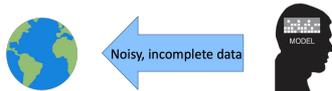


A Local Bias in Mental Model Updating

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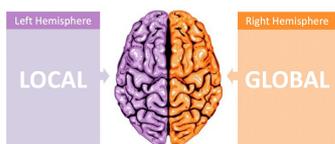
Deficits in Updating our Mental Models



Mental model updating deficits occur when:

- Right or left insula is damaged (1).
- Probabilities are manipulated among patients with left or right brain damage (2).

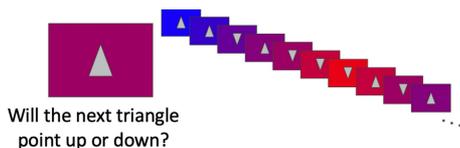
Global and Local Properties



The current study explored how this global-local distinction (3) unfolds in mental model updating.

A Novel Global-Local Updating Task

Participants (n=72) completed our online task.



Global probability

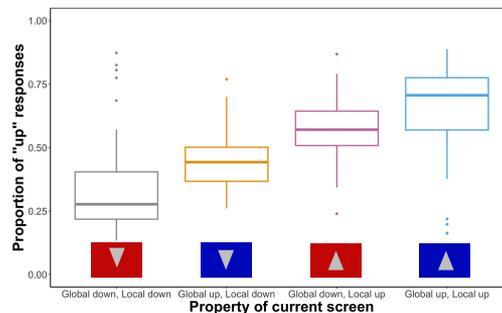
- Red background: 80% chance next triangle is down.
- Blue background: 80% chance next triangle is up.

Local probability

- 80% chance next triangle is the same as the current triangle.

Local Probability Significantly Predicts Participants' Choices

Participants' probability of choosing *up* according to the global and local properties of the current screen.



Multiple logistic regression model predicting participants' choice for the next triangle's direction.

The model was a significant fit to the data ($\chi^2 = 18.39, p < .001$).

Variable	B	SE	β	OR [95% CI]
Constant	-0.70**	0.25		0.50 [0.30, 0.80]
Local	0.99**	0.35	2.66**	2.69 [1.38, 5.36]
Global	0.47	0.34	1.27	1.60 [0.82, 3.17]
Global x Local	-0.09	0.49	-0.25	0.91 [0.35, 2.37]

Note. B = unstandardized coefficients; SE = standard error of estimate; β = standardized coefficients; OR = odds ratio; CI = confidence interval

* $p < .05$. ** $p < .01$. *** $p < .001$

Why Did Our Task Lead to a Local Bias?

Our data show that participants based their guesses primarily on the local probability.

Was the local bias due to global probability not being salient enough?

Data from feedback questions show that participants detected the global probability to a lesser extent than the local probability. This may be due to the global probability occurring in the background, rather than within the triangle itself.

Was the local bias due to a local precedence effect for non-visual tasks?

Visual perception research has argued for a universal global bias (4). In the limited prior work on global and local probabilities, a local bias may be more common than anticipated. For example, a modified Posner cueing task with global and local probabilities co-occurring, detected a local bias in participant performance (5).

References

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