

# Origins of Mind: Lecture 03

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## 1. Perception of Causation

‘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 motion 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)

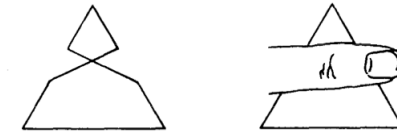
## 2. Object Indexes and Causal Interactions

The *object-specific preview effect*: ‘observers can identify target letters that matched the preview letter from the same object faster than they can identify target letters that matched the preview letter from the other object.’ (Krushke & Fragassi 1996, p. 2)

## 3. Object Indexes and the Principles of Object Perception

The principles of object perception are not items of knowledge instead they characterise the operation of object-indexes (aka FINSTs, mid-level object files) (Leslie et al. 1998; Scholl & Leslie 1999; Carey & Xu 2001).

## 4. Perceptual Expectations



source: Michotte et al (1964) via Kellman and Spelke (1983, figure 2)

## References

- Carey, S. & Xu, F. (2001). Infants’ knowledge of objects: Beyond object files and object tracking. *Cognition*, 80, 179–213.
- 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.
- Scholl, B. J. & Leslie, A. (1999). Explaining the infant’s object concept: Beyond the perception/cognition dichotomy. In E. LePore & Z. 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.