

Elementary school students' ability to activate related concepts in a domain predicts domain-based inferential comprehension

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Inferences are critical for comprehension

ability to make inferences is linked to reading comprehension
(Cain & Oakhill, 1999; Cain, et al., 2001; Oakhill, 1984; Yuill & Oakhill, 1991)

prediction mechanisms have been implicated in language comprehension
(Borovsky, Fernald, & Elman, 2012; DeLong, Urbach, & Kutas, 2005; Kamide, Altmann, & Haywood, 2003)

Inferences rely on semantic knowledge

semantic knowledge theorized to support inferences about known items
(Coley et al., 2004; Medin et al., 1997)

individual differences and changes in aspects of semantic knowledge are related to ability to make domain-consistent inferences
(Coley, 2012; Fisher, Godwin, & Matlen, 2015; Fisher, Godwin, Matlen, & Unger, 2015)

The present study

Hypothesis: the activation of related concepts in semantic memory supports the ability to make inferences when encountering new information.

Two tasks:

(1) co-activation of related concepts (visual search task):

domain	target	related
natural kinds	bone	dog
	plant	watering can
	crocodile	owl
music	drum	guitar
	flute	harp
sports	basketball	racket
	medal	trophy

(2) inferential comprehension task:

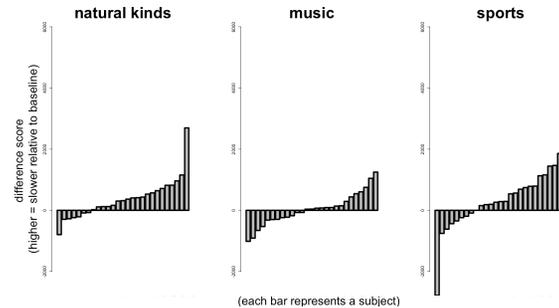
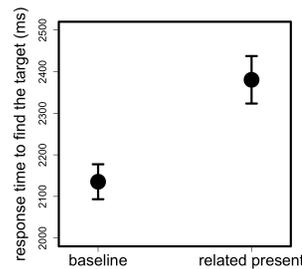
In an orchestra, there are many different instruments. Instruments are organized into families. The three main families of instruments are percussion, string, and brass. Percussion instruments make sounds when they are hit or when they are shaken. The vibrations of the instrument is what produces the sound. Instruments like the drum or the maracas are percussion instruments. **Question:** Which family of instruments make sounds when they are played or shaken? (a) percussion (b) string (c) brass

The harp is one of the simplest instruments, having to vibrate on other sound-changing devices. Different sounds result from how the musician shapes their finger. **Question:** Which family of instruments does the harp belong to? (a) percussion (b) string (c) brass

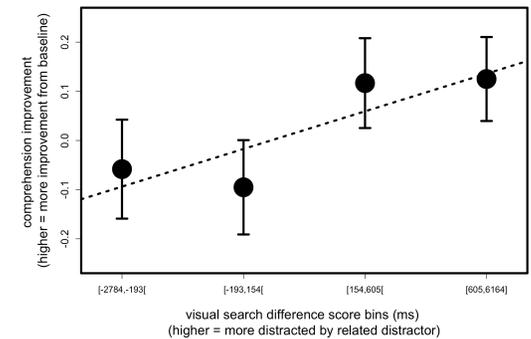
The tromba is a popular instrument in America. It is made of a metal frame with a mouthpiece on one side and a thin piece of wire stretched across the frame. The tromba makes sound when the musician's mouth touches with the tromba's mouthpiece. **Question:** Which family of instruments does the tromba belong to? (a) percussion (b) string (c) brass

N=27
2nd & 3rd graders

Children co-activated related concepts in the visual search task



Stronger co-activation of related concepts predicted better inferential comprehension



$p = 0.06$
(accounting for individual differences in co-activation of concepts in a control, unrelated domain)

Take-home message

Ability to co-activate concepts in a domain predicted ability to make inferences when encountering new information in that domain.

Implications for accounts of comprehension (language comprehension, reading comprehension).

Implications for designing effective interventions for students who struggle to comprehend new information in academic contexts (e.g., reading comprehension should be improved by improving ability to access related concepts).

Acknowledgments

We thank R. Almasi, K. Boyle, H. Do, and A. Vande Velde, for their help with stimuli creation data collection, and coding; and our partners in the community for making this research possible.

This research was supported by the James S. McDonnell Foundation 21st Century Science Initiative in Understanding Human Cognition – Scholar Award (220020401) to A.V.F.

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