

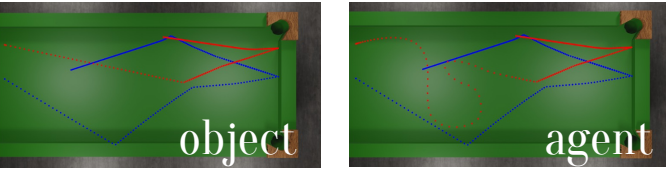
# Animacy influences causal reasoning via counterfactuals.

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## Animacy does not influence causal judgments

- Prior work suggests different cognitive mechanisms for causal reasoning with respect to agents/objects.<sup>1</sup>
- Causal judgments for agents may be influenced by intentionality, which is lacking for objects.
- We examine whether agents and objects are judged as causes to the same extent for the same outcome.
- Differences in causal judgments may indicate distinct cognitive mechanisms, while similarity suggests a single domain-general one.

2 x 2 x 2  
 Actual outcome (in/out) x Counterfactual outcome (in/out) x Animacy (agent/object)



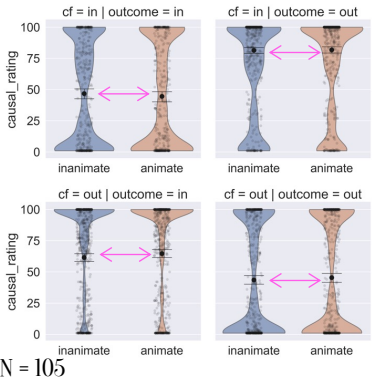
Animacy ✗  
 $\chi^2(1) = 0.023, p = .88$

Actual x Counterfactual  
 $\chi^2(2) = 8.191, p = .004$  ✓

Actual x Counterfactual x Animacy  
 $\chi^2(1) = .742, p = .38$  ✗

Causal ratings were NOT different across animacy conditions. (blue vs orange)

“Ball A caused Ball B to land in[miss] the pocket.” (0-100)

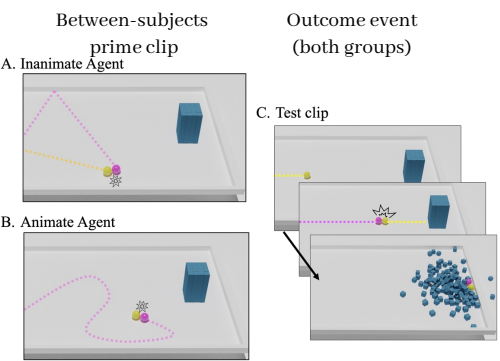


## Causal judgments about agents & objects differ as a function of the counterfactuals they afford

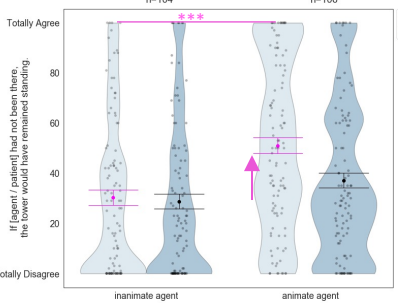
- We indirectly manipulated the contrast of actual and counterfactual outcomes through animacy perception.
- Focus on overdetermination, where an outcome does not counterfactually depend on a single cause, instead multiple events are individually sufficient to bring about the outcome.<sup>2</sup>
- Agents, not objects, are able to change (prevent) the outcome in a relevant counterfactual

### Methods

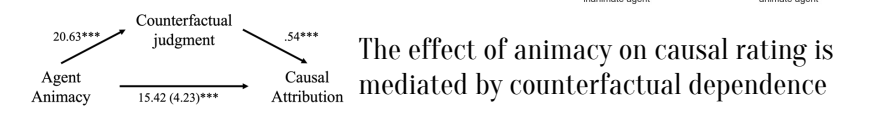
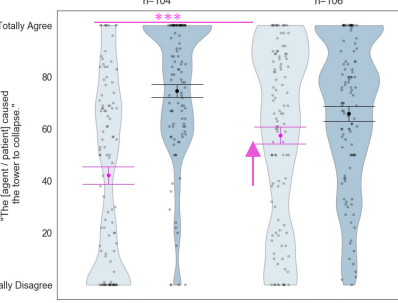
- A priming clip manipulated animacy perception with different ball movements.
- Outcome clip showed identical physics simulation for both animate and inanimate groups.
- Participants rated causal and counterfactual statements using a slider scale.



Outcome judged more dependent on agent than object  
 n=104 n=106



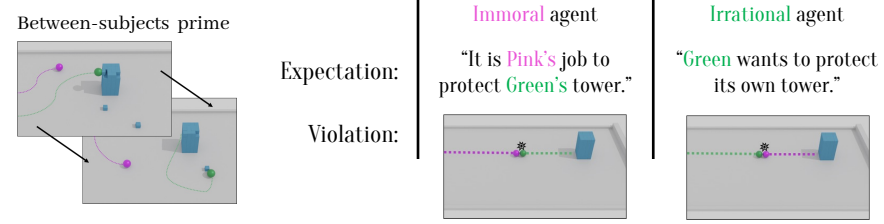
Agents rated more causal than objects for same event  
 n=104 n=106



The effect of animacy on causal rating is mediated by counterfactual dependence

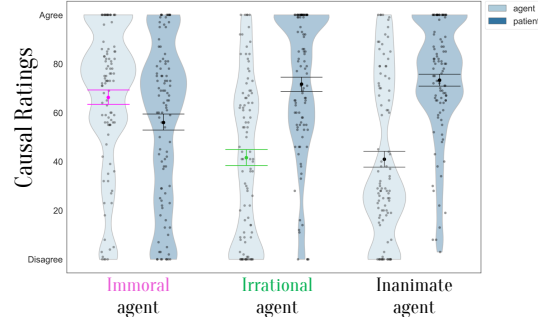
## Prescriptions of how agents/objects should move influence relevant counterfactuals

- Prescriptive norms play a crucial role in determining counterfactual relevance for animate agents.
- People attribute increased causality for an outcome to agents violating social or moral norms.<sup>3</sup>
- Manipulating normativity and animacy reveals the influence of prescriptive expectations on causal judgments.



- Immoral agent was perceived as more causal to destructive outcomes than their inanimate counterpart.
- Moral norm violations had higher causal attribution ratings compared to rational norm violations.
- Other data (not shown) suggest that irrational agent was viewed by participants as moving unintentionally.
- Further work is needed to clarify the role of intentionality in causal judgment as distinct from animacy

“The [agent / patient] ball caused the tower to collapse.”



1. Alicke, M. D. (1992). Culpable causation. *Journal of Personality and Social Psychology*, 63(3), 368–378.  
 2. Walsh, C. R., & Sloman, S. A. (2011). The meaning of cause and prevent: The role of causal mechanism. *Mind & Language*, 26(1), 21–52.  
 3. Samland, J., & Waldmann, M. R. (2016). How prescriptive norms influence causal inferences. *Cognition*, 156, 164–176.