

## Introduction

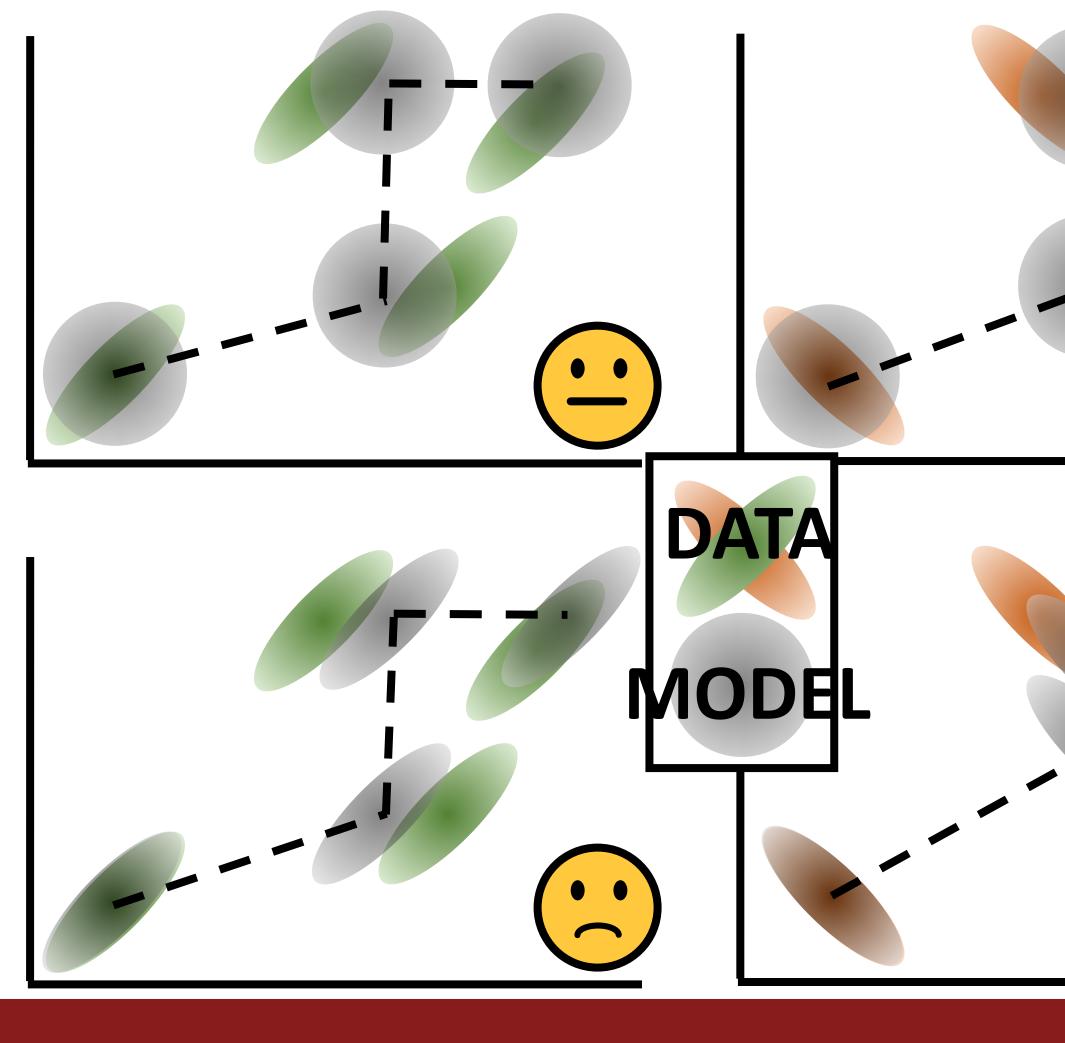
• Debates focus on single vs. dual process

