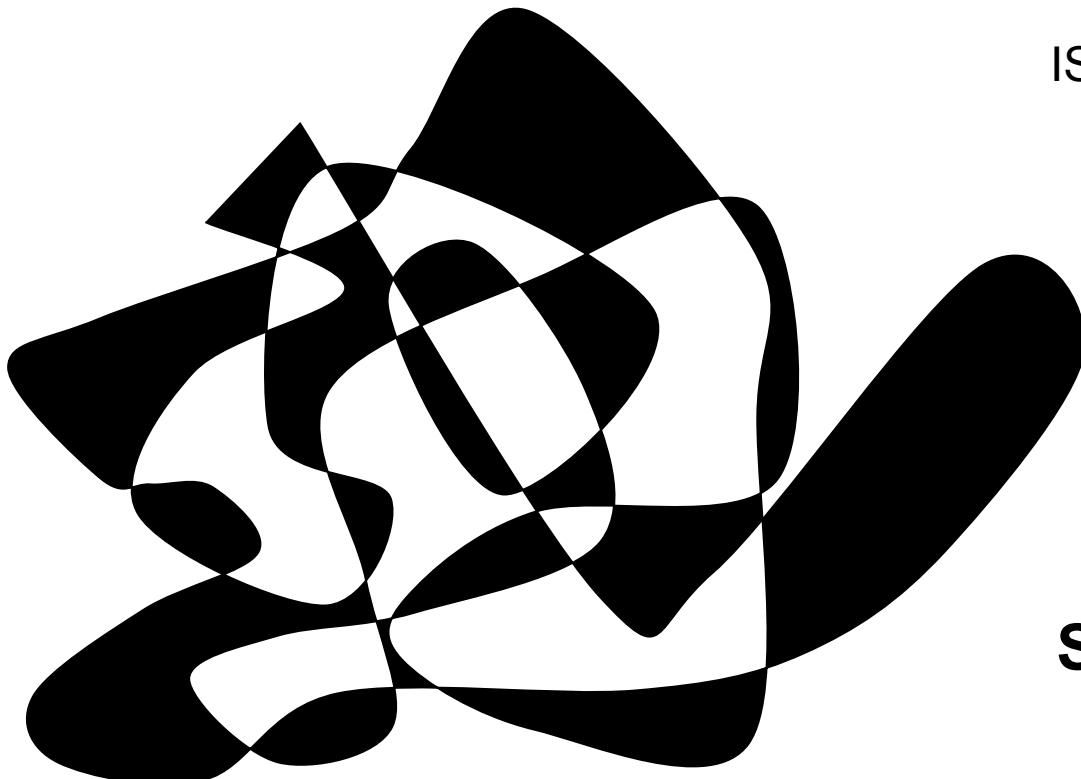


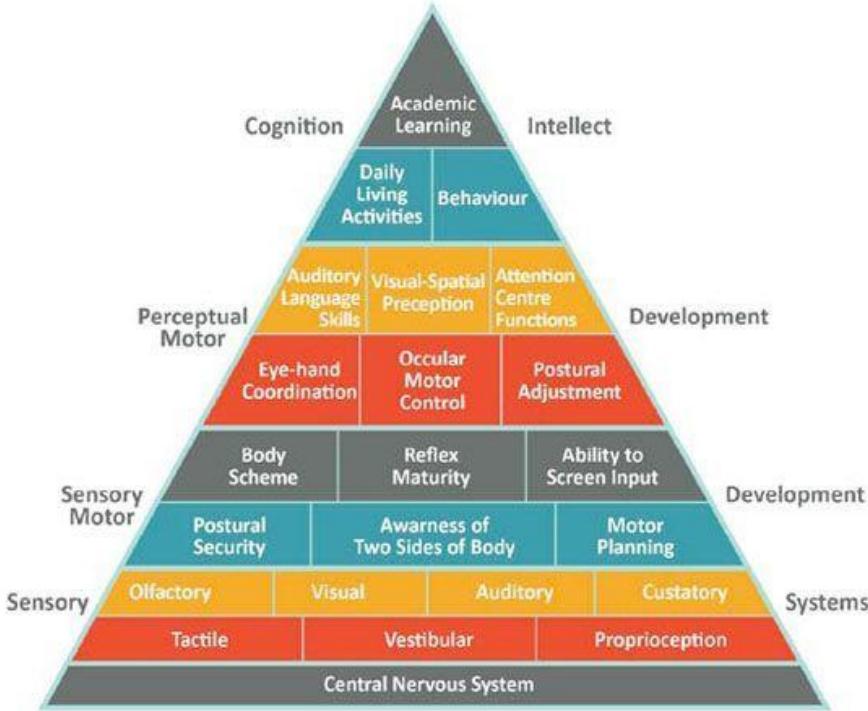
# **Advanced Project Management**

IS 594, Section PJ

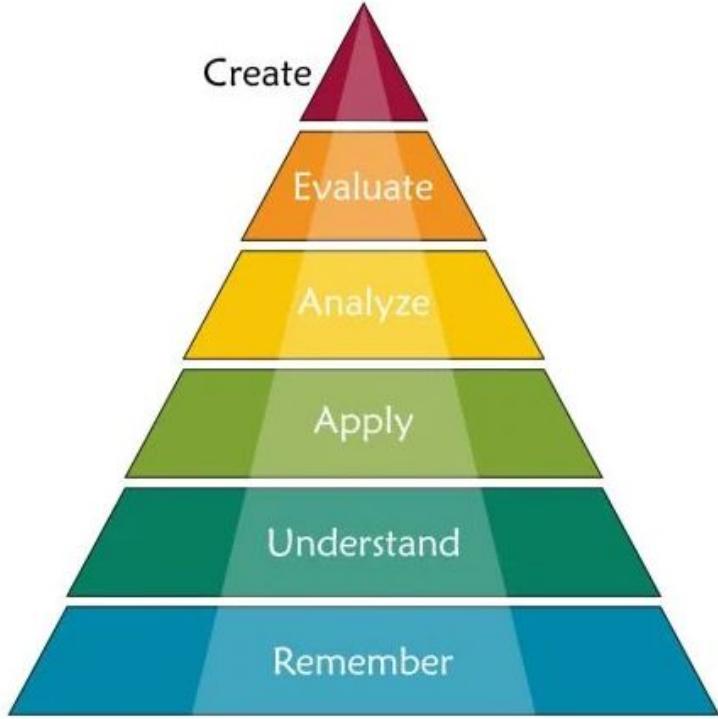


**Skill Acquisition and  
Expertise**

