

DIFFERENTIAL RELIANCE ON THE CAUSAL CORE CONCEPT IN THE DOMAIN OF PHYSICS AND BIOLOGY: A REVISED STUDY

BACKGROUND AND RATIONALE

- Children develop core concepts very early.
- Despite considerable education, adults do not completely abandon those naïve concepts.
- Dispositional theories of causality model causation as an antagonistic interaction between agent- and patient-objects (living as well as inert) with intrinsic dispositions¹:
 - Ontological distinction between “agents” and “patients”
 - Asymmetric attribution of agency²
 - Impact of forces asymmetrically perceived³
- Language expresses causal asymmetry.⁴
- Adhering to ideas of dispositional causality effects:
 - Implicit ascription of specific features to the interacting objects
 - The view that properties are transferred from the agent to the patient³

- This influences the probability that an event is interpreted as including a causal relation.

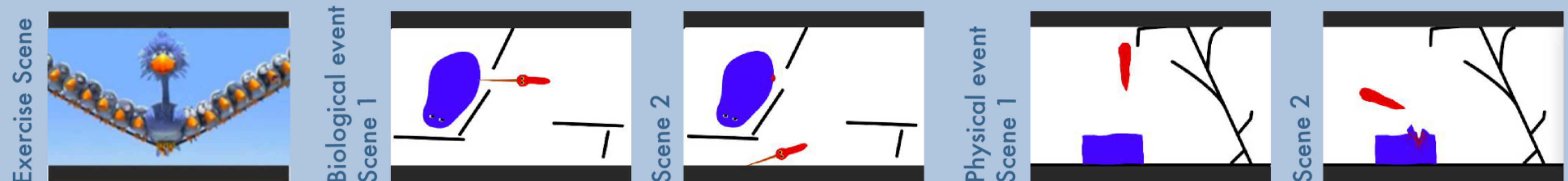
Do adults and children cross-domainly adopt an agent-patient relationship when judging a collision event with two inert objects as well as a sting event with two living objects?

We hypothesize that:

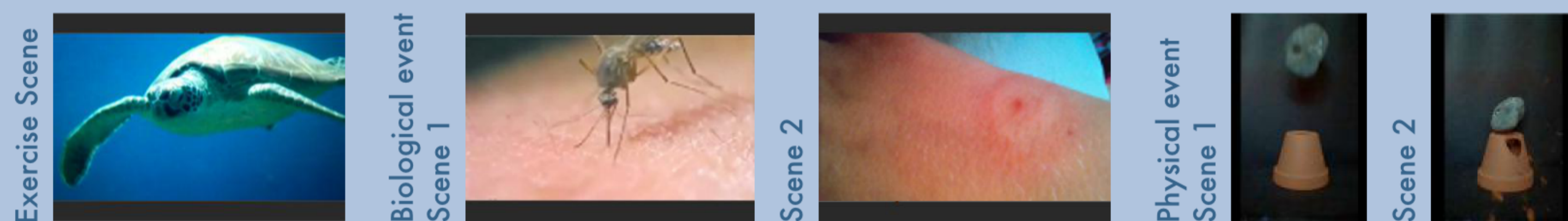
- Interactions of inert as well as living objects are interpreted as involving causal dispositions (i.e. goal-directed agent-like causes and interaction-roles).
- Individuals will judge statements as true or false according to their naïve concept.
- Adults will implicitly give similar naïve answers as children will explicitly.

