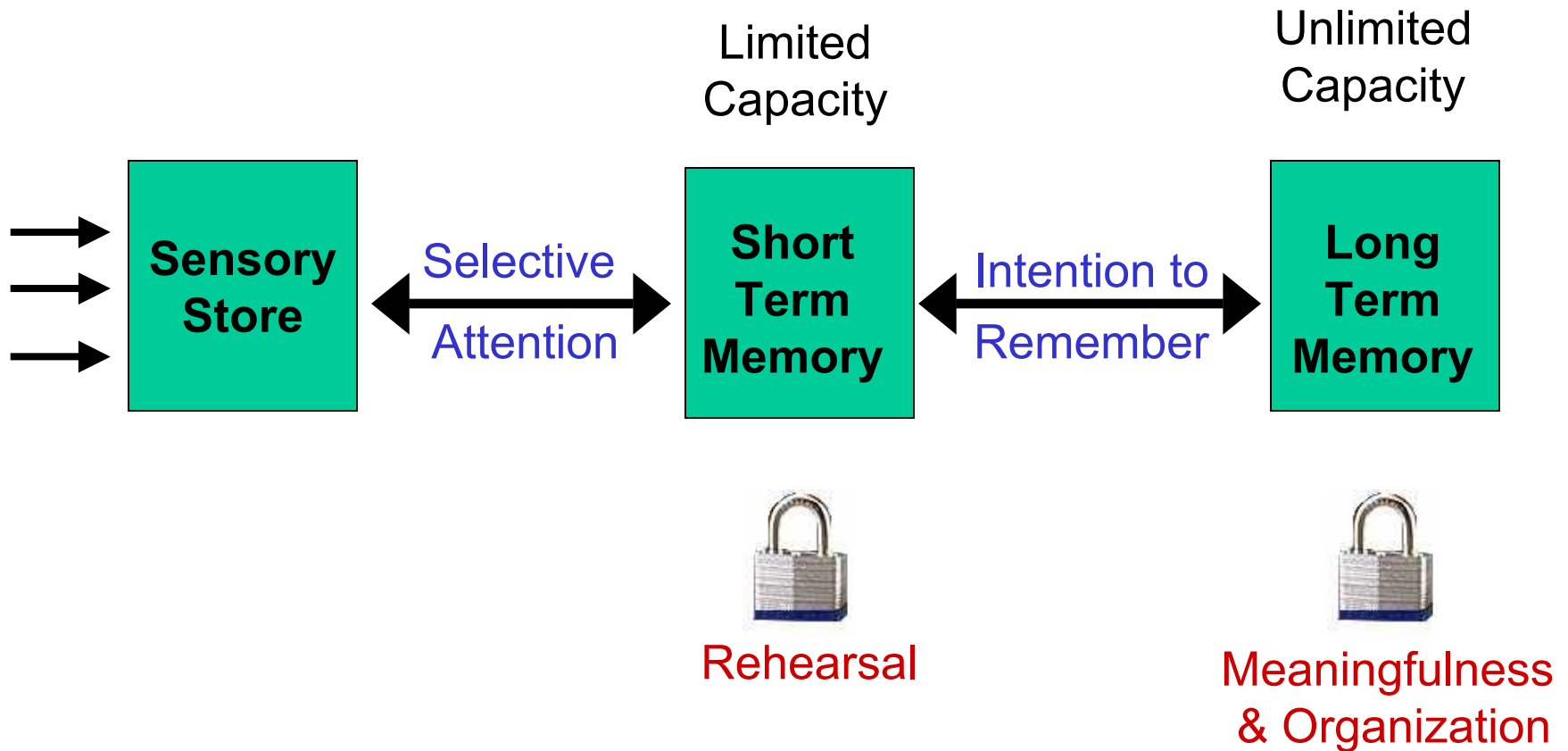


A Model of the Memory System



Information Processing Perspective

“Thinking is Information Processing”

Key Developmental Question: What Develops?

