

# How Deaf Children Learn

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# Why Am I Here?



聾童如何學習

Translated by  
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OXFORD  
UNIVERSITY PRESS

# how deaf children *learn*

WHAT PARENTS AND TEACHERS  
NEED TO KNOW



# Why Am I Here?

- “Deaf children are not hearing children who can’t hear”
- Deaf students can learn as much as hearing peers when taught by skilled teachers of the deaf



# What Do We Know and Need to Know?

- What are the cognitive differences between deaf and hearing learners (and among deaf learners)?
- How do cognitive differences affect language comprehension, literacy, and learning?
- How do (some) teachers deal with those differences in teaching methods and materials?



# Cognitive Differences likely to Influence Learning Outcomes for Deaf Students

- Memory
- Visual information processing
- Concept learning and knowledge organization
- Executive functioning and metacognition

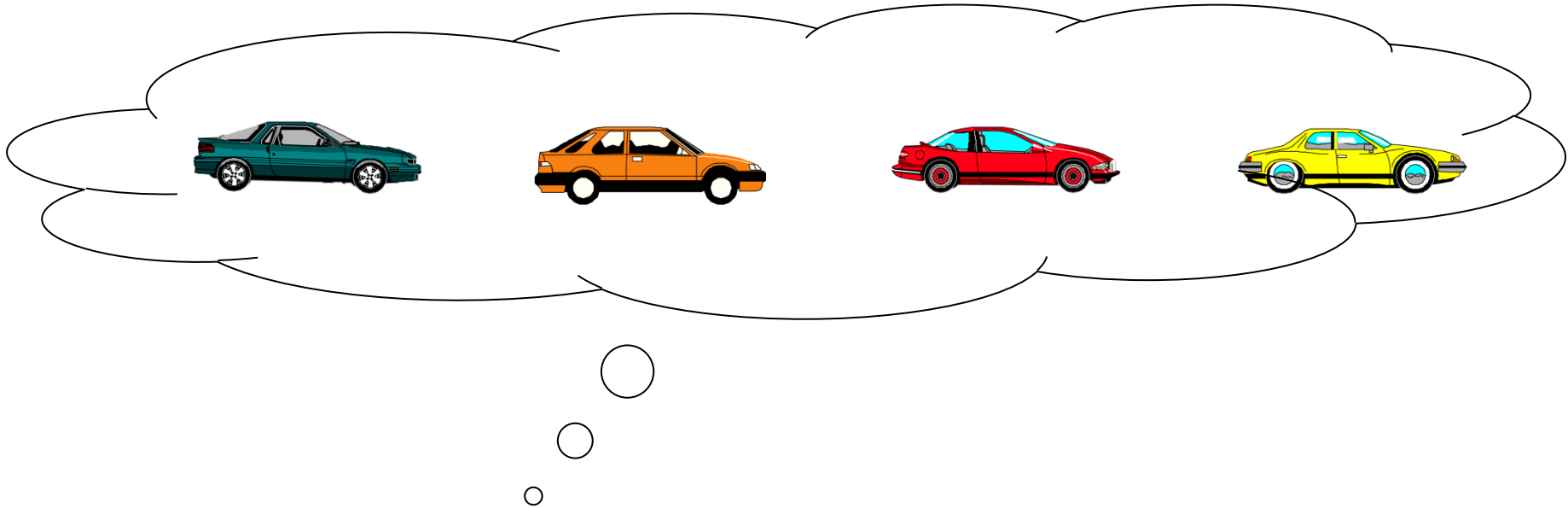


# Memory

- Hearing adults and children > deaf adults and children, especially (but not only) in memory for sequential information
  - Words, signs, text (*Banks et al., 1990; Krakow & Hanson, 1985*)
  - Figures, pictures (*Blair, 1957; Liben, 1979*)

...so it's not just about language
- Native signers have better visual-spatial memory than sequential memory, and better than hearing non-signers (*Hall & Bavelier, 2010*)





There are 4 cars.

The orange car is faster than the green car.

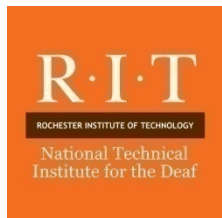
The red car is faster than the orange car.

The yellow car is faster than the red car.