# **Educational Psychology Views of Skill Acquisition**



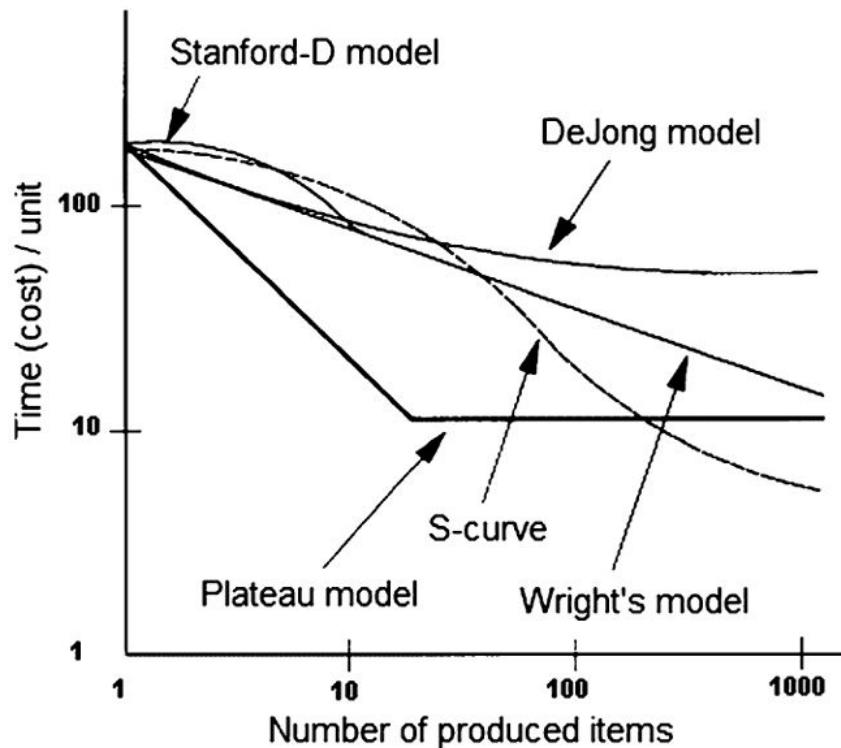
“Learning Pyramid” (National Training Laboratory): remember about 10% of information acquired from text, retain nearly 90% through teaching others.



