Colorful Success: Preschoolers' Use of Perceptual Color Cues to Solve a Spatial Reasoning Problem

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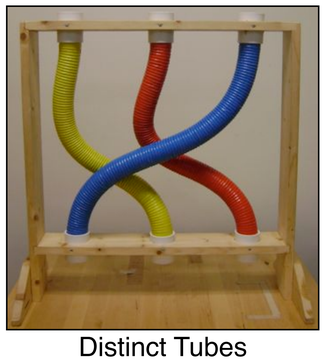
Background

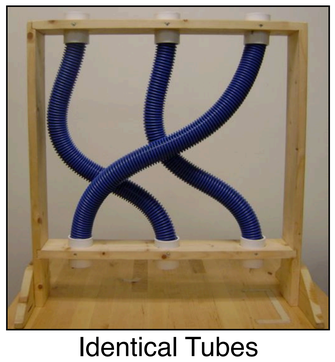
- Prompting preschoolers to use a problem-solving strategy can improve their ability to solve a difficult spatial problem (e.g., Bascandziev & Harris, 2010; Joh, Jaswal, & Keen, 2011)
- **Q**: Can perceptual color cues improve children's spatial reasoning skills? Does learning to use color cues help children adopt a more general problem-solving strategy?
- **A**: Color cues can help children solve difficult spatial problems, but they do not generalize into a useful strategy

Method

- 48 36- to 42-month-old children
- *M* age = 39 mos, *SD* = 2.15; 24 girls
- A ball is dropped down one of three intertwined tubes and participants are asked to predict where it will emerge (modeled after Hood, 1995)



Distinct Tubes



Identical Tubes

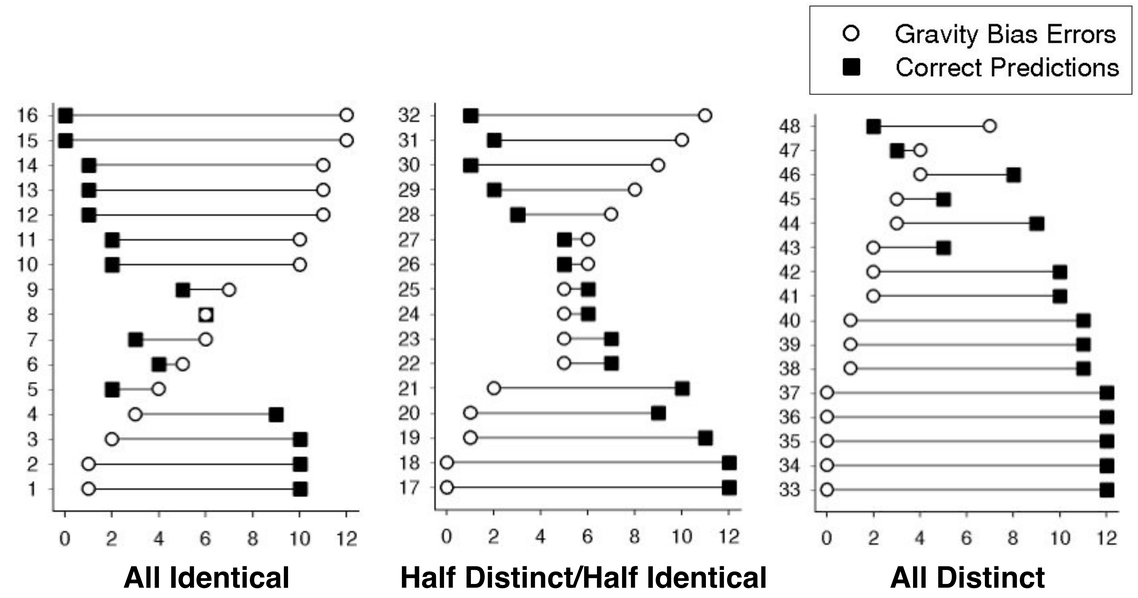
Experimental conditions (each n = 16)

- ***All Distinct***: 12 trials with colored tubes
- ***Half Distinct/Half Identical***: 6 trials with colored tubes followed by 6 trials with identical tubes
- ***All Identical***: 12 trials with identical tubes

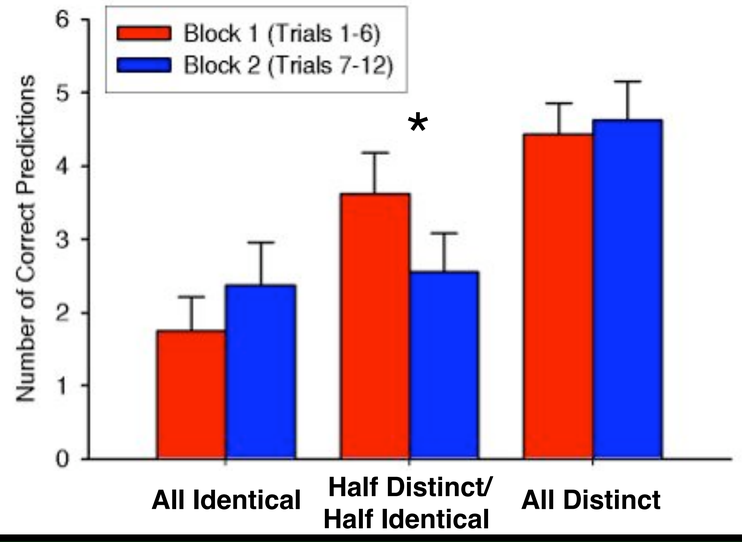
Patterns of Predictions

Group means (SD) by prediction type (out of 12 trials)

	Correct	Gravity Error	*p*
All Identical	4.13 (3.74)	7.00 (4.03)	0.15
Half Distinct/ Half Identical	6.19 (3.80)	5.06 (3.94)	0.54
All Distinct	9.06 (3.43)	1.88 (1.96)	< .01



Effectiveness of Color Cues



- Overall, color cues were useful: Children made correct predictions on 70.5% of color trials vs. 37.2% of identical trials
- However, the color cues did not prompt children to adopt a general problem-solving strategy
- In the Half Distinct/Half Identical condition, children reverted to gravity bias errors as soon as the color cues were removed:
  - Trial 6: 62.5% correct
  - Trial 7: 25.0% correct

Switching Strategy

- Although children did not switch frequently (14.4% of trials), they did benefit from switching
- Children in All Identical condition switched more than those in Half Distinct/Half Identical condition ($p = .06$)
- Switching was most helpful when there were no color cues (All Identical): Correct on 82.1% of switch trials vs. 22.2% of no-switch trials

	All Identical	Half Distinct/ Half Identical	All Distinct
Initially Correct Choice	34	88	132
Initially Incorrect Choice	158	104	60
No Switch	119	87	40
Switch	39	17	20
Switch to Incorrect	7	5	1
Switch to Correct	32	12	19
Total Correct Predictions	66	99	145

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