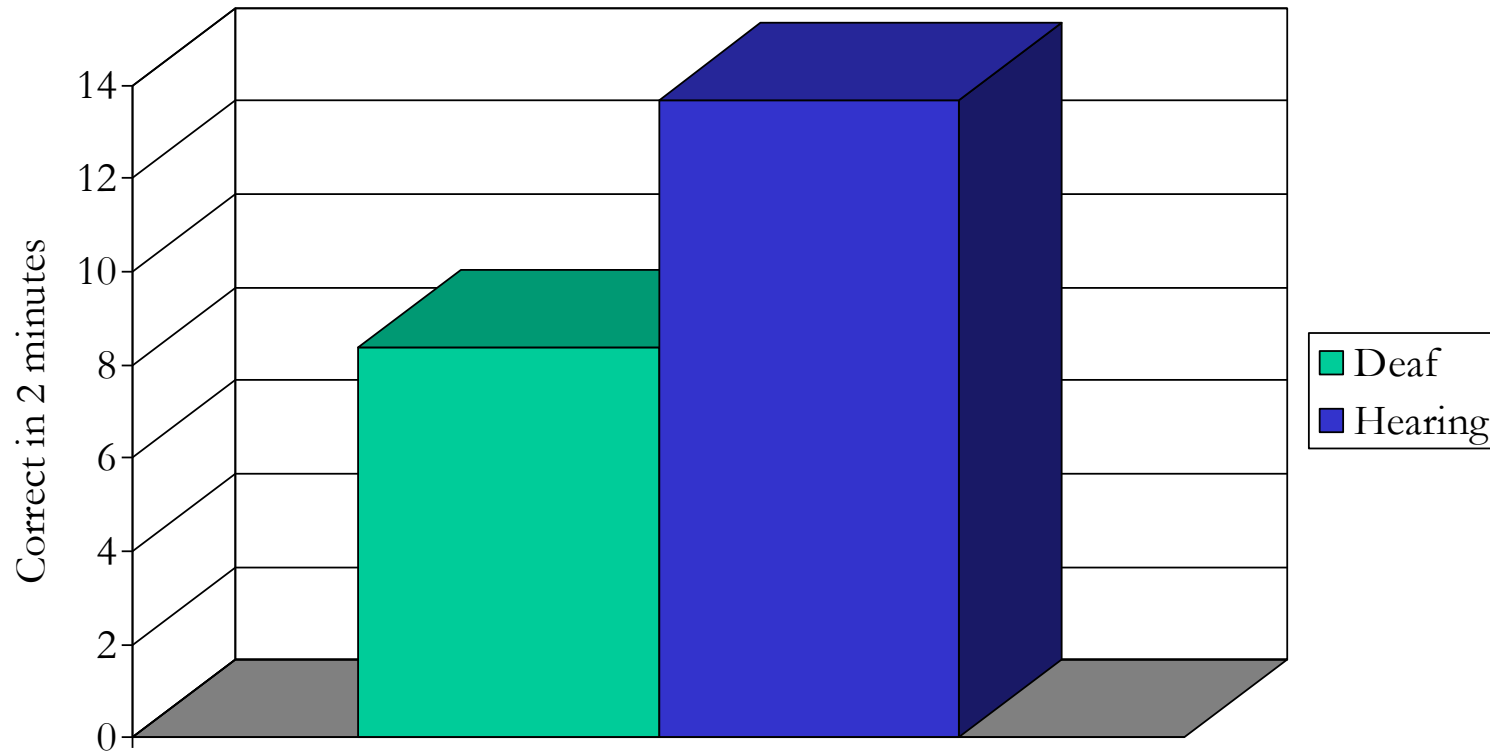




*Is the yellow car is faster than the green car?*



# Four-Term Series Problems



# What Do We Know and Need to Know?

- Memory [*short-term memory* or *working memory*]
- Having an ability is not the same as knowing when and how to use it
- Can we teach it?
- How can we use it in the classroom?