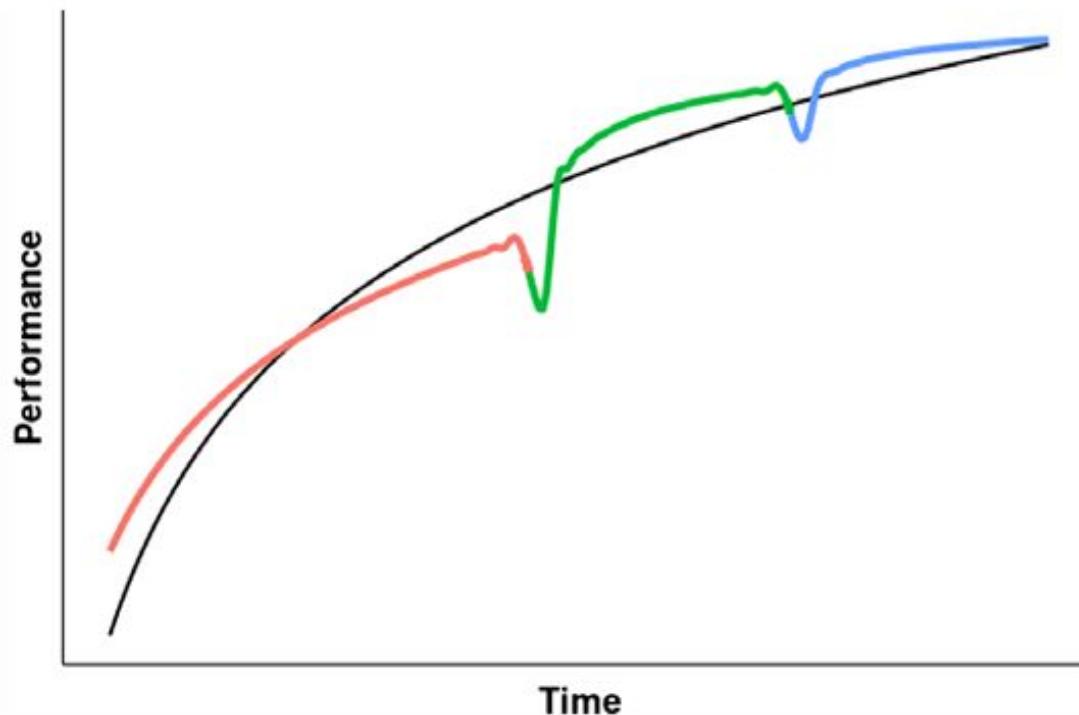
Bloom's Taxonomy: Taxonomy of Educational Objectives (circa 1956). Knowledge is the necessary precondition for putting skills/abilities into practice.

