





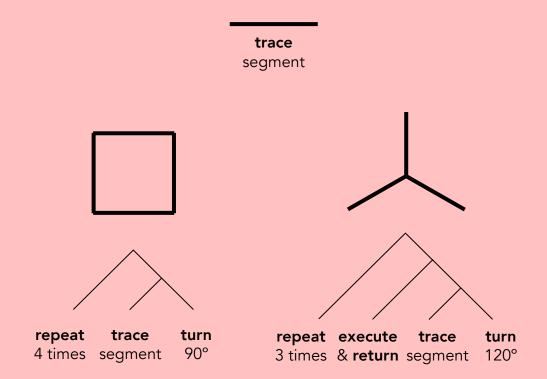




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# Background

We build on the recent proposal that geometric shapes are represented in a language of thought (LOT) consisting of a handful of primitives that combine to recreate the encoded shape (Sablé-Meyer et al. 2022)



Sablé-Meyer et al. (2022) found that adults' reaction times and error rates in match-to-sample tasks were predicted by the minimum description length (MDL) of the shape's LOT program

This fuses two features of geometric shape representations that are partly independent, format (LOT) and selection (MDL), and uses MDL data to argue for LOT—Highly indirect evidence

We report more direct evidence for tree structure in geometric shape representations from three online experiments with adults



# Geometric shape representations in human adults have syntactic structure

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# **Experiment 1: Structural Ambiguity**

Different structured representations can be induced for the same shape

Samples		Targets			
Shape	Structure	Matches		Deviants	
		Congruent	Incongruent	Modified congruent	Modified incongruent
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	┌∕ + ┌╱	$\prod$	$\mathcal{C}$	$\prod$	$\prod$
Error rates					
	Matches	D	eviants		
0	4-	***	**		
0.	3 <b>-</b>			50 subjects	S
				16 shapes	
0	2-			256 trials	
0.	0-	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		Within-sub	pjects

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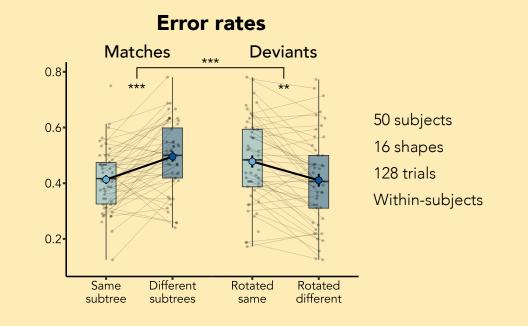
congruent incongruent

Congruent Incongruent

# **Experiment 2: Subtree Facilitation**

Subparts are easier to recognize when they belong to the same subtree

Samples				Targets			
Shape	Structure	Overlap	Matches		Deviants		
		·	Same subtree	Different subtrees	Rotated same	Rotated different	
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# **Experiment 3: Movement Depth**

Shapes are easier to reconfigure when they are split higher up in the tree

