

Demi-journée sur la causalité

14 février 2014

Salle Socrate 23

Programme

14h00-15h20

Mathias Frisch (University of Maryland) : Causation in Physics

Pause

15h30 – 16h15

Marcus Missal (UCL) : Causality perception and prediction.

Pause

16h25 – 17h10

Julien Blondeau (UCL) et Michel Ghins (UCL) : Is There an Intrinsic Criterion for Causal Lawlike Statements?

Résumés

Mathias Frisch : Causation in Physics

Many contemporary philosophers of physics (and philosophers of science more generally) follow Bertrand Russell in arguing that there is no room for causal notions in physics. Causation, as James Woodward has put it, has a ‘human face’, which makes causal notions sit ill with fundamental theories of physics. In this talk I examine several anti-causal arguments and show that the human face of causation is the face of scientific representations much more generally.

Marcus Missal (UCL) : Causality perception and prediction.

When viewing one object move after being struck by another, humans perceive that the action of the first object “caused” the motion of the second, not that the two events occurred independently. Although established as a perceptual and linguistic concept, it is not yet known whether the notion of causality exists as a fundamental, preattentive “Gestalt” that can influence predictive motor processes. Therefore, eye movements of human observers were measured while viewing a display in which a launcher impacted a tool to trigger the motion of a second “reaction” target. The reaction target could move either in the direction predicted by transfer of momentum after the collision (“causal”) or in a different direction (“noncausal”), with equal probability. Control trials were also performed with identical target motion, either with a 100 ms time delay between the collision and reactive motion, or without the interposed tool. Subjects made significantly more predictive movements

(smooth pursuit and saccades) in the causal direction during standard trials, and smooth pursuit latencies were also shorter overall. These trends were reduced or absent in control trials. In addition, pursuit latencies in the noncausal direction were longer during standard trials than during control trials. The results show that causal context has a strong influence on predictive movements.

Julien Blondeau (UCL) et Michel Ghins (UCL) : Is There an Intrinsic Criterion for Causal Lawlike Statements?

A scientific mathematical law is causal if and only if it is a process law that contains a time derivative. This is the intrinsic criterion for causal laws we propose. A process is a spacetime line along which some properties are conserved or vary. A process law contains a time variable, but only process laws that contain a time derivative are causal laws. An effect is identified with what corresponds to a time derivative of some property or magnitude in a process law, whereas the other terms correspond to the cause(s). According to our criterion, causes are simultaneous with their effects and causality has no temporal direction. Several examples from natural and social disciplines support the applicability of our criterion to all scientific laws. Various objections to our proposal are presented and refuted. The merits our intrinsic theory of causality vis-à-vis the Salmon–Dowe conserved quantity theory are discussed.