Chapter 2
Causation in the Social Realm

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Abstract Explanation is at the center of scientific research, and explanation almost always involves the discovery of causal relations among factors, conditions, or events. This is true in the social sciences no less than in the natural sciences. But social causes look quite a bit different from causes of natural phenomena. They result from the choices and actions of numerous individuals rather than fixed natural laws, and the causal pathways that link antecedents to consequents are less exact than those linking gas leaks to explosions. It is, therefore, a crucial challenge for the philosophy of social science to give a compelling account of causal reasoning about social phenomena that does justice to the research problems faced by social scientists.

Learning Objectives
By studying this chapter, you will:

- Gain exposure to philosophical theories of causal explanation.
- Learn how "ontology" is important in social research.
- Learn about the theory of causal mechanisms.
- Become acquainted with how several causal research methodologies relate to social ontology.
- Become acquainted with scientific realism as an approach to social research.

2.1 Why Discuss the Ontology of Causation?

Ontology precedes methodology. We cannot design good methodologies for scientific research without having reasonably well-developed ideas about the nature of the phenomena that we intend to investigate (Little, 2020). This point is especially important in approaching the idea of social causation. Only when we have a reasonably clear understanding of the logic and implications of the scientific idea of

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causality can we design appropriate methods of inquiry for searching out causal relations. And only then can we give a philosophically adequate justification of existing methods—that is, an account of how the research method in question corresponds to a sophisticated understanding of the nature of the social world.

Here I will work within the framework of an "actor-centered" view of social ontology (Little, 2006, 2014, 2016). On this view, the social realm is constituted by individual actors who themselves have been cultivated and developed within ongoing social relations and who conduct their lives and actions according to their understandings and purposes. Social structures, social institutions, organizations, normative systems, cultures, and technical practices all derive their characteristics and causal powers from the socially constituted and situated individuals who make them up (Little, 2006).

This fact about social entities and processes suggests a high degree of contingency in the social world. Unlike chemistry, the social world is not a system of law-governed processes; it is instead a mix of different sorts of institutions, forms of human behavior, natural and environmental constraints, and contingent events. The entities that make up the social world at a given time and place have no essential ontological stability; they do not fall into "natural kinds"; and there is no reason to expect deep similarity across a number of ostensibly similar institutions—states, for example, or labor unions. The "things" that we find in the social world are heterogeneous and contingent. And the metaphysics associated with classical thinking about the natural world—laws of nature; common, unchanging structures; and fully predictable processes of change—do not provide appropriate building blocks for our understandings and expectations of the social world nor do they suggest the right kinds of social science theories and constructs.

Instead of naturalism, this actor-centered approach to social ontology leads to an approach to social science theorizing that emphasizes agency, contingency, and plasticity in the makeup of social facts. It recognizes that there is a degree of pattern in social life, but emphasizes that these patterns fall far short of the regularities associated with laws of nature. It emphasizes contingency of social processes and outcomes. It insists upon the importance and legitimacy of eclectic use of multiple social theories: social processes and entities are heterogeneous, and therefore, it is appropriate to appeal to different types of social theories as we explain various parts of the social world. It emphasizes the importance of path dependence in social outcomes.

Box 2.1 Definitions

Agency: The fact that social change and causation derives from the purposive actions of individual social actors.

Contingency: Social outcomes depend upon conjunctions of occurrences that need not have taken place, so the outcome itself need not have taken place. Closely related to "path dependency."

(continued)

Box 2.1 (continued)

Path dependency: The feature of social processes according to which minor and underdetermined events in an early stage of a process make later changes more probable. For example, the QWERTY arrangement of the typewriter keyboard was selected in order to prevent typists from jamming the mechanism by typing too rapidly. Fifty years later, after widespread adoption, it proved impossible to adopt a more efficient arrangement of the keys to permit more rapid typing.

Plasticity: A feature of an entity or group of entities according to which the properties of the entity can change over time. Biological species demonstrate plasticity through evolution, and social entities demonstrate plasticity through the piecemeal changes introduced into them by a variety of actors and participants.