# Cognitive Differences likely to Influence Learning Outcomes for Deaf Students

- Memory
- Visual information processing



# What We Know vs. What We Think We Know about Educating Deaf Learners

- Deaf children are “visual learners”

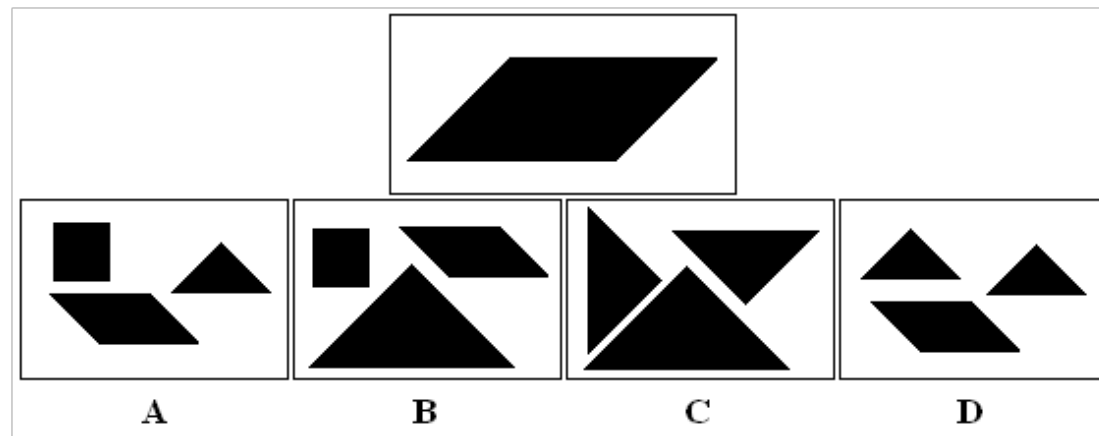
*(Marschark & Hauser, 2012)*

- Signers faster, more accurate than nonsigners generating complex visual images *(Emmorey et al., 1993)*



# Deaf Children are “Visual Learners”

- Do deaf learners have better visual-spatial skills?



- Hearing learners  $\geq$  deaf learners  
(*Blatto-Vallee et al., 2007; Morrison et al., 2012*)



# Deaf Children are “Visual Learners”

- Deaf children are “visual learners”
  - Hearing learners  $\geq$  deaf learners in visual-spatial skills  
(*Blatto-Vallee et al., 2007; Morrison et al., 2012*)
  - No difference between early and late signers
  - Less hearing is linked to better scores
  - Performance predicts deaf students’ math scores
- Having an ability is not the same as knowing when and how to use it



