

Focus

Do concrete or abstract labels facilitate four-year-olds' performance on a relational patterning task?

Does the way in which children describe their patterns matter?

Background

Relational reasoning is a fundamental component of cognition and development (Gentner & Loewenstein, 2002).

Most four-year-olds can **detect** similar relations (Son, Smith, & Goldstone, 2011), and the **presence of labels** can support this ability (Gentner & Ratterman, 1991).

However, little is known about children's ability to **generate** similar relations and if the **type of label** matters.

Type of Label

Abstract labels are generic & arbitrarily linked to referents.
 + draw attention to structure
 + support concrete/abstract link
 + shared across relations

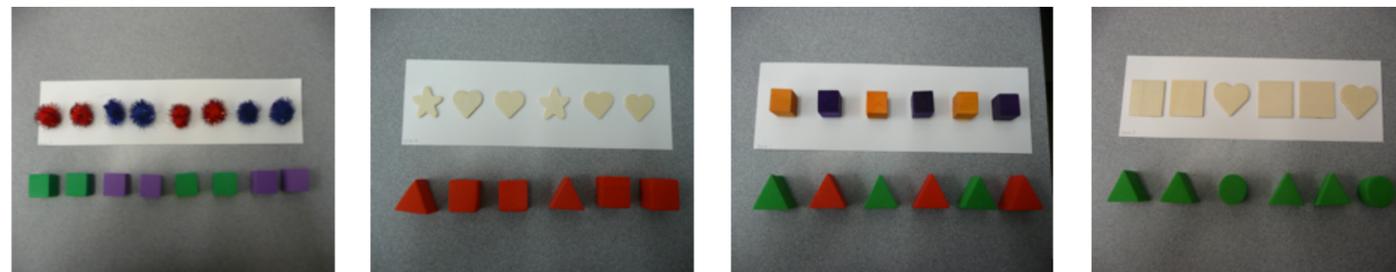
Concrete labels are familiar & reference perceptual features.
 + connect with prior knowledge
 + developmentally accessible
 + highlight key elements

(Fyfe, McNeil, Son, & Goldstone, 2014; Kaminski et al., 2009)

Method

Participants: 62 preschoolers (*M* age = 4.4)

Task: After seeing three examples, solve and describe eight pattern abstraction tasks (recreate the relation in a pattern using novel materials)



Conditions

Concrete: Experimenter referred to color or shape of pattern elements ("red-red-blue-blue")

Abstract: Experimenter used arbitrary, conventional naming system ("A-A-B-B")

Conclusions

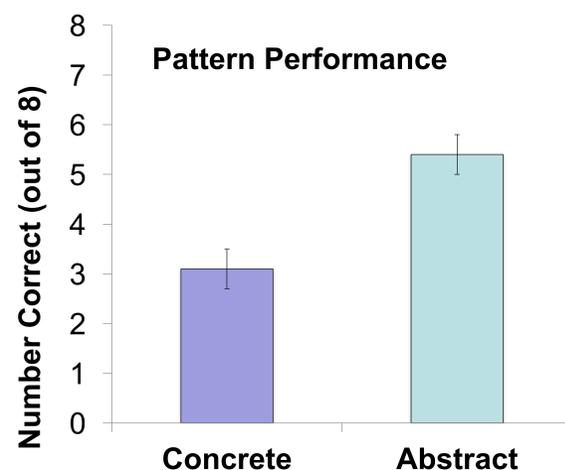
Using abstract language to describe patterns facilitates children's relational reasoning

Children exposed to abstract, letter labels generated more correct patterns than children exposed to concrete labels.

Children's adoption of the abstract language was key.

In line with previous work, children's abstract descriptions predicted pattern performance (Rittle-Johnson et al., 2013)

Results



Abstract significantly outperformed concrete, $F(1, 58) = 14.67, p < .001, \eta_p^2 = .20$

Children's Descriptions

Many children used familiar, concrete labels. Children in the abstract condition also used the abstract labels (either correctly or incorrectly). See table below.

Descriptions Predict Performance

Correct AB: positively related to score, $r = .60, p < .001$

Incorrect AB: negatively related to score, $r = -.24, p < .03$

Vague Concrete: negative related to score, $r = -.42, p < .001$

Frequency of Correct AB descriptions mediated the relation between condition and performance, $p < .05$.

Type	Example (reference to ABBABB sequence)	% use across all eight trials		% children who used at least once	
		Concrete	Abstract	Concrete	Abstract
Correct AB	"It goes A, B, B, A, B, B"	0*	55	0*	77
Incorrect AB	"It goes A, B, A, B, A, B"	0*	19	0*	47
Correct Concrete	"Red, blue, blue, red, blue, blue"	75*	12	94*	30
Vague Concrete	"Red triangles"	20	8	41*	17
Random	"Dinosaurs"	1	6	3	7
No Response	"I don't know"	4	1	19	7

Implications

Minor differences in language input can impact how children reason (Gentner, 2003). Using letters to label patterns can be beneficial.

Abstract language may provide one way to link concrete learning materials and the ideas they are intended to represent.

References

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