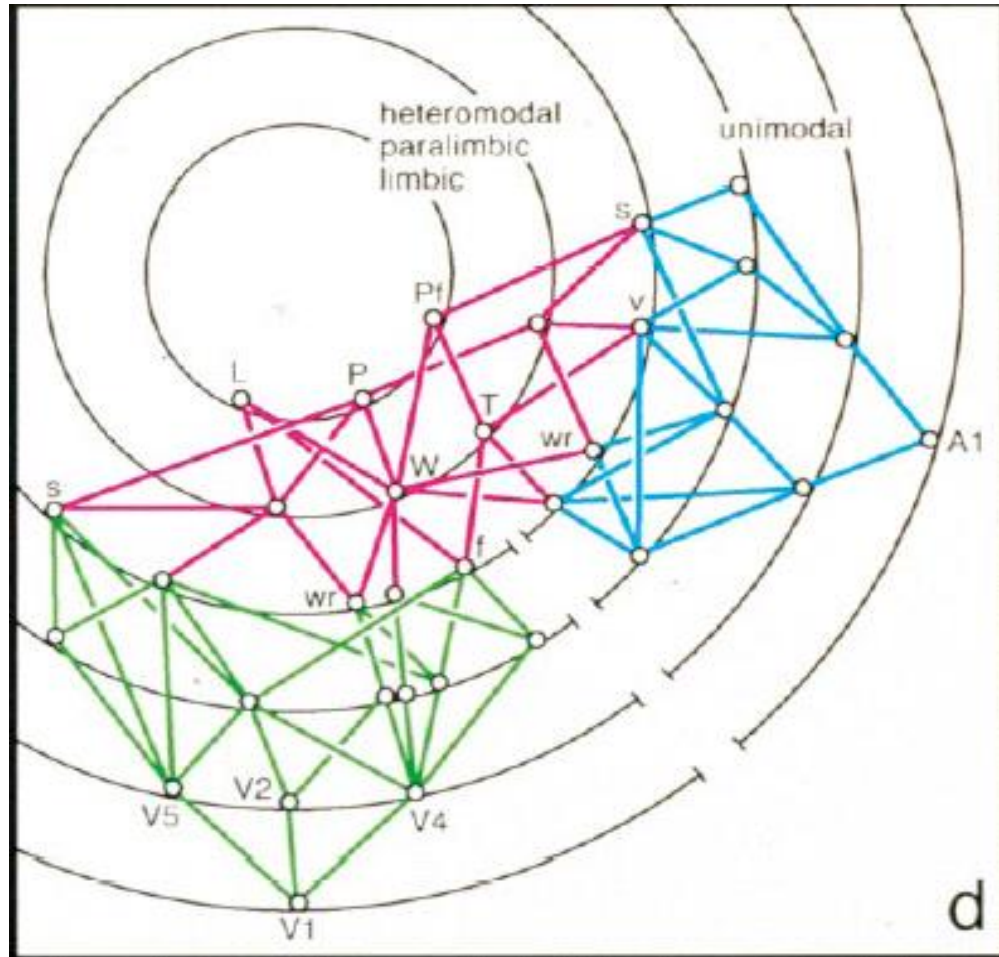
Transition between two states within the state space.

More Personalized



Marcel Mesulam

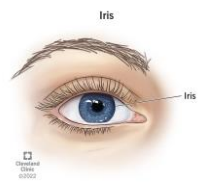
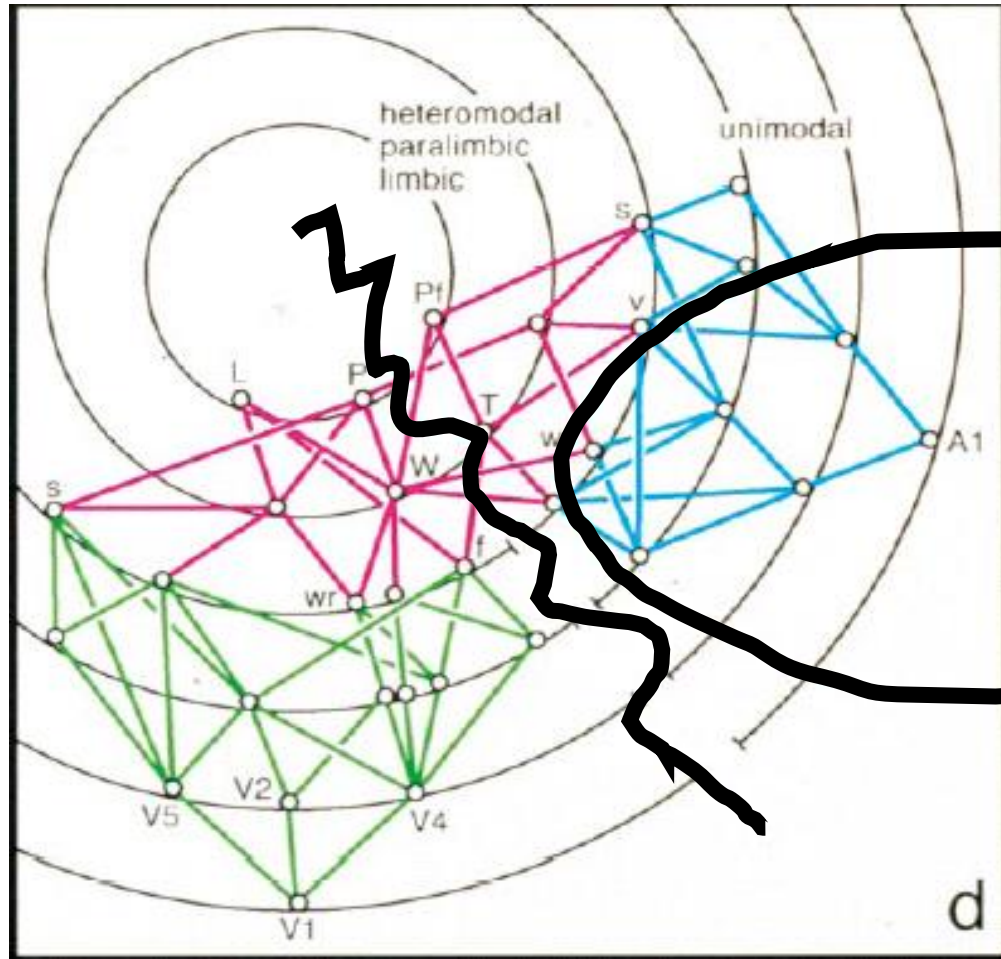
From Sensation to cognition  
Mesulam 1998