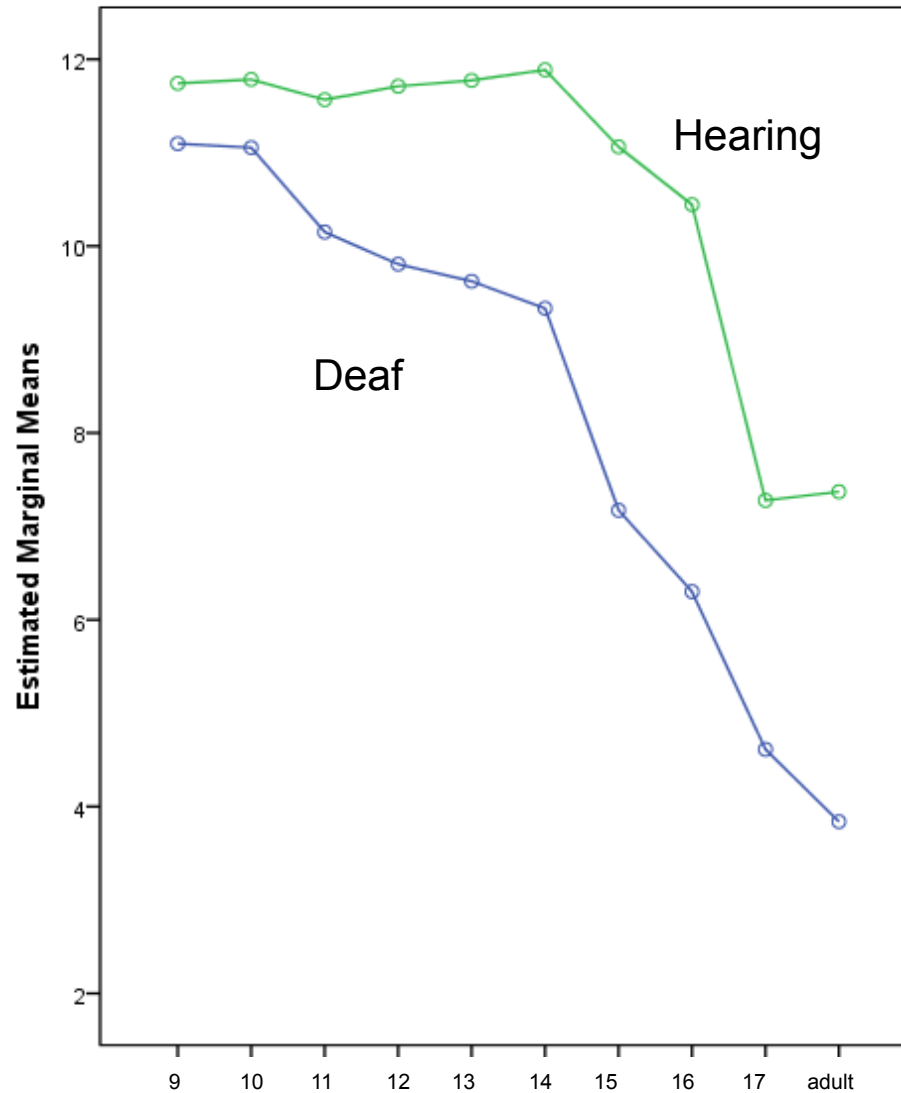
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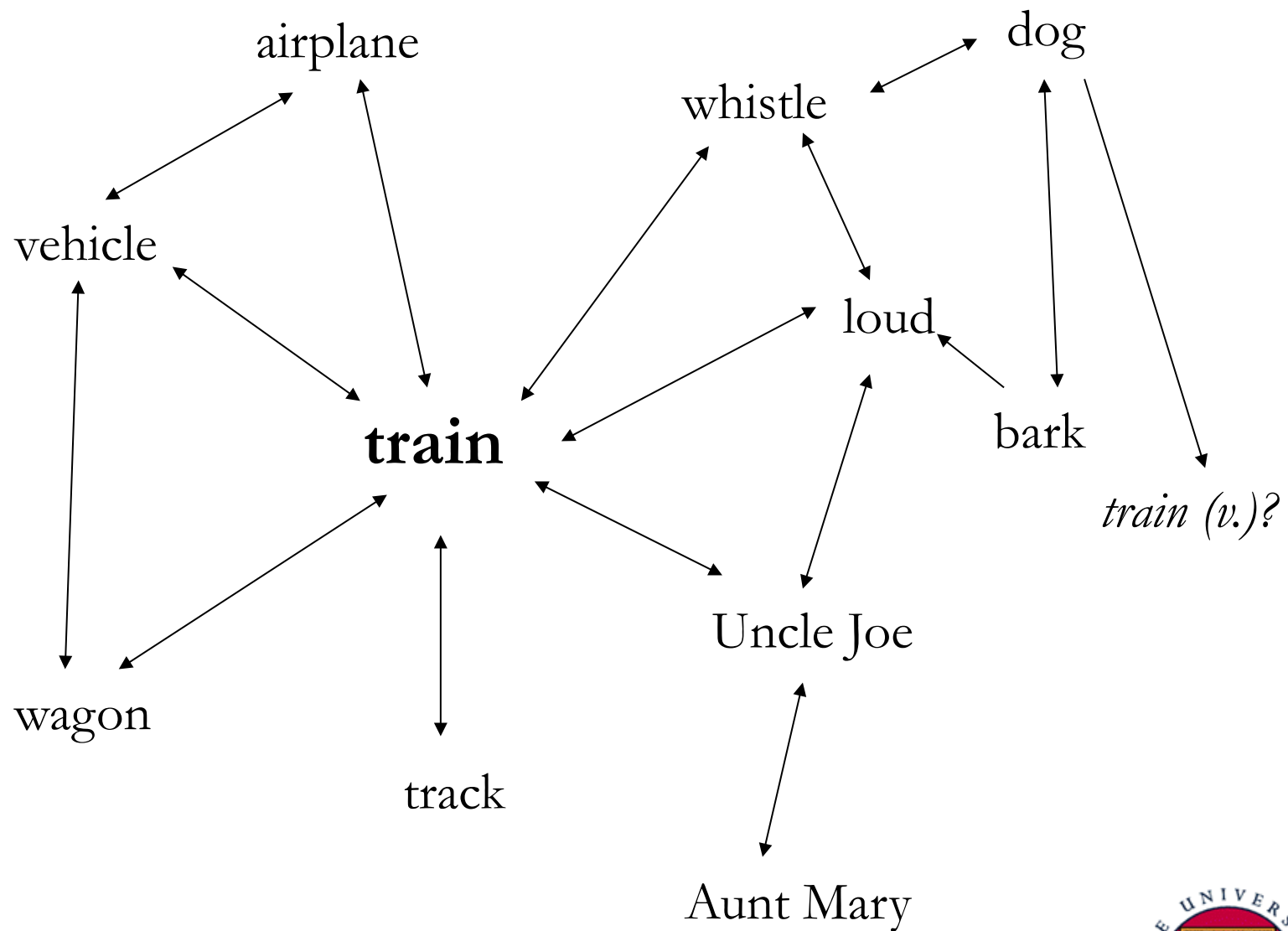
- Memory
- Visual information processing
- Concept learning and knowledge organization  
[*Semantic or long-term memory*]