METHODS

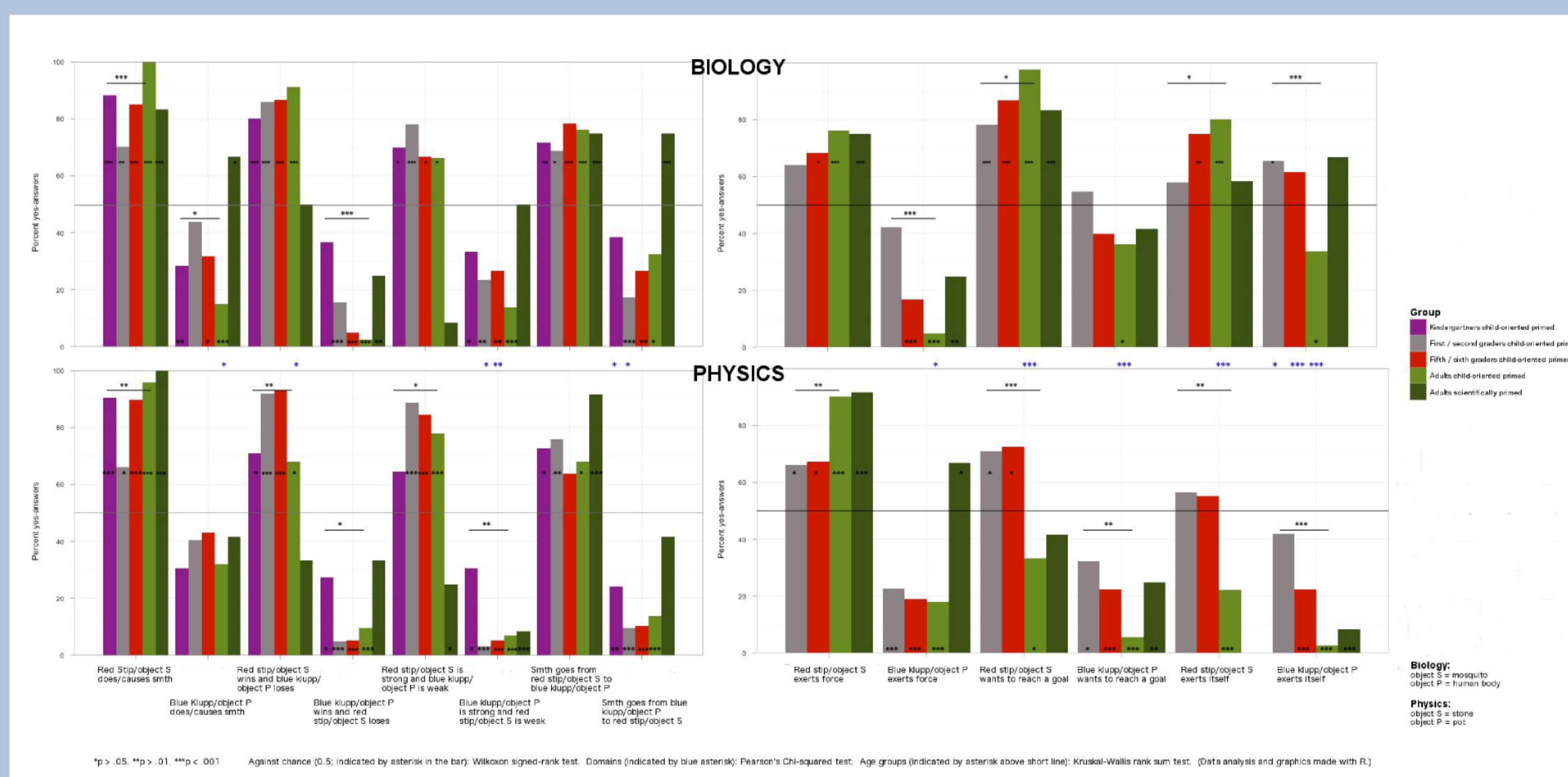
- A sample of 61 kindergartners (age $M = 5.9$, $SD = .44$), 63 first / second graders (age $M = 7.32$, $SD = .47$), 59 fifth / sixth graders (age $M = 11.56$, $SD = .73$) and 88 lay adults (age $M = 25.6$, $SD = 8.84$) were tested.
- Participants watched a biological or a physical event.
- Then, they heard 14 sentence pairs and judged them as right or wrong.
- Adults additionally experienced time pressure.



- Assuming that the child-oriented setting primes the naïve thinking, a part of the adults conducted the study in a *scientific manner*.



RESULTS



DISCUSSION

- Across the domains, participants categorised the two objects into agent and patient roles with corresponding attributes.
- Under time pressure and considering the setting, adults judged the statements similar to children - suggesting that naïve concepts are never fully abandoned.

Findings indicate that children, as well as adults under time pressure and in a child-oriented setting, use dispositional causal concepts when interpreting a physical collision event and a biological sting event. Moreover, the tendency to adopt a dispositional stance increases with age, particularly noticeable in the biological domain.

References

- ¹Mayrhofer, R., & Waldmann, M. R. (2015). Agents and causes: Dispositional intuitions as a guide to causal structure. *Cognitive Science*, 39(1), 65-69.
- ²White, P. A. (2006). The causal asymmetry. *Psychological Review*, 113, 132-147.
- ³White, P. A. (2009). Property transmission: An explanatory account of the role of similarity information in causal inference. *Psychological Bulletin*, 135, 774-793.
- ⁴Talmy, L. (1988). Force dynamics in language. *Cognitive Science*, 12, 49-100.