Marcel Mesulam

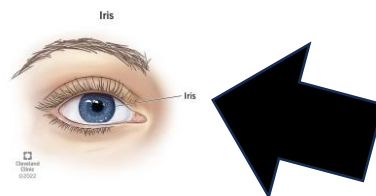
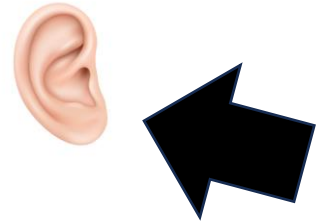
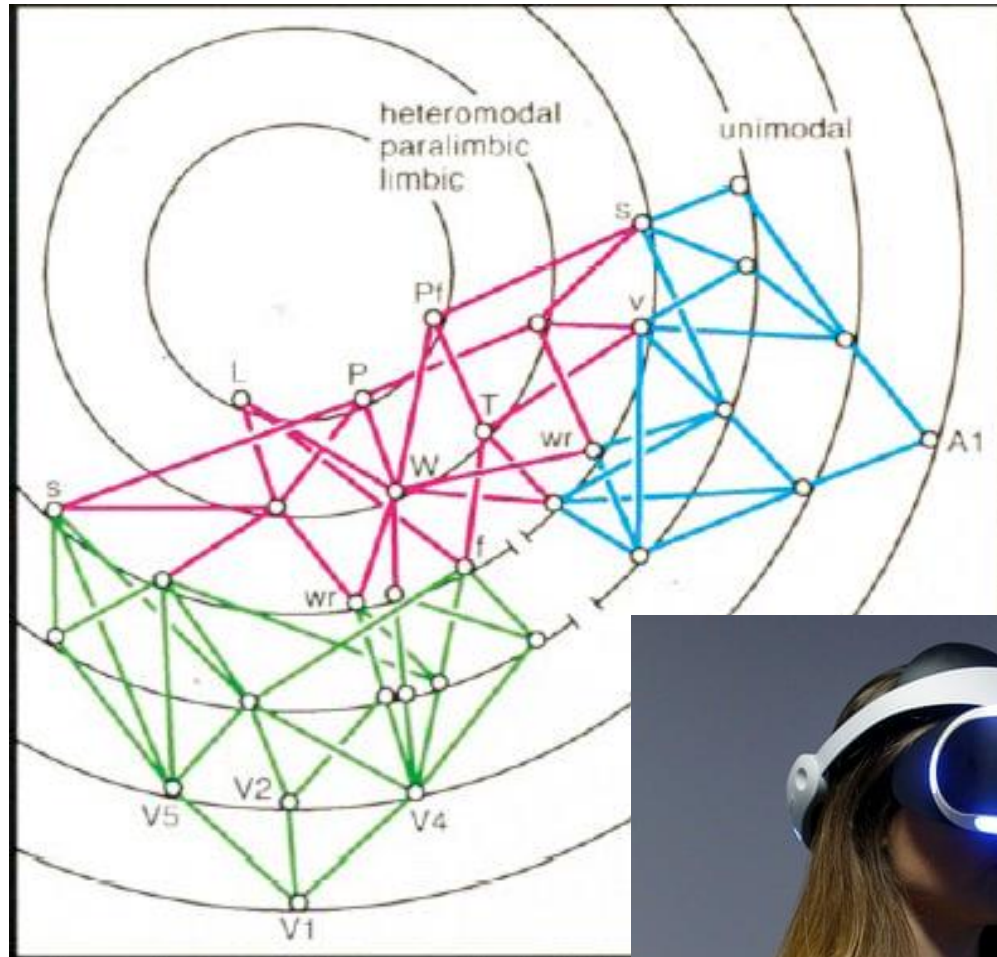
From Sensation to cognition  
Mesulam 1998





Marcel Mesulam

From Sensation to cognition  
Mesulam 1998



Iris



# Schizophrenia

<https://www.youtube.com/watch?v=TmteGdkLat0>