How does this ontological perspective fit with current work in policy studies? There are several current fields of social research that illustrate this approach particularly well. One is the field of the "new institutionalism." Researchers in this tradition examine the specific rules and incentives that constitute a given institutional setting. They examine the patterns of behavior that these rules and incentives give rise to in the participants in the institution, and they consider as well the opportunities and incentives that exist for various powerful actors to either maintain the existing institutional arrangements or modify them. Kathleen Thelen's (2004) study of different institutions of skill formation in Germany, Great Britain, the United States, and Japan is a case in point. This approach postulates the causal reality of institutions and the specific ensembles of rules, incentives, and practices that make them up; it emphasizes that differences across institutions lead to substantial differences in behavior; and it provides a basis for explanations of various social outcomes. The rules of liability governing the predations of cattle in East Africa or Shasta County, California, create very different patterns of behavior in cattle owners and other landowners in the various settings (Ellickson, 1991). It is characteristic of the new institutionalism that researchers in this tradition generally avoid reifying large social institutions and look instead at the more proximate and variable sets of rules, incentives, and practices within which people live and act.

2.2 Scientific Realism About the Social World and Social Causation

We are best prepared for the task of discovering causal relationships in the social world when we adopt a realist approach to the social world and to social causation. We provide an explanation of an event or pattern when we succeed in identifying the real causal conditions and events that brought it about. The central tenet of causal

realism is a thesis about causal mechanisms and causal powers. Causal realism holds that we can only assert that there is a causal relationship between X and Y if we can offer a credible hypothesis of the sort of underlying mechanism that connects X to the occurrence of Y. The sociologist Mats Ekström puts the view this way: "the essence of causal analysis is … the elucidation of the processes that generate the objects, events, and actions we seek to explain" (Ekström, 1992: 115). Authors who have urged the centrality of causal mechanisms for explanatory purposes include Roy Bhaskar (1975), Nancy Cartwright (1989), Jon Elster (1989), Rom Harré and Madden (1975), Wesley Salmon (1984), and Peter Hedström (2005).

Scientific realism about social causes comes down to several simple ideas.

First, there is such a thing as social causation. Causal realism is a defensible position when it comes to the social world: there are real causal relations among social factors (structures, institutions, groups, norms, and salient social characteristics like race or gender). We can give a rigorous interpretation to claims like "racial discrimination causes health disparities in the United States" or "rail networks cause changes in patterns of habitation."

Second, causal relations among factors or events depend on the existence of real social-causal mechanisms linking cause to effect. Discovery of correlations among factors does not constitute the whole meaning of a causal statement. Rather, it is necessary to have a hypothesis about the mechanisms and processes that give rise to the correlation. Hypotheses about the causal mechanisms that exist among factors of interest permit the researcher to exclude spurious correlation (cases where variations in both factors are the result of some third factor) and to establish the direction of causal influence (cases where it is unclear whether the correlation between A and B results from A causing B or B causing A). So mechanisms are more fundamental than regularities.

Third, the discovery of social mechanisms in policy studies often requires the formulation of mid-level theories and models of these mechanisms and processes—for example, the theory of free-riders. For example, an urban policy researcher may observe that racially mixed high-poverty neighborhoods have higher levels of racial health disparities than racially mixed low-poverty neighborhoods. This is an observation of correlation. Researchers like Robert Sampson (2010) would like to know how "neighborhood effects" work in transmitting racial health disparities. What are the mechanisms by which a neighborhood influences the health status of an individual household? In order to attempt to answer this question, Sampson turns to mid-level hypotheses in urban sociology that contribute to a theory of the mechanisms involved in this apparent causal relationship. By mid-level theory, I mean essentially the same thing that Robert Merton (1963) conveyed when he introduced the term: an account of the real social processes that take place above the level of isolated individual action but below the level of full theories of whole social systems. Marx's theory of capitalism illustrates the latter; Jevons's theory of the individual consumer as a utility maximizer illustrates the former. Coase's theory of transaction costs (Coase, 1988) is a good example of a mid-level theory: general enough to apply across a wide range of institutional settings, but modest enough in

its claim of comprehensiveness to admit of careful empirical investigation. Significantly, the theory of transaction costs has spawned major new developments in the new institutionalism in sociology (Brinton & Nee, 1998).

And finally, it is important to recognize and welcome the variety of forms of social scientific reasoning that can be utilized to discover and validate the existence of causal relations in the social world. Properly understood, there is no contradiction between the effort to use quantitative tools to chart the empirical outlines of a complex social reality, and the use of theory, comparison, case studies, process tracing, and other research approaches aimed at uncovering the salient social mechanisms that hold this empirical reality together.