Structural Changes in the Info Processing System

Vs.

Changes in the Efficiency With Which a Child
Uses the System With Age

Sensory Memory - Sperling's Classic Study

G	W	C
K	P	X
U	E	S

Findings: matrix presented 1/20th of a sec

Recall of letters – 40%

If row signaled right after presentation – 80%

Age differences in auditory retrieval from sensory store

Short-Term Memory

Study These Numbers

8 1 6 4 4 9 3 6 2 5 1 6 9 4 1

Short-term Memory

Study These Numbers

9^2 8^2 7^2 6^2 5^2 4^2 3^2 2^2 1^2

Changes in Short-Term Memory Capacity

Use a Memory Span Test – Digits/letters/words
child/person tries to remember items in order
presented

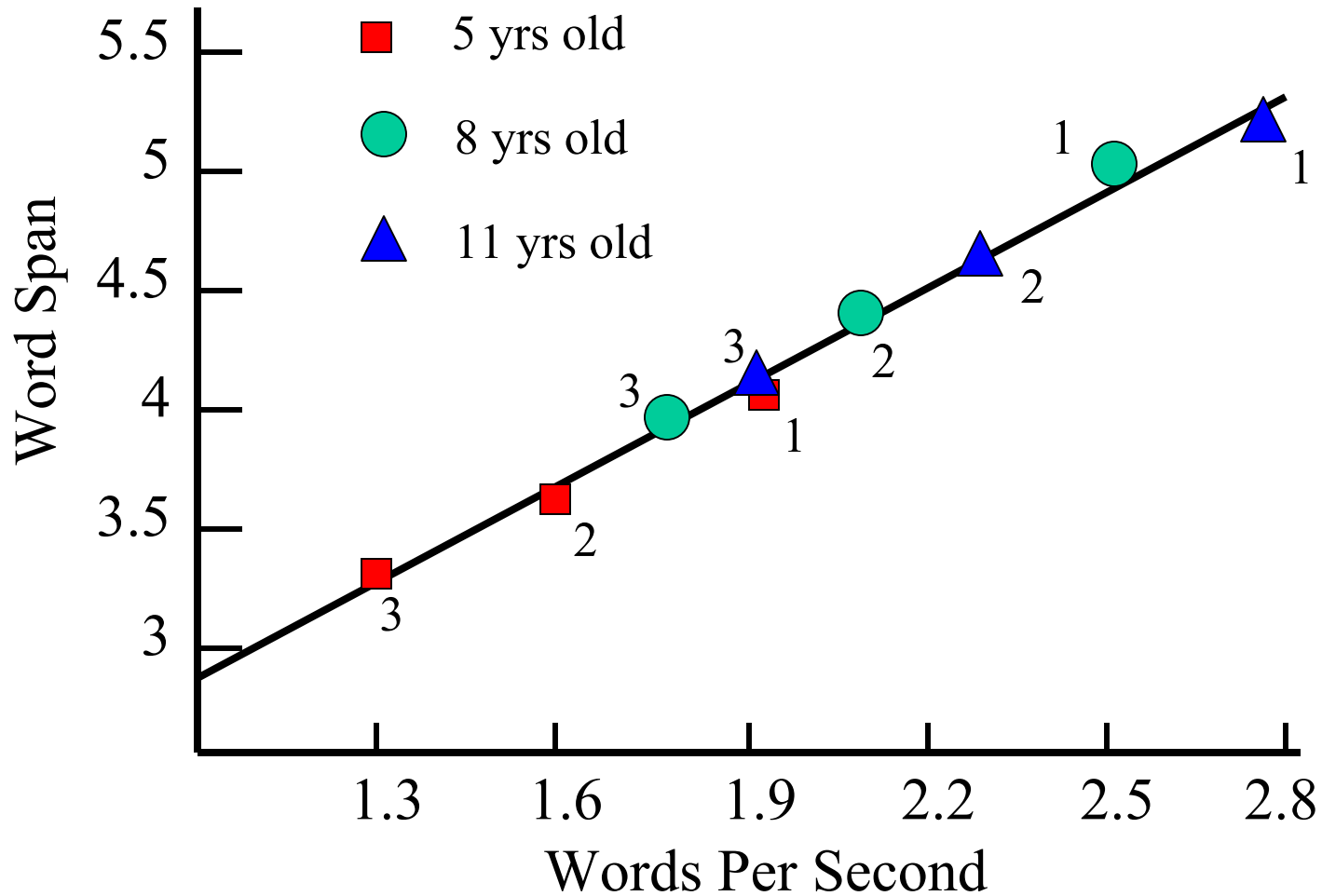
at 2 yrs – 2 items

at 4 yrs – 3 to 4 items

at 6 yrs – 4 to 5 items

by 9-10 yrs essentially adult levels, 7 ± 2

Memory Span, Pronunciation Rate & Age



Which Lists Are Easiest To Remember?

Wallet	Paint	Hill	Hill
Gelatin	Leg	Meat	River
Necklace	Gold	Saw	Lake
Bayonet	Newspaper	Scarf	Meat
Glacier	Cat	Cat	Corn
Kennel	Cup	River	Cake
Luggage	Party	Hammer	Saw
Smock	Machine	Bird	Hammer
Dynamite	Chair	Corn	Wrench
Windmill	Dollar	Skirt	Scarf
Sausage	Teacher	Snake	Skirt
Tulip	Pepper	Wrench	Hat
Trolley	Hill	Lake	Cat
Hive	Circle	Hat	Bird
Acorn	Snow	Cake	Snake

Which List of Sentences Are Easiest To Remember?

John walked on the roof

Bill picked up the egg

Pete hid the axe

Jim flew the kite

Frank flipped the switch

Alfred built a boat

Sam hit his head on the ceiling

Adam quit his job

Jay fixed the sail

Ted wrote the play

Santa Claus walked on the roof

The Easter Bunny picked up the egg

George Washington hid the axe

Benjamin Franklin flew the kite

Thomas Edison flipped the switch

Noah built a boat

Pat Ewing hit his head on the ceiling

Richard Nixon quit his job

Christopher Columbus fixed the sail

William Shakespeare wrote the play

From an Info Processing Perspective:

