Causal mechanisms: The processes or pathways through which an outcome is brought into being. We explain an outcome by offering a hypothesis about the cause(s) that typically bring it about. So a central ambition of virtually all social research is to discover causes. Consider an example: A rise in prices causes a reduction in consumption. The causal mechanism linking cause to effect involves the choices of the rational consumers who observe the price rise; adjust their consumption to maximize overall utility; and reduce their individual consumption of this good. In the aggregate, this rational behavior at the individual level produces the effect of lower aggregate consumption.

There are two broad types of theories of causation: the Humean theory ("causation as regularities") and the causal realist theory ("causation as causal mechanism"). The Humean theory holds that causation is entirely constituted by facts about empirical regularities among observable variables; there is no underlying causal nature, causal power, or causal necessity. The causal realist takes notions of causal mechanisms and causal powers as fundamental, and holds that the task of scientific research is to arrive at empirically justified theories and hypotheses about those causal mechanisms. Consider these various assertions about the statement, "X caused Y":

- X is a necessary and/or sufficient condition of Y.
- If X had not occurred, Y would not have occurred.
- The conditional probability of Y given X is different from the absolute probability of Y ($P(Y|X) <> P(Y)$).
- X appears with a non-zero coefficient in a regression equation predicting the value of Y.
- There is a causal mechanism leading from the occurrence of X to the occurrence of Y.

The central insight of causal realism is that the final criterion is in fact the most fundamental. According to causal realism, the fact of the existence of underlying causal mechanisms linking X to Y accounts for each of the other criteria; the other criteria are symptoms of the fact that there is a causal pathway linking X to Y.

Causal reasoning thus presupposes the presence of a causal mechanism; the researcher ought to attempt to identify the unseen causal mechanism joining the variables of interest. And this list of causal criteria suggests a variety of ways of using available evidence to test or confirm a causal hypothesis: apply Mill's methods of similarity and difference as a test for necessary and sufficient conditions, examine conditional probabilities, examine correlations and regressions among the variables of interest, and use appropriate parts of social theory to hypothesize about underlying causal mechanisms. Causal realism insists, finally, that empirical evidence must be advanced to assess the credibility of the causal mechanism that is postulated between cause and effect.

What is a causal mechanism? A causal mechanism is a sequence of events or conditions, governed by lawlike regularities, leading from the explanans to the explanandum. Wesley Salmon puts the point this way: "Causal processes, causal interactions, and causal laws provide the mechanisms by which the world works; to understand *why* certain things happen, we need to see *how* they are produced by these mechanisms" (Salmon 1984 : 132). Nancy Cartwright likewise places real causal mechanisms at the center of her account of scientific knowledge. As she and John Dupré

put the point, "things and events have causal capacities: in virtue of the properties they possess, they have the power to bring about other events or states" (Dupré and Cartwright 1988). And most fundamentally, Cartwright argues that identifying causal relations requires substantive theories of the causal powers or capacities that govern the entities in question. Causal relations cannot be directly inferred from facts about association among variables.

The general nature of the mechanisms that underlie social causation has been the subject of debate. Several broad approaches may be identified: agent-based models, structural models, and social influence models. Agent-based models follow the strategy of aggregating the results of individual-level choices into macro-level outcomes; structural models attempt to demonstrate the causal effects of given social structures or institutions (e.g. the tax collection system) on social outcomes (levels of compliance); and social influence models attempt to identify the factors that work behind the backs of agents to influence their choices. Thomas Schelling's apt title "Micromotives and Macrobehavior" (Schelling 1978) captures the logic of the former approach, and his work profoundly illustrates the sometimes highly unpredictable results of the interactions of locally rational-intentional behavior. Jon Elster has also shed light on the ways in which the tools of rational choice theory support the construction of largescale sociological explanations (Elster 1989). Emirbayer and Mische provide an extensive review of the current state of debate on the concept of agency (Emirbayer and Mische 1998). Structuralist and social influence approaches attempt to identify socially salient influences such as institution, state, race, gender, educational status, and to provide detailed accounts of how these factors influence or constrain individual trajectories—thereby affecting social outcomes.

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