2.2.1 Critical Realism

Critical realism is a specific tradition within the late-twentieth-century analytic philosophy that derives from the work of Rom Harré and Roy Bhaskar (Harré & Madden, 1975; Bhaskar, 1975; Archer et al., 2016). In brief, the view holds that the ontological stance of realism is required for a coherent conception of scientific knowledge itself. Unqualified skepticism about "unobservable entities" makes scientific research and experimentation philosophically incoherent. We are forced to take the view that the entities postulated by our best theories of the world are "real"—whether electrons, viruses, or social structures. For Bhaskar, this ontological premise has much the status of Kant's transcendental arguments for causation and space and time: we cannot make sense of experience without postulating causation and locations in space and time (Bhaskar, 1975).

Concretely in the social sciences, this is taken to mean that we can be confident in asserting that social entities exist if these concepts play genuine roles in well-developed and empirically supported theories of the social world: for example, organizations, markets, institutions, social classes, normative systems, rules, ideologies, and social networks. Further, we can be confident in attributing causal powers and effects to the various social entities that we have identified—always to be supported by empirical evidence of various kinds.

2.3 What Is Causation?

Let us turn now to a more specific analysis of causation. What do we mean by a cause of something? Generally speaking, a cause is a circumstance that serves to bring about (or renders more probable) its effect, in a given environment of background conditions. Causes *produce* their effects (in appropriate background conditions). A current fruitful approach is to understand causal linkages in terms of the specific *causal mechanisms* that link cause to effect.

We can provide a preliminary definition of causation along these lines:

- A causes B in the presence of $C_i =_{def}$. A suffices to bring about B in the presence of conditions C_i (sufficiency).
- A causes B in the presence of $C_i =_{def}$. If C_i were present but A had not occurred, then B would not have occurred (necessity).

That is, A is necessary and sufficient in conditions C_i for the production of B. This definition can be understood in either a deterministic version or a probabilistic version. The deterministic version asserts that A in the presence of C_i always brings about B; the probabilistic version asserts that the occurrence of A in the presence of C_i increases the likelihood of the occurrence of B.

There is a fundamental choice to be made when we consider the topic of causation. Are causes real, or are causal statements just summaries of experimental and observational results and the statistical findings that can be generated using these sets of data? The first approach is the position described above as causal realism, while the second can be called causal instrumentalism. If we choose causal realism, we are endorsing the idea that there is such a thing as a *real* causal linkage between A and B; that A has the power to produce B; and that there is such a thing as causal necessity. If we choose causal instrumentalism, we are agnostic about the underlying realities of the situation, and we restrict our claims to observable patterns and regularities. The philosopher David Hume (2007) endorsed the second view; whereas many philosophers of science since the 1970s have endorsed the former view.

Most of the contributors to the current volume engage with the premises of causal realism. They believe that social causation is real; there are real social relations among social factors (structures, institutions, groups, norms, and salient social characteristics like race or gender), and there are real underlying causal mechanisms and powers that constitute those causal relations. According to scientific realists, a key task of science is to discover the causal mechanisms and powers that underlie the observable phenomena that we study.

Causal realists acknowledge a key intellectual obligation that goes along with postulating real social mechanisms: to provide an account of the ontological *substrate* within which these mechanisms operate**.** In the social realm, the substrate is the system of social actors whose mental frameworks, actions, and relationships constitute the social world. This is what is meant by an "actor-centered" ontology of the social world. On this view, every social mechanism derives from facts about individual actors, the institutional context, the features of the social construction and development of individuals, and the factors governing purposive agency in specific sorts of settings. Different research programs in the social sciences target different aspects of this nexus.

This view of the underlying reality of social causation justifies a conception of causal necessity in the social realm. Do causes make their effects "necessary" in any useful sense? This is the claim that Hume rejected—the notion that there is any "necessary" connection between cause and effect. By contrast, the notion of *natural necessity* is sometimes invoked to capture this idea:

- A causes B: given the natural properties of A and given the laws of nature and given the antecedent conditions, B necessarily occurs.

This can be paraphrased as follows:

- Given A, B occurs as a result of natural necessity.

So the sense of necessity of the occurrence of the effect in this case is this: given A and given the natural properties and powers of the entities involved, B had to occur. Or in terms of possible worlds and counterfactuals (Lewis, 1973), we can say:

- In any possible world in which the laws of nature obtain, when A occurs, B invariably occurs as well.