# **Cognitive Science Views of Skill Acquisition and Expertise**

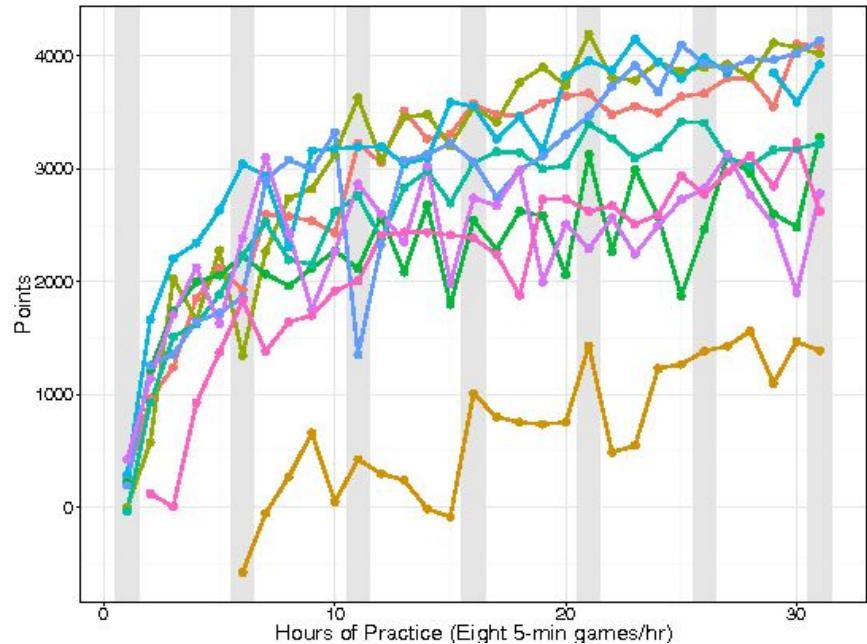
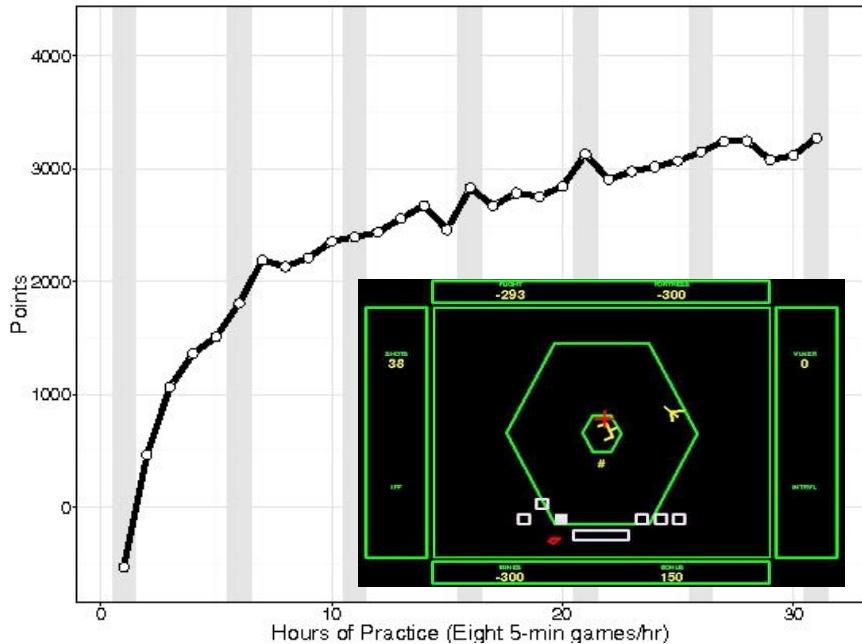
Anzanello, M.J. and Fogliatto, F.S. (2011). Learning curve models and applications: Literature review and research directions. *International Journal of Industrial Ergonomics*, 41, 573-583.



Gray and Lindstedt (2017). Plateaus, Dips, and Leaps: Where to Look for Inventions and Discoveries During Skilled Performance. *Cognitive Science*, 41, 1838–1870.



# Train novices on video game Space Fortress



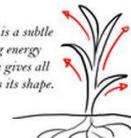
Gray and Lindstedt (2017). Plateaus, Dips, and Leaps: Where to Look for Inventions and Discoveries During Skilled Performance. *Cognitive Science*, 41, 1838–1870.

## THE FIRST 4 MOVEMENTS

# Novice Learning of Tai Chi movements (procedural)

### Peng

Peng is a subtle spring energy which gives all things its shape.



As you press on a leaf gently, it has a very soft resistance force. This is called peng. A natural, constant, relax spring force.



Tai chi is for us to practice peng.

With this skill, one can listen force through touch.



### Lu

Lu is a deflective force. Absorbing and following a incoming force, then deflect away.



Like 2 magnets repelling each other when negative meets negative.

Incoming force is absorbed first. Absorption is carried by body alignment and legs.



### Zi

Zi is the energy of compression. It is to neutralise incoming force.



Like earth's gravitational pull, squeezing the earth's crust into compressed layers.

Zi is to stop an incoming force and also to break the opponent's structure. When the structure is compromised, opponent's power is lost.



### An

An is a release of outward energy.



Outward release of energy can be seen from nature; volcanoes and ocean waves.