• State-Trace Analysis can probe latent dimensionality

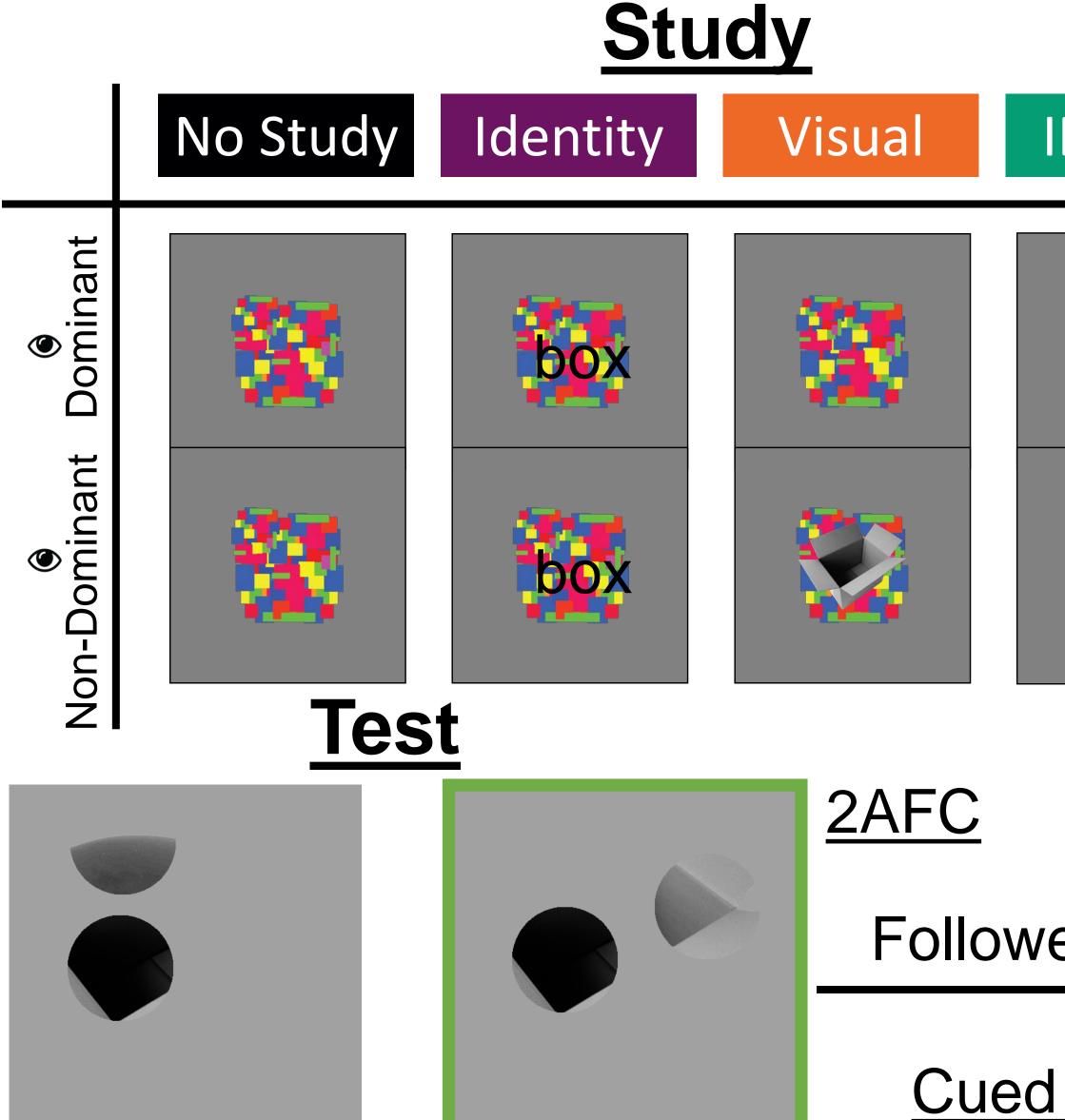
• Challenge: Inferences often assume task performance independence