Applied to social causation within the context of an ontology of actor-centered social facts, here is what causal necessity looks like:

- Given the beliefs, intentions, values, and goals of various participants and given the constraints, opportunities, and incentives created by the social context, whenever A occurs, the outcome B necessarily occurs [financial crisis, ethnic violence, rapid spread of infectious disease …].

This conception aligns with Wesley Salmon's idea of the "causal structure of the world," applied to the social world (1984). And this in turn indicates why causal mechanisms are such an important contribution to the analysis of causation. A causal mechanism is a constituent of this "stream of events" leading from A to B.

Probabilistic causal relations involve replacing exceptionless connections among events with probabilistic connections among events. A has a probabilistic causal relationship to B just in case the occurrence of A increases (or decreases) the likelihood of the occurrence of B. This is the substance of Wesley Salmon's (1984) criterion of causal relevance. Here is Salmon's idea of causal relevance:

- A is causally relevant to B *if and only if* the conditional probability of B given A is different from the absolute probability of B (Salmon, 1984, adapted notation).

For a causal realist, the definition is extended by a hypothesis about an underlying causal mechanism. For example, smoking is causally relevant to the occurrence of lung cancer [working through physiological mechanisms X, Y, Z]. And cell physiologists are expected to provide the mechanisms that connect exposure to tobacco smoke to increased risk of malignant cell reproduction.

It is important to emphasize that we can be causal realists about probabilistic causes just as we can about deterministic causes. A causal power or capacity is expressed as a tendency to produce an outcome; but this tendency generally requires facilitating conditions in order to be operative. The causal power is appropriately regarded as being real, whether or not it is ever stimulated by appropriate events and circumstances. A given cube of sugar is soluble, whether or not it is ever immersed in water at room temperature.

These definitions have logical implications that suggest different avenues of research and inquiry in the social sciences. First, both the deterministic and the probabilistic versions imply the truth of a *counterfactual* statement: If A had not

occurred in these circumstances, B would not have occurred. (Or if A had not occurred in these circumstances, the probability of B would not have increased.) The counterfactual associated with a causal assertion suggests an experimental approach to causal inquiry. We can arrange a set of circumstances involving C_i and remove the occurrence of A and then observe whether B occurs (or observe the conditional probability of the occurrence of B).

Another important implication of a causal assertion is the idea of a set of necessary and sufficient conditions for the occurrence of E, the circumstance of explanatory interest. With deterministic causation, the assertion of a causal relationship between A and B implies that A is sufficient for the occurrence of B (in the presence of C_i) and often the assertion implies that A is a necessary condition as well. (If A had not occurred, then B would not have occurred.) On these assumptions, a valid research strategy involves identifying an appropriate set of cases in which A, C_i, and B occur, and then observe whether the appropriate covariances occur or not. J. L. Mackie (1974) provided a more detailed analysis of the logic of necessary and sufficient conditions in complex conjunctural causation with his concept of an INUS condition: "*insufficient* but *non-redundant* part of an *unnecessary* but *sufficient* condition" (62). Significantly, Mackie's formulation provides a basis for a Boolean approach to discovering causal relations among multiple factors.

These definitions and logical implications give scope to a number of different strategies for investigating causal relationships among various conditions. For probabilistic causal relationships, we can evaluate various sets of conditional probabilities corresponding to the presence or absence of conditions of interest. For deterministic causal relationships, we can exploit the features of necessary and sufficient conditions by designing a "truth table" or Boolean test of the co-occurrence of various conditions (Ragin, 1987). This is the logic of Mill's methods of similarity and difference (Mill, 1988; Little, 1995). For both deterministic and probabilistic causal relationships, we can attempt to discover and trace the workings of the causal mechanisms that link the occurrence of A to the occurrence of B.

2.3.1 Causal Mechanisms

As noted above, the central tenet of causal realism is a thesis about the real existence of causal mechanisms and causal powers. The fundamental causal concept is that of a mechanism through which A brings about or produces B (Little 2011). According to this approach, we can only assert that there is a causal relationship between A and B if we can offer a credible hypothesis of the sort of underlying mechanism that connects A to the occurrence of B. This is central to our understanding of causation from single-case studies to large statistical studies suggesting causal relationships between two or more variables. Peter Hedström and other exponents of analytical sociology are recent voices for this approach for the social sciences (Hedström, 2005; Hedström & Ylikoski, 2010). An important paper by Machamer et al. (2000) sets the terms of current technical discussions of causal mechanisms, and James

Mahoney (2001) surveyed the various theories of causal mechanisms and called for a greater specificity.