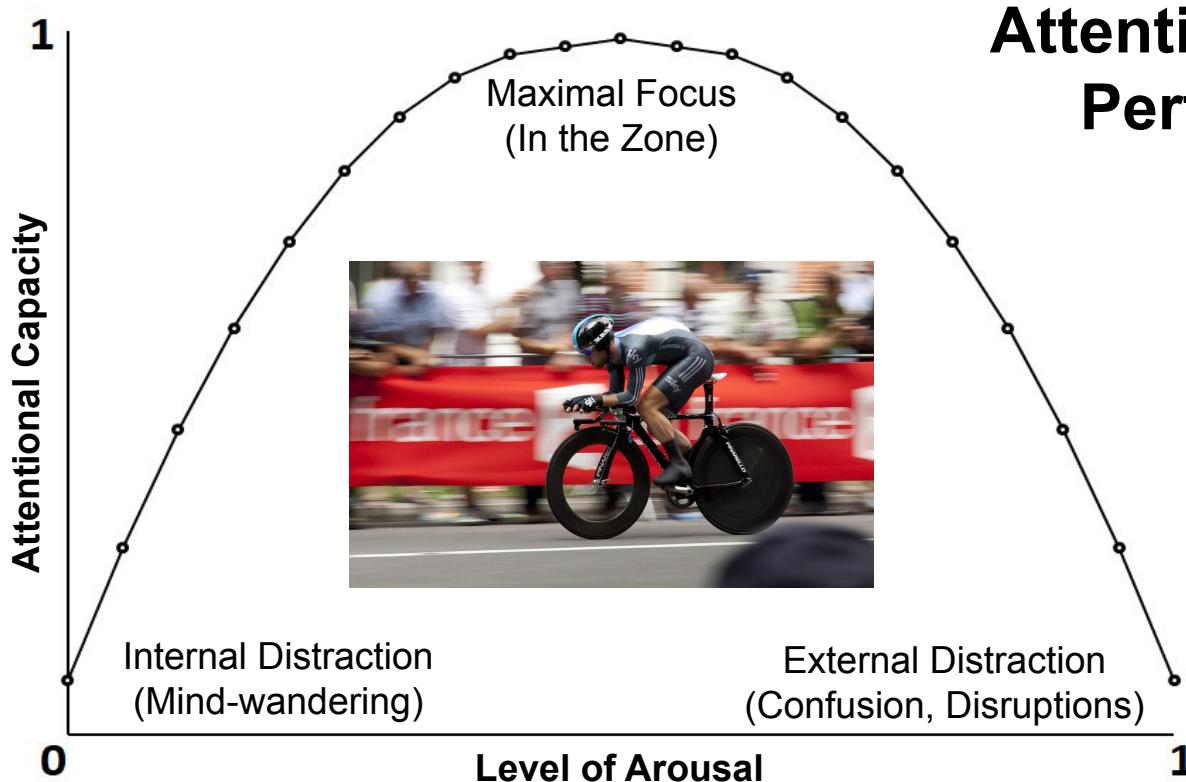
**What Happens When you Stop Learning  
(intentionally and unintentionally)?**

Rational Badger (2024). Overcome Learning Plateaus – And Reignite Your Progress. *Medium*, May 13.

<https://medium.com/@RationalBadger/overcome-learning-plateaus-8729b622fa4a>

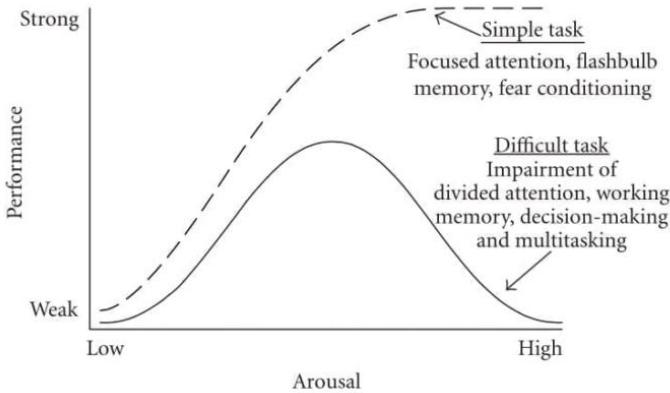
Hitting a learning plateau: point at which you stop making progress (lose confidence, demotivational).