 Participant, Item, and Condition effects can all induce dependencies

#### **Monotonic Model Fi**



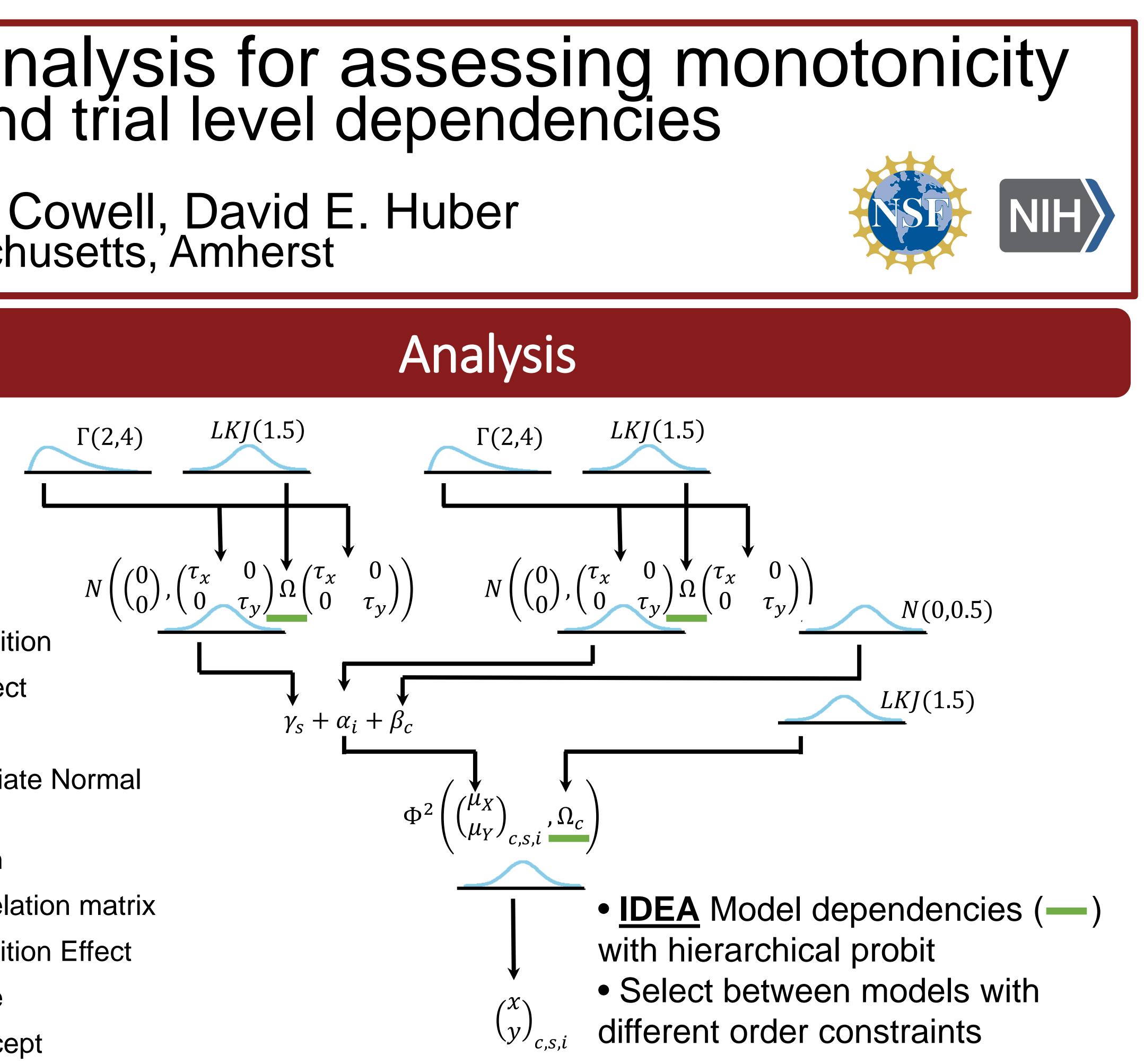




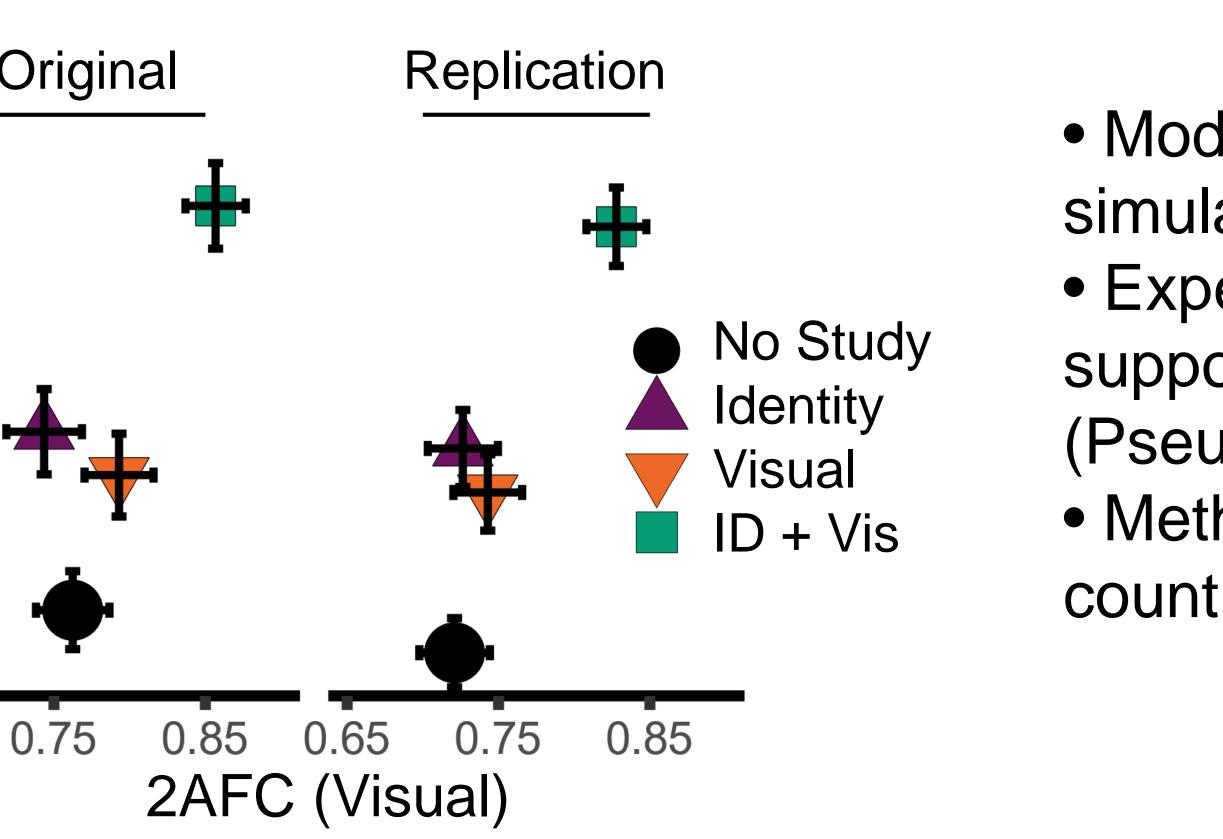
# A hierarchical Bayesian state trace analysis for assessing monotonicity factoring out subject, item, and trial level dependencies

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ΙΟΠ		
t Solution	<ul> <li>Monotonic</li> <li>1 or more</li> <li>latent</li> <li>dimension</li> </ul>	
ts Fits	<ul> <li>Non- Monotonic</li> <li>2 or more</li> <li>latent</li> <li>dimensions</li> </ul>	$x, y$ Data $c$ Condit $s$ Subject $i$ Item $\Phi^2$ Bivaria $CDF$
	Current Methods	$\mu$ Mean $\Omega$ Correla $\beta$ Condit $\tau$ Scale $\gamma, \alpha$ Interce
ata		(Identity) 0.6 0.5
	Predicted Performance ★	0.65 (0
	Provide the second seco	<ul> <li>State-Trae</li> <li>Sensitivity</li> </ul>
ed by		<ul> <li>Bamber (1979) S</li> <li>Prince, Brown, H</li> <li>Sadil, Potter, Cov Are Independent</li> </ul>



#### Results



### Discussion

ace Analysis ought to be sensitive to correlations in task performance ty to correlation achieved with parametric assumptions

# References

State-trace analysis: A method of testing simple theories of causation. J. of Math. Psych., 19(2), 137-181. Heathcote (2012). The Design and Analysis of State-Trace Experiments. Psych. Methods, 17(1), 78-99 owell, Huber (2019) Connecting the Dots Without Top-Down Knowledge: Evidence for Rapidly-Learned Low-Level Associations That nt of Object Identity. J. of Exp. Psych: General, 148(6), 1058-1070. mpson, & Gelman (2018) Using Stacking to Average Bayesian Predictive Distributions. Bayesian Analysis 13(3). 917-1003

 Model recovers correlations from simulated datasets Experiment with replication supported non-monotonicity (PseudoBMA+ BF ~470) Method applicable despite low trial count per participant