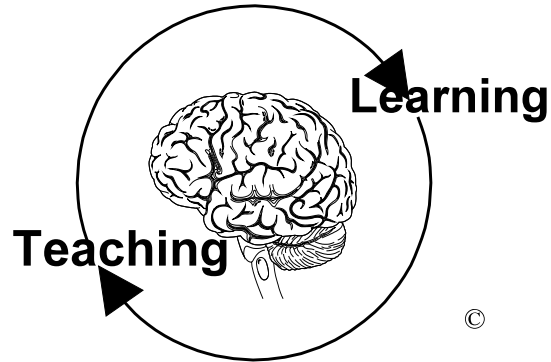


# *What Research Says About the Gifted Brain*

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Arizona Association for Gifted and Talented  
36<sup>th</sup> Annual Conference  
Black Canyon Conference Center  
Phoenix, Arizona  
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NOTE: As a courtesy to fellow participants and the speaker, please turn off audible cell phones and beepers. Thank you.

# WHAT MAKES A BRAIN GIFTED?

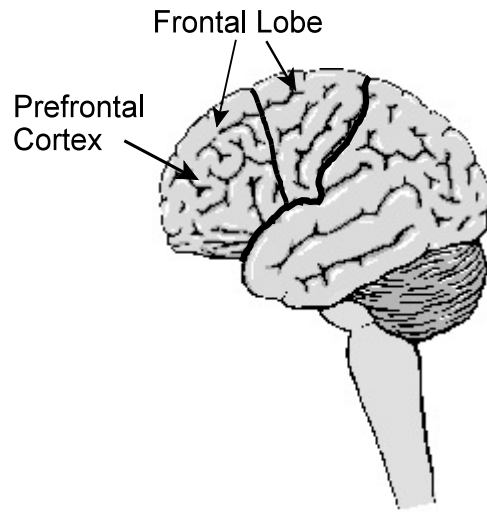
## A. EXECUTIVE FUNCTIONS

Frontal Lobe: \_\_\_\_\_

\_\_\_\_\_

Prefrontal cortex: \_\_\_\_\_

\_\_\_\_\_



## B. NOVELTY TO ROUTINE

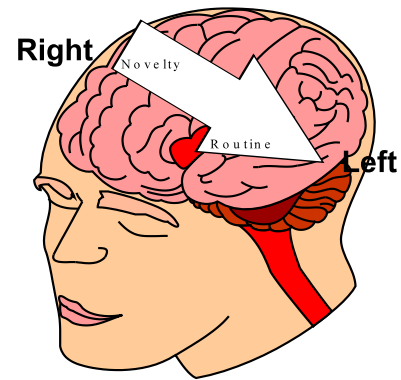
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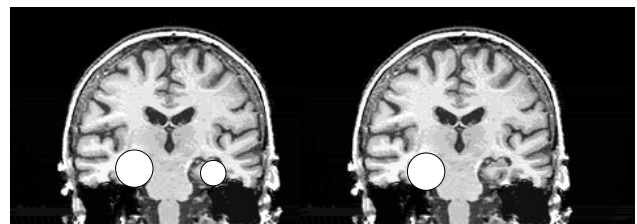
Implications: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NOVEL

PRACTICED



L R

L R

A representation of PET scans showing the changes in regional blood flow for novel and practiced tasks. The highlighted circles show areas of high activation in the left and right temporal lobes for novel tasks, but only in the left temporal lobe for practiced tasks.

