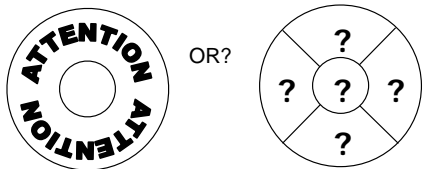


What is Attention?

Single Mechanism or Multiple Modes?



If attention is a single mechanism:

- Performance on all attention tasks should be positively correlated.

If attention consists of multiple modes:

- Task correlations should be sparse and organized.
- Relationships among attention modes revealed by correlations and principal components.

What are the individual differences?

- Do women with a high number of Attention Deficit/Hyperactivity Disorder traits differ in their attention performance?

Suzuki/Grabowecky Attention Battery

Series of 11 Attention tasks

Central Attention:
TASK: Is the central letter "T" or "S"?

Neutral condition: 4 T 4
Interference condition: S T S

MEASURE: $RT_{Interference} - RT_{Neutral}$
 $RT_{Neutral}$

Peripheral Attention:
TASK: Is the peripheral letter "T" or "S"?

Neutral condition: T 8 X
Interference condition: T S X

MEASURE: $RT_{Interference} - RT_{Neutral}$
 $RT_{Neutral}$

Grouping
TASK: Is the rectangle in the cued color horizontal or vertical?

MEASURE: $RT_{Interference} - RT_{Pop-out}$
 $RT_{Pop-out}$

Screen 1: Color Cue Screen 2: Pop-out condition Screen 2: Interference condition

Shifting Attention Between Objects

TASK 1. Single-object naming: name each object
TASK 2. Overlapped-object naming: name all 5 objects

MEASURE: $RT_{Overlapped} - RT_{Single}$
 RT_{Single}

Global Attention
Task: Are the coherently moving dots moving Linearly or Radially?
MEASURE: Proportion of coherently moving dots varies from 20-60%
MEASURE: Proportion Correct

Multiple Object Tracking
Task: Attentively track 4 initially flashed dots for 6 sec and then mouse click on them.
MEASURE: Number of successfully tracked dots
20 dots Speed = 8"/sec

Object Vigilance
Task: Respond "yes" to animals, furniture and clothing, and "no" to everything else. Targets appear 10% of the time.
MEASURE: $RT_{Non-Target} - RT_{Target}$
 RT_{Target}

Spatial Vigilance
Task: Respond "yes" targets that appear in the squares, and "no" to everything else. Targets appear 10% of the time.
MEASURE: $RT_{Non-Target} - RT_{Target}$
 RT_{Target}

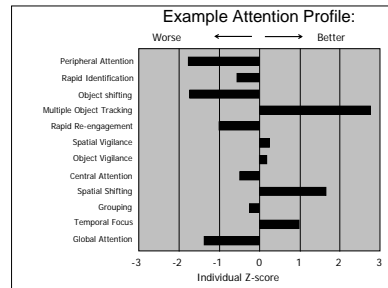
Rapid Identification
TASK: Identify briefly (30 ms) flashed (and masked) animals.
MEASURE: Proportion Correct

Spatial Shifting
MEASURE: Shifting Speed = Frame duration at 50% correct determined by 1 up 1 down staircase.

Temporal Focus & Rapid Re-engagement
TASK: Identify T1 and T2 digits
MEASURE: $P(T1 \text{ correct}) - P(T2 \text{ correct}) | T1 \text{ correct}$

Rapid Re-engagement
MEASURE: $P(T1 \text{ correct}) - P(T2 \text{ correct}) | T1 \text{ correct}$