- Beginner → advanced beginner: next step (separating practice from performance) takes more effort.
- “more time invested in skill development, less progress per unit time”.
- Needs: targeted feedback, professional training, systems of daily activities, break skill into smaller components.

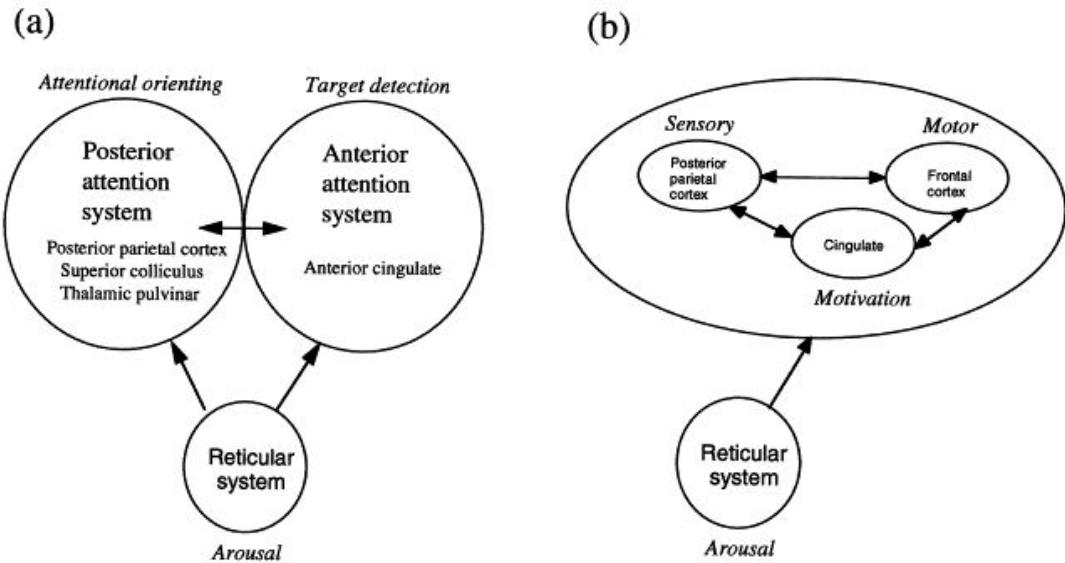


## Attention and Task Performance

Nieuwenhuis (2024). Arousal and performance: revisiting the famous inverted-U-shaped curve. *Trends in Cognitive Science*, 28(5), 394-396.