## C. NEURAL EFFICIENCY

**Alpha Waves:**

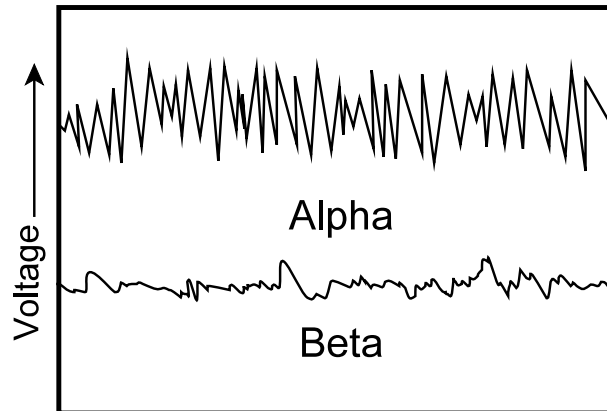
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**Beta Waves:**

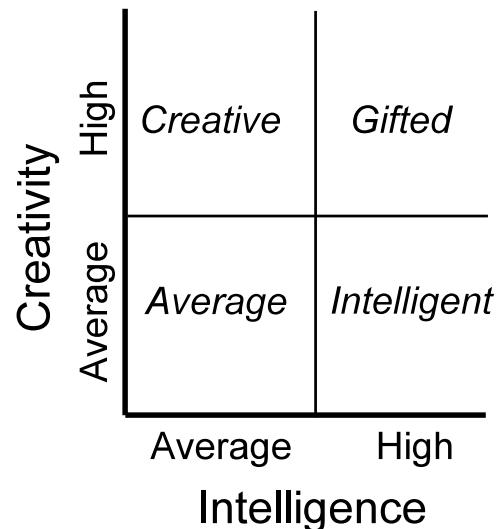
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Research Findings (N. Jausovec, 2000):

- Alpha waves showed that high IQ individuals use less mental effort than average IQ when solving problems requiring convergent and logical thinking.
- Alpha waves showed that high creative individuals used less mental effort than average creative individuals when engaged in creative problem solving.
- Creative individuals showed more cooperation among brain areas than gifted ones, who showed greater decoupling of areas when solving ill-defined problems.