Attention Profiles

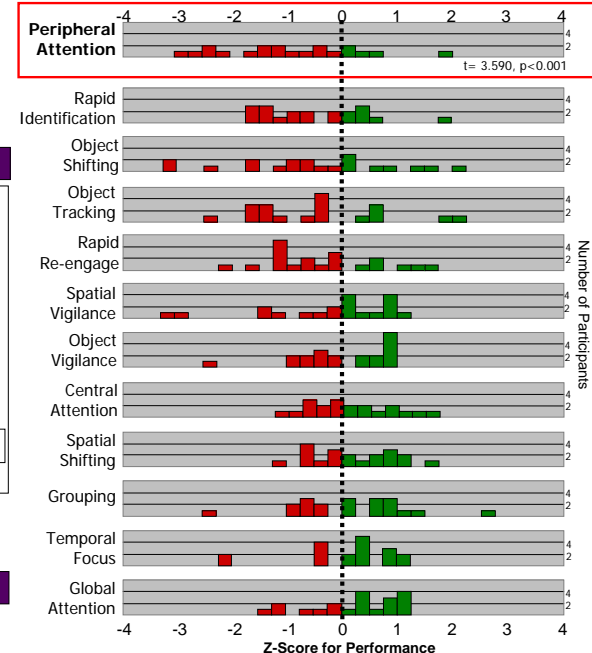


Women with High-ADHD-Traits

Selection Criterion: (non-clinical sample) Women who self reported a high number of ADHD traits (h-ADHD-t).

- 2 standard deviations above normed average on modified version of the DSM-IV Checklist for Childhood and Adult ADHD behaviors (Barkley & Murphy, 2006).
- 20 women, age 18-21 (mean 19.00)

Comparison Group: 116 Age and education matched women from normative database.



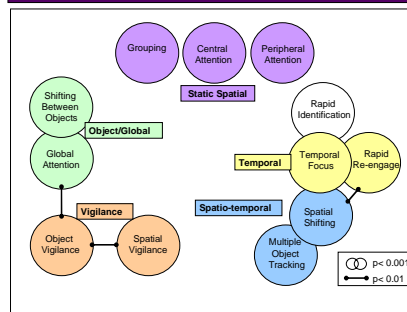
Neurophysiological Evidence for Multiple Modes of Attention

Attention ability	Target of operation	Primary neural substrates	Task
Focus	at a central location at peripheral locations at moments in time	IPS, FEF, ACC, SC, TN DLPFC, STG	Central focus Peripheral focus Temporal focusing, Rapid Object Id Global Motion
Distribute	to detect a global motion pattern	MT/MST, IPS	Global Motion
Maintain	to detect infrequent targets (vigilance)	DLPFC, TPJ	Object Vigilance
Shift	across spatial locations across overlapped objects rapidly from one engagement to next	SPL-IPS, SC, TN SPL, LOC, IT IPL, STG	Spatial Shifting Object shifting Rapid re-engagement
Track	multiple moving objects	SPL, IPS, FEF	Tracking

Suzuki/Grabowecky Visual Attention Battery

- 11 attention tasks based upon behavioral and neurophysiological research.
- 190 participants completed all 11 tasks within 2 hours.
- Between task correlations and principal components analysis revealed relationships.

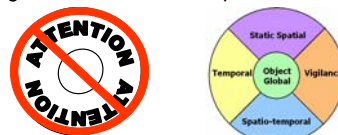
Structure of Attention



Correlational Relationships: Represented by overlap between ovals and connecting lines
Principal Components: Represented by colors

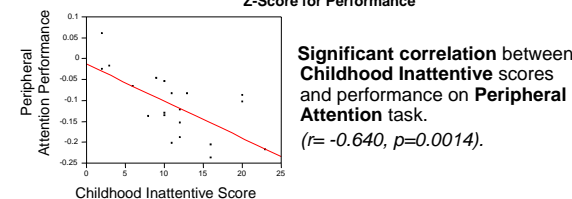
What is Attention?

Single Mechanism or Multiple Modes?



Evidence for Multiple Modes:

- Relationships among attention modes revealed by correlations and principal components.
- Task correlations are sparse and organized.



Women with high ADHD traits are selectively impaired at attending to peripheral locations, or perhaps inhibiting central items.