1) Children learn to make more effective use of their information processing system

Particularly they become more deliberate, more strategic, with age. Use of rehearsal, organization, imagery, semantic processing strategies increase

2) Basic cognitive operations become more automatic (through practice) and take up less cognitive capacity

Children can deal with more information and engage in more cognitively complex strategies

The Role of Automatization

Demonstration Study:

Step 1: you see “4 + 5”

Step 2: a fraction of a second, you see
(to the right of where you saw “4 + 5”)

“9”

Step 3: you are asked if the “9” was one of the
two addends (4, 5)

Key Finding: automatization arithmetic knowledge
inferred with performance

The Role of Automatization

How many different basic information processing skills are affected by automatization?

- Basic arithmetic skills
- Higher order math problem solving that relies on basic arithmetic skills
- Basic reading decoding skills
- Higher order reading comprehension skills that rely on basic decoding skills
- What else? Anything that involves keeping a plan in mind and implementing that plan
writing a passage/essay, for example

The Role of Encoding

Demonstration Study:

Step 1: 4 yr olds, 11 yr olds, & college students are shown a train carrying a ball. They are asked to predict the trajectory of the ball when its dropped out a hole as the train moves.

Key Finding: 70% of the children and quite a number of college students predict the ball will fall straight down.

When they see what really happens, they still claimed the ball went straight down, but had some explanation why it may have looked different.

The Role of Encoding

How many different cognitive tasks are affected by encoding processes?

- Piaget type tasks
- Memory type tasks
- Reading comprehension
- Math problem solving
- Scientific problem solving
- Infant habituation rates (related to IQ)