DIFFERENTIAL RELIANCE ON THE CAUSAL CORE CONCEPT IN THE DOMAIN OF PHYSICS AND BIOLOGY

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THEORETICAL BACKGROUND

- 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 dispositions[1]:
  - Ontological distinction between "agents" and "patients"
  - Asymmetric attribution of agency: agent acts and is viewed as the cause, whereas patient is acted upon and is the locus of effect[2]
  - Impact of forces asymmetrically perceived: agent is stronger than patient[3]
- 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 patient[3]
- This influences the probability that an event is interpreted as including a causal relation

Research question

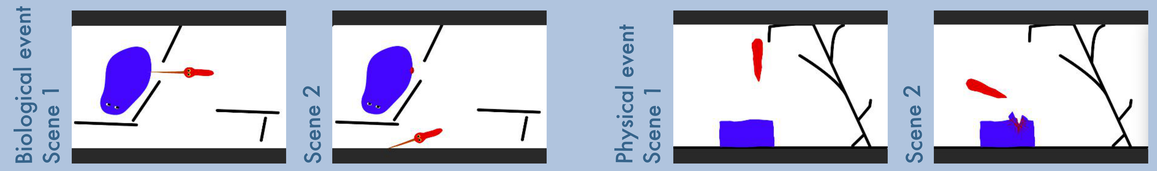
- Do adults and children cross-domainly adopt an agent-patient relationship when judging a collision event with two inert objects as well as a sting event with two living objects?

Based on theoretical insights and the status quo of research, we hypothesize that:

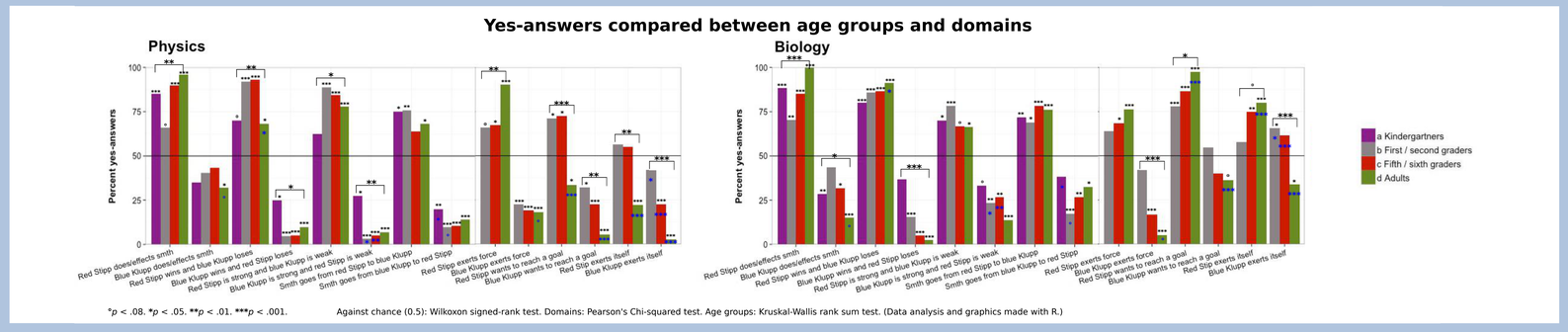
- Interactions of inert as well as living objects are interpreted as involving causal dispositions (i.e. goal-directed agent-like causes and interaction-roles)
- Individuals will judge statements as true or false according to their naïve concept
- Adults will implicitly give similar naïve answers as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

METHODS

- A sample of 50 kindergartners (age *M* = 6, *SD* = .49),
  63 first / second graders (age *M* = 7.32, *SD* = .47),
  59 fifth / sixth graders (age *M* = 11.56, *SD* = .73) and
  76 lay adults (age *M* = 23.72, *SD* = 5.73) 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



RESULTS



*p < .08. *p < .05. **p < .01. ***p < .001. Against chance (0.5): Wilkoxon signed-rank test. Domains: Pearson's Chi-squared test. Age groups: Kruskal-Wallis rank sum test. (Data analysis and graphics made with R.)

DISCUSSION

- Across the domains, participants categorised the two objects into agent and patient roles with corresponding attributes
- Under time pressure, 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, 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
[1]Mayrhofer, R., & Waldmann, M. R. (2015). Agents and causes: Dispositional intuitions as a guide to causal structure. *Cognitive Science*, *39*(1), 65-69.
[2]White, P. A. (2006). The causal asymmetry. *Psychological Review*, *113*, 132-147.
[3]White, P. A. (2009). Property transmission: An explanatory account of the role of similarity information in causal inference. *Psychological Bulletin*, *135*, 774-793.
[4]Talmy, L. (1988). Force dynamics in language. *Cognitive Science*, *12*, 49-100.

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