What is a causal mechanism? Consider this formulation: a causal mechanism is a sequence of events, conditions, and processes leading from the explanans to the explanandum (Little, 1991: 15, 2016: 190–192). A causal relation exists between A and B if and only if there is a set of causal mechanisms that lead from A to B. This is an ontological premise, asserting that causal mechanisms are real and are the legitimate object of scientific investigation.

The theory has received substantial development in the biological sciences. Glennan et al. (2021) put the mechanisms theory in the form of six brief theses:

(1) The most fruitful way to define mechanisms is that a mechanism for a phenomenon consists of entities (or parts) whose activities and interactions are organized so as to be responsible for the phenomenon.
(2) Scientists can only discover, describe, and explain mechanisms through the construction of models, and these models are inevitably partial, abstract, idealized and plural.
(3) Mechanistic explanations are ubiquitous across the empirical sciences.
(4) Emphasizing that mechanistic explanations are ubiquitous in all scientific disciplines does not entail that all scientific explanations are mechanistic.
(5) The diversity of kinds of mechanisms requires and explains the diversity of tools, strategies and heuristics for mechanism discovery.
(6) The mechanisms literature is a rich source of insights that can be used to address challenging reasoning problems in science, technology and evidence-based policy.

This definition is developed for explanations in biology, but it works well with typical examples of social mechanisms.

The idea that there are real mechanisms embodied in a given domain of phenomena provides a way of presenting causal relations that serves as a powerful alternative to the pure regularity view associated with Hume and purely quantitative approaches to causation. Significantly, this is the thrust of Judea Pearl's development of structural equation modeling (discussed below): in order to get a basis for causal inference out of a statistical analysis of a large dataset, it is necessary to provide a theory of the causal mechanisms and relations that are at work in this domain (Pearl, 2021).

Mechanisms bring about specific effects. For example, "over-grazing of the commons" is a mechanism of resource depletion. Whenever the conditions of the mechanism are satisfied, the result ensues. Moreover, we can reconstruct why this would be true for purposive actors in the presence of a public good (Hardin, 1968). Or consider another example from the social sciences: "the mechanism of stereotype threat causes poor performance on standardized tests by specific groups" (Steele, 2011). This mechanism is a hypothesized process within the cognitive–emotional system of the subjects of the test, leading from exposure to the stereotype threat through a specified cognitive–emotional mechanism to impaired performance on the test. So we can properly understand a claim for social causation along these lines: "C causes E" rests upon the hypothesis that "there is a set of causal mechanisms that convey circumstances including C to circumstances including E." In the social realm, we can be more specific. "C causes E" implies the belief that "there is a set of opportunities, incentives, rules, and norms in virtue of which actors in the presence of C bring about E through their actions."

Are there any social mechanisms? There are many examples from every area of social research. For example: "Collective action problems often cause strikes to fail." "Increasing demand for a good causes prices to rise for the good in a competitive market." "Transportation systems cause shifts of social activity and habitation." "Recognition of mutual interdependence leads to medium-term social cooperation in rural settings." In each case, we have a causal claim that depends on a hypothesis about an underlying behavioral, cognitive, or institutional mechanism producing a pattern of collective behavior.

The discovery of social mechanisms often requires the formulation of mid-level theories and models of these mechanisms and processes—for example, the theory of free-riders or the theory of grievance escalation in contentious politics. Mid-level theories in the social sciences can be viewed as discrete components of a toolbox for explanation. Discoveries about specific features of the workings of institutions, individual-collective paradoxes, failures of individual rationality like those studied in behavioral economics—all of these mid-level theories of social mechanisms can be incorporated into an account of the workings of specific social ensembles. The response of a university to a sudden global pandemic may be seen as an aggregation of a handful of well-known institutional dysfunctions, behavioral patterns, and cognitive shortcomings on the part of the various actors.

