

## Causal Interactions

s.butterfill@warwick.ac.uk

‘There are some cases ... in which a causal impression arises, clear, genuine, and unmistakable, and the idea of cause can be derived from it by simple abstraction in just the same way as the idea of shape or movement can be derived from the perception of shape or movement’ (Michotte 1963, p. 270–1)

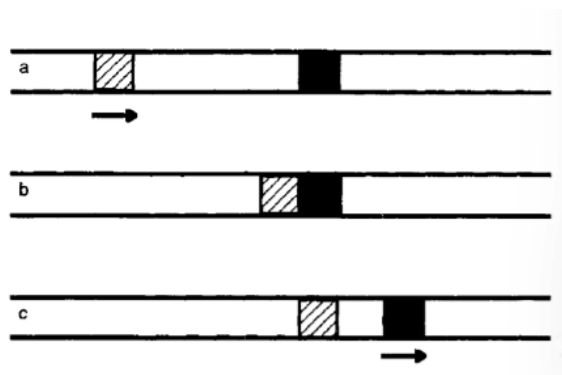
Infants at around six months of age seem also to distinguish launching from other sequences, much as adults do (Leslie & Keeble 1987).

‘when there is a launching event beneath the overlap (or underlap event) timed such that the launch occurs at the point of maximum overlap, observers inaccurately report that the overlap is incomplete, suggesting that they see an illusory crescent.’ (Scholl & Nakayama 2004, p. 461)

Why does the illusory causal crescent appear? Scholl and Nakayama suggest a ‘a simple categorical explanation for the Causal Crescents illusion: the visual system, when led by other means to perceive an event as a causal collision, effectively ‘refuses’ to see the two objects as fully overlapped, because of an internalized constraint to the effect that such a spatial arrangement is not physically possible. As a result, a thin crescent of one object remains uncovered by the other one—as would in fact be the case in a straight-on billiard-ball collision where the mo-

tion occurs at an angle close to the line of sight.’ (Scholl & Nakayama 2004, p. 466)

‘just as the visual system works to recover the physical structure of the world by inferring properties such as 3-D shape, so too does it work to recover the causal ... structure of the world by inferring properties such as causality’ (Scholl & Tremoulet 2000, p. 299)



from Thines, Costall and Butterworth 1991: 69

## References

- Adolphs, R. (2010). Conceptual challenges and directions for social neuroscience. *Neuron*, 65(6), 752–767.
- Carey, S. (2009). *The Origin of Concepts*. Oxford: Oxford University Press.
- Carey, S. & Spelke, E. (1996). Science and core knowledge. *Philosophy of Science*, 63, 515–533.

Carey, S. & Xu, F. (2001). Infants’ knowledge of objects: Beyond object files and object tracking. *Cognition*, 80, 179–213.

Fodor, J. (1983). *The Modularity of Mind: an Essay on Faculty Psychology*. Bradford book. Cambridge, Mass ; London: MIT Press.

Keren, G. & Schul, Y. (2009). Two is not always better than one. *Perspectives on Psychological Science*, 4(6), 533–550.

Krushke, J. K. & Fragassi, M. M. (1996). The perception of causality: Feature binding in interacting objects. In *Proceedings of the Eighteenth Annual Conference of the Cognitive Science Society* (pp. 441–446). Hillsdale, NJ: Erlbaum.

Leslie, A. & Keeble, S. (1987). Do six-month-old infants perceive causality? *Cognition*, 25, 265–288.

Leslie, A., Xu, F., Tremoulet, P. D., & Scholl, B. J. (1998). Indexing and the object concept: Developing ‘what’ and ‘where’ systems. *Trends in Cognitive Sciences*, 2(1).

Michotte, A. (1946 [1963]). *The Perception of Causality*. London: Meuthen.

Samuels, R. (2004). Innateness in cognitive science. *Trends in Cognitive Sciences*, 8(3), 136–41.

Scholl, B. J. & Leslie, A. (1999). Explaining the infant’s object concept: Beyond the perception/cognition dichotomy. In E. LePore & Z. W. Pylyshyn (Eds.), *What Is Cognitive Science?* (pp. 26–73). Oxford: Blackwell.

Scholl, B. J. & Nakayama, K. (2004). Illusory causal crescents: Misperceived spatial relations due to perceived causality. *Perception*, 33, 455–469.

Scholl, B. J. & Tremoulet, P. D. (2000). Perceptual causality and animacy. *Trends in Cognitive Sciences*, 4(8), 299–309.