The causal reordering effect (Bechlivanidis & Lagnado, 2013) is a recently discovered illusion in which events that are thought to be causally related are perceived to occur in the order suggested by their causal relationship even if that order conflicts with the objective temporal order.

Imagine for example that your friend is holding a glass of water that suddenly slips through his hand and starts falling to the floor. While you are following the glass with your gaze and half a second **before** it reaches the ground, it shatters to pieces. Recent research indicates that you will in fact perceive the shattering **after** the glass collides with the floor. In other words, people seem to impose at the perceptual level the temporal priority principle of causal relationships: effects can never precede their causes.

The following proposals aim to further elucidate the effect, the exact conditions in which it arises and the theoretical and practical implications. Any further ideas about projects examining the effect are very welcome.

1. Is the reordering effect present only in sequences where objects are in motion? This would suggest that the effect occurs only in noisy perceptual environments. Devise a paradigm in which there are strong causal assumptions about non-moving objects to test whether the effect depends on perceptual noise.
2. In the absence of stable causal knowledge, causal inference depends strongly on temporal order cues. Thus, if A occurs before B and we know that A and B are somehow correlated, temporal order is one of the major cues that is used to determine the causal direction, i.e. which is the cause and which is the effect. This well-known fact in combination with the causal reordering effect suggests a bidirectional relationship between causal and temporal order: we use temporal order to learn about causal relationships and we use causal knowledge to infer temporal order. Can we devise an experiment that will illustrate this bidirectionality?
3. To what extent does the presence of alternative causal explanations reduce the causal reordering effect? In other words, if the (objective) temporal order in which events take place can be explained by the behaviour of another event, would people report the correct temporal order?
4. What is the role of agency in the reordering effect? In the cases where I am causing the effect rather than passively observing it, will I perceive my action occurring before or after the effect? Compare the effect in purely observational vs. interventional contexts. See also (Rohde et al, 2014)

Suggested Reading

Bechlivanidis, C., & Lagnado, D. A. (2013). Does the "why" tell us the "when"? *Psychological science, 24*(8), 1563-1572. doi: 10.1177/0956797613476046

Marieke Rohde, Meike Scheller, Marc O. Ernst (2014) Effects can precede their cause in the sense of agency, Neuropsychologia, <http://dx.doi.org/> 10.1016/j.neuropsychologia.2014.10.011