Aage Sørensen summarizes a causal realist position for the social and policy sciences in these terms: "Sociological ideas are best reintroduced into quantitative sociological research by focusing on specifying the mechanisms by which change is brought about in social processes" (Sørensen, 1998: 264). Sørensen argues that social explanation requires better integration of theory and evidence. Central to an adequate explanatory theory, however, is the specification of the mechanisms that are hypothesized to underlie a given set of observations. "Developing theoretical ideas about social processes is to specify some concept of what brings about a certain outcome—a change in political regimes, a new job, an increase in corporate performance, … The development of the conceptualization of change amounts to proposing a mechanism for a social process" (Sørensen, 1998: 239–240). If an educational policy researcher finds that there is an empirical correlation between schools that have high turnover of teaching staff and high dropout rates, it is very important to investigate whether there is a mechanism that leads from teacher turnover to student dropout. Otherwise, both characteristics may be the joint result of a third factor (inadequate school funding, for example). Sørensen makes the critical point that one cannot select a statistical model for analysis of a set of data without first asking the question, "What in the nature of the mechanisms do we wish to postulate to link the influences of some variables with others?" Rather, it is necessary to have a hypothesis of the mechanisms that link the variables before we can arrive at a justified estimate of the relative importance of the causal variables in bringing about the outcome.

Emphasis on causal mechanisms for adequate social explanation has several favorable benefits for policy research. Policy research is always concerned about

causation: what interventions can be made that would bring about different outcomes? When policy researchers look carefully for the social mechanisms that underlie the processes that they study, they are in a much better position to diagnose the reasons for poor outcomes and to recommend interventions that will bring about better outcomes. Emphasis on the need for analysis of underlying causal mechanisms takes us away from uncritical reliance on uncritical statistical models.

2.3.2 Causal Powers

Some philosophers of science have argued that substantive theories of causal powers and properties are crucial to scientific explanation. Leading exponents of this view include Rom Harré (Harré & Madden 1975), Nancy Cartwright (1989), and Stephen Mumford (2009). Nancy Cartwright places real causal powers and capacities at the center of her account of scientific knowledge (1989). 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 & Cartwright, 1988). Cartwright argues, for the natural sciences, that the concept of a real causal connection among a set of events is more fundamental than the concept of a law of nature. And most fundamentally, she argues that identifying causal relations requires substantive theories of the causal powers ("capacities", in her language) that govern the entities in question. Causal relations cannot be directly inferred from facts about association among variables. As she puts the point, "No reduction of generic causation to regularities is possible" (1989: 90). The importance of this idea for sociological research is profound; it confirms the notion shared by many researchers that attribution of social causation depends inherently on the formulation of good, middle-level theories about the real causal properties of various social forces and entities.

Cartwright's philosophy of causation points to the idea of a causal power—a set of propensities associated with a given entity that actively bring about the effect. The causal powers theory rests on the claim that causation is conveyed from cause to effect through the active *powers and capacities* that inhere in the entities making up the cause.

The idea of an ontology of causal powers is that certain kinds of things (metals, gases, military bureaucracies) have internal characteristics that lead them to interact causally with the world in specific and knowable ways. This means that we can sometimes identify dispositional properties that attach to kinds of things. Metals conduct electricity; gases expand when heated; military bureaucracies centralize command functions (Harré & Madden, 1975). Stephen Mumford and Rani Lill Anjum explore the philosophical implications of a powers theory of causation (2011).

The language of causal powers allows us to incorporate a number of typical causal assertions in the social sciences: "Organizations of type X produce lower rates of industrial accidents"; "paramilitary organizations promote fascist mobilization"; "tenure systems in research universities promote higher levels of faculty research productivity." In each case, we are asserting that a certain kind of social organization possesses, in light of the specifics of its rules and functioning, a disposition to stimulate certain kinds of participant behavior and certain kinds of aggregate outcomes. This is to attribute a specific causal power to species of organizations and institutions.

Sociologist James Coleman offered the view that we should distinguish carefully between macro-level social factors and micro-level individual action (Coleman, 1990). He held that all social causation proceeded through three distinct paths: social factors that influence individual behavior, individuals who interact with each other and create new social facts, and the creation of new macro-level social factors that are the aggregate result of individual actions and interactions at the micro-level. Coleman did not believe that there were direct causal influences from one macro-level social fact to another macro-level social fact. Coleman offered a diagram of this view, which came to be known as "Coleman's boat" (Fig. 2.1). On this view, when we say that a certain social entity, structure, or institution has a certain power or capacity, we mean something reasonably specific: given its configuration, it creates an environment in which individuals commonly perform a certain kind of action. This is the downward strut in the Coleman's boat diagram, labeled 1 in Fig. 2.1. This approach has two important consequences. First, social powers are not "irreducible"—rather, we can explain how they work by analyzing the specific environment of formation and choice they create. And second, they cannot be regarded as deriving from the "essential" properties of the entity. Change the institution even slightly and we may find that it has very different causal powers and capacities. Change the rules of liability for open-range grazing and you get different patterns of behavior by ranchers and farmers (Ellickson, 1991).

