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What happened? Reconstructing the past through vision and sound

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Abstract

We introduce a novel experimental paradigm for studying multi-modal integration in causal inference. Our experiments feature a physically realistic Plinko machine in which a ball is dropped through one of three holes and comes to rest at the bottom after colliding with a number of obstacles. We develop a hypothetical simulation model which postulates that people figure out what happened by integrating visual and auditory evidence through mental simulation. We test the model in a series of three experiments. In Experiment 1, participants only receive visual information and either predict where the ball will land, or infer in what hole it was dropped based on where it landed. In Experiment 2, participants receive both visual and auditory information – they hear what sounds the dropped ball makes. We find that participants are capable of integrating both sources of information, and that the sounds help them figure out what happened. In Experiment 3, we show strong cue integration: even when vision and sound are individually completely non-diagnostic, participants succeed by combining both sources of evidence.