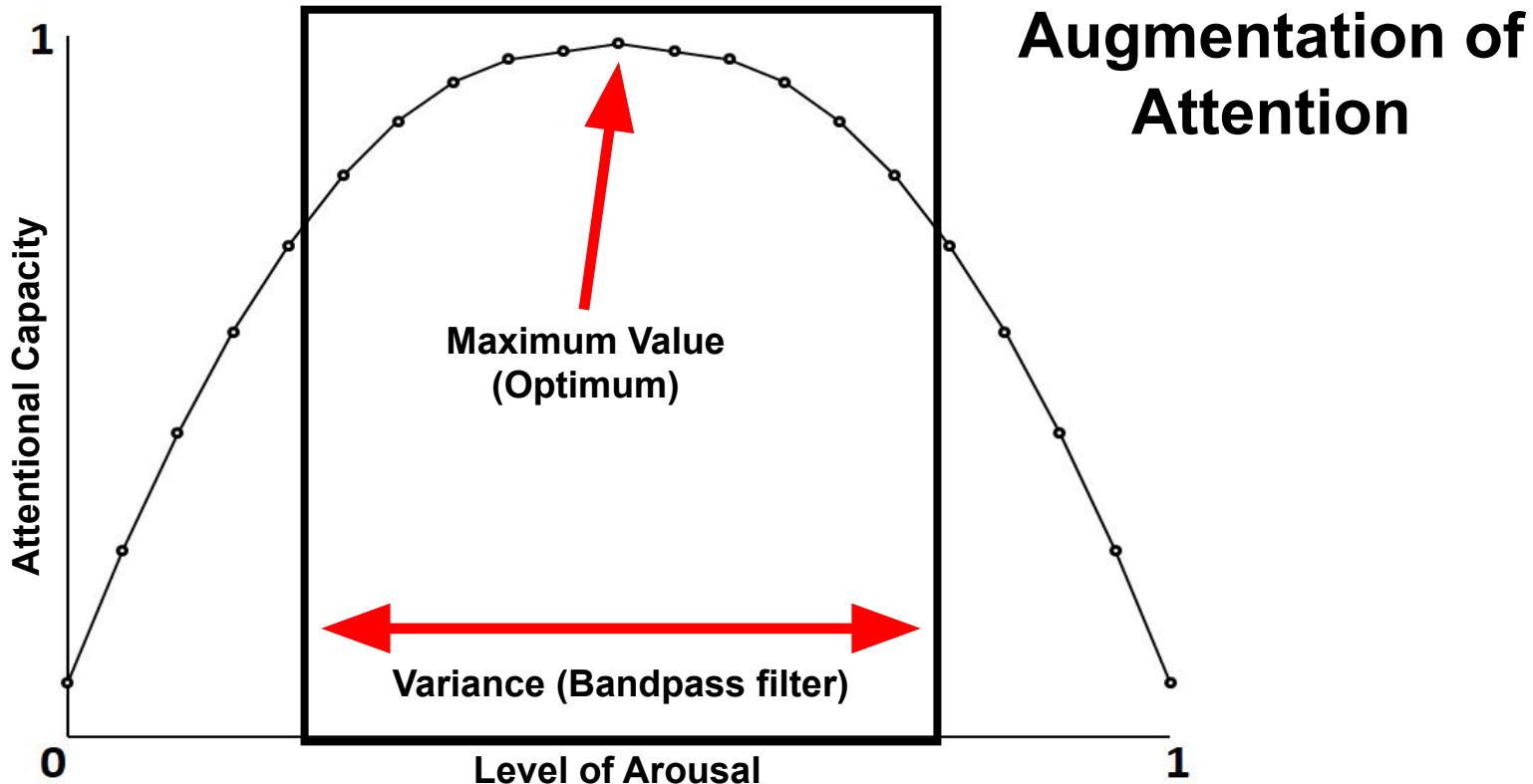


## Connection between Attention and Arousal



Posner and Petersen (1990). The attention system of the human brain. *Annual Reviews in Neuroscience*, 13, 25-42.

Mesulam (1981). A cortical network for directed attention and unilateral neglect. *Archives of Neurology*, 38, 304-325.



Nieuwenhuis (2024). Arousal and performance: revisiting the famous inverted-U-shaped curve.  
*Trends in Cognitive Science*, 28(5), 394-396.

# **Environmental Approaches to Enhancing Performance**

# Natural Elements and Productivity

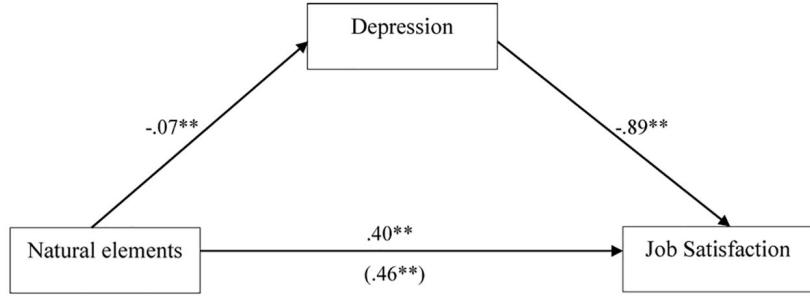
<https://blog.turningart.com/how-to-use-natural-elements-to-create-a-productive-office-space>

<https://www.hermanmiller.com/research/categories/white-papers/nature-based-design-the-new-green/#source3>

## Biophilic Design Principles for work spaces (office space, workshop)

- reduces stress, increases productivity and creativity (improved attention, learning, cognitive function).
- encourage gardens, walkways, sources of natural light, gurgling water fountains, presence of plants and animals.





An et.al (2016). Why We Need More Nature at Work: Effects of Natural Elements and Sunlight on Employee Mental Health and Work Attitudes. *PLoS One*, 11(5), e0155614.