# PPVT Scores of University Students





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# What Do We Know and Need to Know?

- Concept learning and knowledge organization
- Do deaf and hearing learners acquire concepts in similar ways? (*Marschark & Woll, 2012*)
- How are concepts activated by signs, words, and things? (*Hermans, Knoors, Ormel, & Verhoeven, 2008*)
- How do these differences affect their use in the classroom?



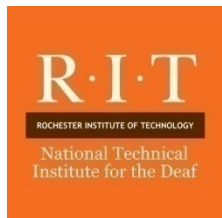
# Cognitive Differences likely to Influence Learning Outcomes for Deaf Students

- Memory
- Visual information processing
- Concept learning and knowledge organization
- Executive functioning and metacognition



# Executive Functioning and Metacognition

- “Higher-order cognition”
  - Controlling of one’s own behavior
  - Self-monitoring of comprehension and learning
  - Knowing when to use context and prior knowledge



# Bottom-up and Top-down Aspects of Reading

**TOP**

Knowledge

conceptual  
(words, things)

strategic  
(problem solving)

metacognitive / metalinguistic

---

discourse structure

grammar

vocabulary

morphology

phonology/orthography

**BOTTOM**

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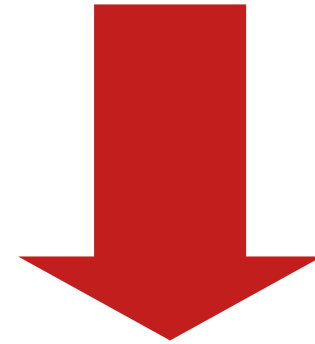
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# Bottom-up and Top-down Aspects of Reading



*What you know*



*Words on the page*



# Language Comprehension Involves Bottom-up and Top-down Processing

**TOP**

Knowledge

conceptual  
(words, things)

strategic  
(problem solving)

metacognitive / metalinguistic

---

discourse structure

grammar

vocabulary

morphology

phonology/orthography

**BOTTOM**

**CERP**

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# Learning (Concepts, Language, Academic, and Social) Involves Bottom-up and Top-down Processing

**TOP**

Knowledge

conceptual  
(words, things)

strategic  
(problem solving)

metacognitive / metalinguistic

---

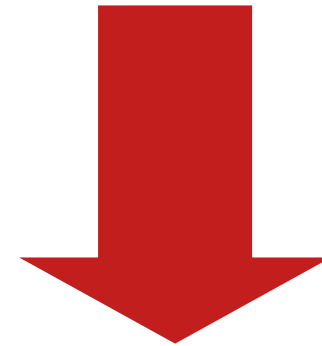
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**BOTTOM**