**Implications:**

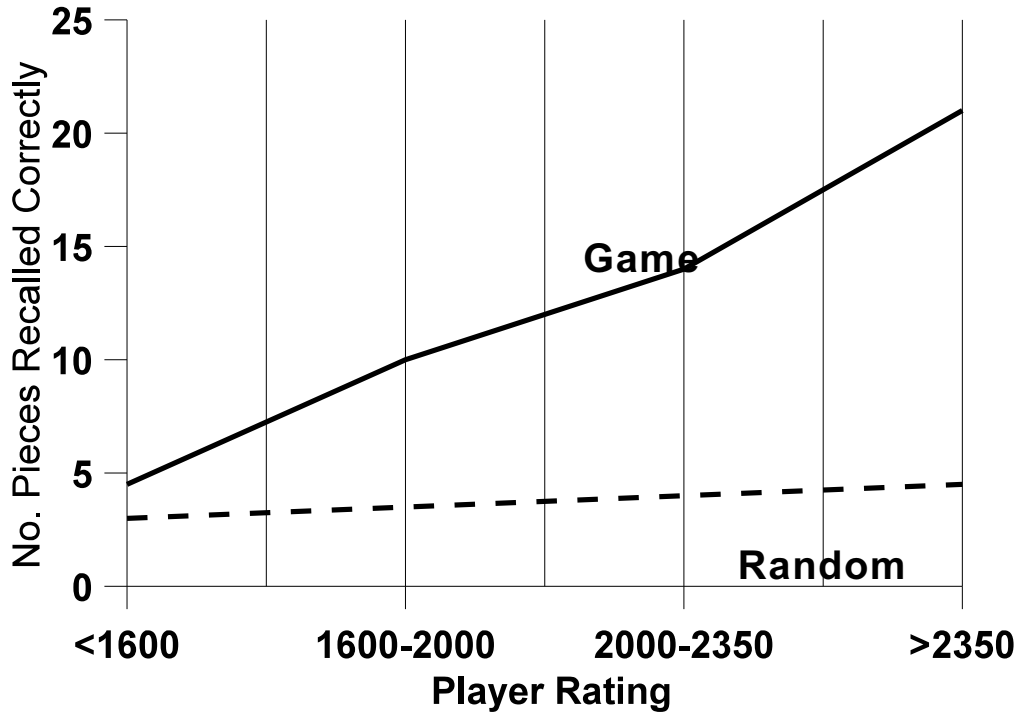
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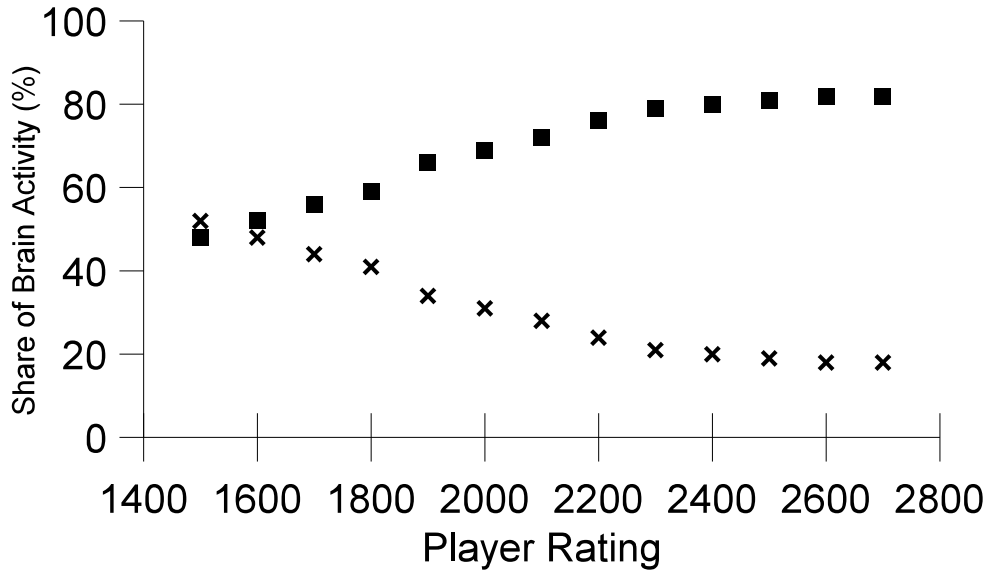
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Source: Jausovec, N. (2000, September). Differences in cognitive processes between gifted, intelligent, creative, and average individuals while solving complex problems: An EEG study. *Intelligence*, 28, 213-240.

## Recall of Game and Random Positions



## Brain Activity in Chess Masters



- Long-Term Memory Areas
- × Working Memory Areas

**WHAT NEUROSCIENCE HAS FOUND:**

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## D. TYPES OF DECISIONS FACING THE PREFRONTAL CORTEX

### **Veridical:**

Solve simple concrete problems:

“What is my doctor’s telephone number?”

“How much money is left in my savings account?”

“When is my nephew’s birthday?”

Each question is clear and the brain searches for a single, indisputable answer. This process is called veridical decision making, or finding the single, true answer.

### **Adaptive:**

Other questions might be:

“Am I sick enough to see the doctor or should I wait a few days?”

“Should I use some of my savings to buy stocks or bonds?”

“What gift should I get for my nephew’s birthday?”

These questions are ambiguous and have no intrinsically unique answer. This requires adaptive decision making. One adapts the decision on the basis of context and priorities at the moment. At another time and place, the decision might be different.

**Veridical decision making  
gets us through the day.  
Adaptive decision making  
gets us through life.**

**Does most course work in schools emphasize more veridical or adaptive decision making, or both about equally?**

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**Implications:**

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## E. WHY UNDERACHIEVING GIFTED STUDENTS?

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Percentage of underachieving gifted students in western cultures estimated at: \_\_\_\_\_ % or (decimal) \_\_\_\_\_

Total number of students in my school or district = \_\_\_\_\_  
(decimal) X \_\_\_\_\_

Approximate number of underachieving students = \_\_\_\_\_

How are we identifying them? \_\_\_\_\_

**F. IMPLICATIONS FOR GIFTED EDUCATION:**

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