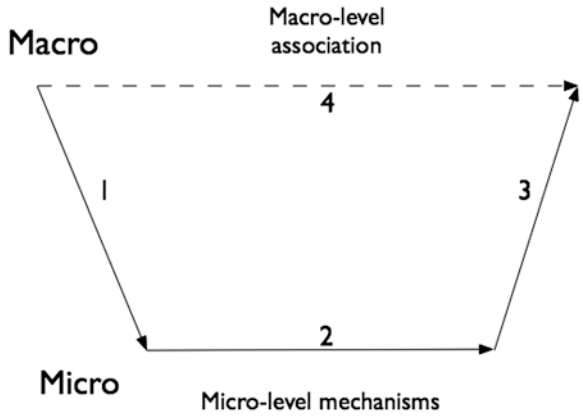

Fig. 2.1 Coleman's boat. (Author's diagram after Coleman, 1990)

2.3.3 Manipulability and Invariance

Several other aspects of the causal structure of the world have been important in recent discussions of causality in the social sciences. Jim Woodward is a leading exponent of the manipulability (or interventionist) account. He develops his views in detail in his recent book, *Making Things Happen: A Theory of Causal Explanation* (2003). The view is an intuitively plausible one: causal claims have to do with judgments about how the world would be if we altered certain circumstances. If we observe that the concentration of sulfuric acid is increasing in the atmosphere leading to acid rain in certain regions, we might consider the increasing volume of H_2SO_4 released by coal power plants from 1960 to 1990. And we might hypothesize that there is a causal connection between these facts. A counterfactual causal statement holds that if X (increasing emissions) had not occurred, then Y (increasing acid rain) would not have occurred. The manipulability theory adds this point: if we could remove X from the sequence, then we would alter the value of Y. And this, in turn, makes good sense of the ways in which we design controlled experiments and policy interventions.

Woodward extends this analysis to develop the idea of a relationship that is "invariant under intervention." This idea follows the notion of experimental testing of a causal hypothesis. We are interested in the belief that "X causes Y." We look for interventions that change the state of Y. If we find that the only interventions that change Y, do so through their ability to change X, then the X–Y relation is said to be invariant under intervention, and X is said to cause Y (Woodward, 2003: 369–370). Woodward now applies this idea to causal mechanisms. A mechanism consists of separate components that have intervention–invariant relations to separate sets of outcomes. These components are modular: they exercise their influence independently. And, like keys on a piano, they can be separately activated with discrete results. This amounts to a precise and novel specification of the meaning of "causal mechanism": "So far I have been arguing that components of mechanisms should behave in accord with regularities that are invariant under interventions and support counterfactuals about what would happen in hypothetical experiments" (374).

A related line of thought on causal analysis is the idea of *difference-making*. This approach to causation focuses on the explanations we are looking for when we ask about the cause of some outcome. Here philosophers note that there are vastly many conditions that are causally necessary for an event but do not count as being explanatory. Lee Harvey Oswald was alive when he fired his rifle in Dallas; but this does not play an explanatory role in the assassination of Kennedy. Crudely speaking, we want to know which causal factors were *salient* and which factors made a difference in the outcome. Michael Strevens (2008) provides an innovative explication of this set of intuitions through the idea of "Kairetic" explanation, a formal way of identifying salient causal factors out of a haystack of causally involved factors in the occurrence of an event guided by generality, cohesion, and accuracy. "To this end, I formulate a recipe that extracts from any detailed description of a causal process a higher level, abstract description that specifies only difference-making properties of the process" (Strevens 2008: xiii).

2.4 Pluralism About Causal Inquiry

This volume is concerned with the problem of causal inquiry and methods for the discovery of causal relations among factors. How can social researchers identify causal relations among social events and structures? The problem of causal inference is fundamental to methodology in the social and policy sciences. A well-informed and balanced handbook of political science methodology is provided by Box-Steffensmeier et al. (2008). Here I will provide a brief discussion of several approaches to causal inferences in the social sciences that follows the typology offered there. Especially relevant is Henry Brady's contribution to the volume (Brady, 2008).