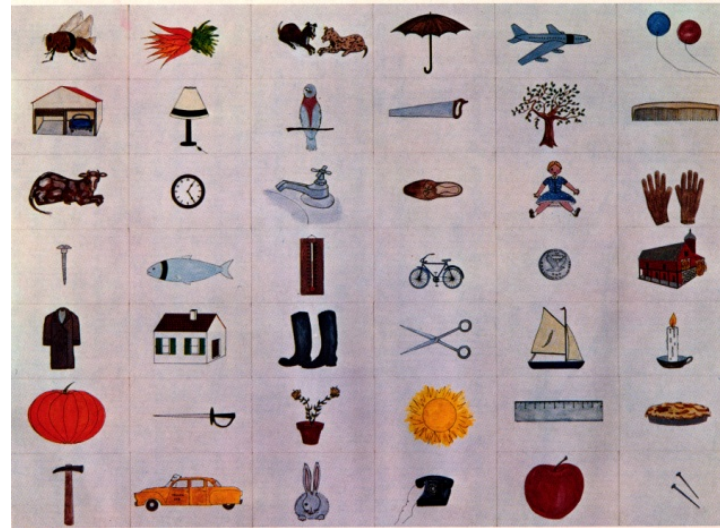
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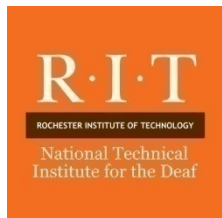




Liben (1979)



Marschark & Everhart (1999)



# What Do We Know and Need to Know?

- Executive functioning and learning
- Having knowledge is not the same as knowing when and how to use it
- How can we teach deaf students to better monitor language comprehension and learning?
- How can we increase their use of knowledge we know they have?





The TERENCE Project

FP7- ICT-257410

<http://www.terenceproject.eu>







"TRAFFIC JAM"

# WHICH IS THE CAUSE?

## INSTRUCTIONS

Your avatar needs help. Choose the correct image. Careful: two mistakes and you lose!

2 POINTS



The passengers do not remove Anabel from the roadside



**Cause**



**Effect**



The dog stands right in front of Anabel



Sophie sits in the back row of the bus



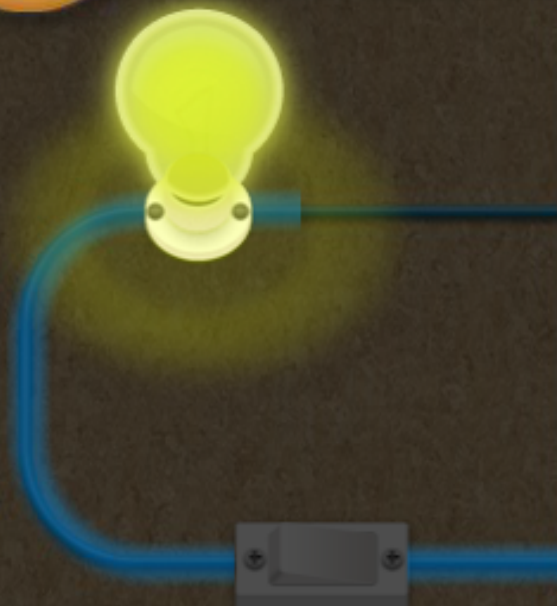
Sophie visits the new Sport Complex

While  
After

# SMART GAMES

2 GAME POINTS

1 TOTAL



Sophie and Mitch spread out their towels on the terrace.

Ben and Luke decide to have a race.

Sophie gives Ben a friendly speech about winners and losers.

QUESTION:

What happens during? What happens after?

SKIP >

Sophie and Ben go to the new Sports Complex in town.

Sophie gives Ben a friendly speech about winners and losers.

Sophie and Mitch spread out their towels on the terrace.



# What Does It All Mean?



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# What Does It All Mean?

- Deaf students' challenges in school are related to differences in language comprehension, cognition, and learning strategies, not just language modality
- Deaf and hearing children have different knowledge, backgrounds, experiences, and learning strategies





# What Does It All Mean?

- Differences  $\neq$  disabilities
  - Cognitive differences can be strengths, weaknesses, or just differences, but all add to diversity in the classroom
- Deaf students can learn as much as hearing peers when taught by skilled teachers of the deaf
  - Teachers (and students) must understand the differences and adjust to them



# Take-Home Messages



# Take-Home Messages

- Don't believe everything you read
- Beware generalizations (and simple answers)
- Deaf children aren't hearing children who can't hear
- If we want to improve literacy and academic outcomes, it's not just about language
- We need to ask the right questions, even if they are difficult questions



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