In their introduction to the volume, Box-Steffensmeier, Brady, and Collier propose that there are three important kinds of questions to answer when we are investigating the idea of causal relations in the social world. First is semantic: what do we mean by statements such as "A causes B"? Second is ontological: what are the features of the world that we intend to identify when we assert a causal relationship between A and B? And third is epistemological: through what kinds of investigations and processes of inference can we establish the likelihood of a causal assertion about the relationship that exists among two or more features of the social world? The last question brings us to scientific methodology and a variety of techniques of causal inquiry and inference. However, Box-Steffensmeier, Brady, and Collier are correct in asserting the prior importance of the other two families of questions. We cannot design a methodology of inquiry without having a reasonably well-developed idea of what it is that we are searching for, and that means we must provide reasonable answers to the semantic and ontological questions about causation first. The editors also make a point that is central to the current chapter as well, in favor of a pluralism of approaches to the task of causal inquiry in the social sciences (2008: 29). There is no uniquely best approach to causal inquiry in the social and policy sciences. The editors refer explicitly to a range of approaches that can be used to investigate causation in the social world: qualitative and quantitative investigation, small-n or large-n studies, experimental data, detailed historical narratives, and other approaches.

Henry Brady (2008) provides a useful typology of several families of methods of inquiry and inference that have developed within the social sciences and that find a clear place within the semantic and ontological framework of causation that is developed in this chapter. Brady distinguishes among "neo-humean regularity" approaches, counterfactual approaches, manipulation approaches, and mechanism approaches. And he shows how a wide range of common research methods in the social sciences fall within one or the other of these rubrics. Each of these families of approaches derives from a crucial feature of what we mean by a causal relationship: the fact that causes commonly produce their effects, giving rise to observable regularities; the fact that causes act as sufficient and necessary conditions for their effects, giving rise to the possibility of making inferences about counterfactual scenarios; the fact that causes produce or inhibit other events, giving rise to the

possibility of intervening or manipulating a sequence of events; and the fact that causal relations are real and are conveyed by specific (unobservable) sequences of mechanisms leading from cause to effect, giving rise to the importance of attempting to discover the operative mechanisms.

Brady's typology suggests a variety of avenues of causal inquiry that are possible in the social sciences, given the foregoing analysis of social causes. The ideas sketched in previous sections about the ontology of social causation support multiple avenues for discovering causation. Causes produce their effects, causes work through mechanisms, causal relationships should be expected to result in strong associations among events, and causal necessity supports counterfactual reasoning. We can thus design methods of inquiry that take advantage of the various of ontological characteristics of social causation.

First, the primacy of "real underlying causal mechanisms" suggests that direct research aimed at discovery of the social pathways through which a given outcome is produced by the actions of individual actors within given institutional and normative circumstances is likely to be fruitful. Theory formation about the "institutional logics" created by a given institutional setting can be supplemented by direct study of cases to attempt to identify the pathways hypothesized (Thornton et al., 2012). These insights into the ontology of causation provide encouragement for case-based methods of inquiry, including process tracing, comparative studies, and testing of middle-level social theories of mechanisms. This is a set of methodological ideas supporting causal inquiry developed in detail by George and Bennett (2005), Steinmetz (2004, 2007), and Ermakoff (2019).

Second, the logic of necessary and sufficient conditions associated with the concept of a cause implies methods of research based on experimentation and observation. If we hypothesize that X is a necessary condition for the occurrence of Y, we can design a research study that searches for cases in which Y occurs but X does not. Ragin (1987), Mill (1988), and Tarrow (2010) describe the logic of such cases. The logic of necessary and sufficient conditions also supports research designs based on experimental and quasi-experimental methods—research studies in which the researcher attempts to isolate the phenomenon of interest and observes the outcomes with and without the presence of the hypothetical causal factor. Woodward (2003) illustrates the underlying logic of the experimental approach.

John Stuart Mill's methods of similarity and difference (1988) derive from this feature of the logic of causation. If we believe that A_1 & A_2 are jointly sufficient to produce B, we can evaluate this hypothesis by finding a number of cases in which A_1, A_2, and B occur and examine whether there are any cases where A_1 & A_2 are present but B is absent. If there is such a case, then we can conclude that A_1 & A_2 are not sufficient for B. Likewise, if we believe that A_3 is necessary for the occurrence of B, we can collect a number of cases and determine whether there are any instances where B occurs but A_3 is absent. If so, we can conclude that W is not necessary for the occurrence of B.

2.4.1 Case Studies and Process Tracing

Alexander George and Andrew Bennett (2005) argue for the value of a case study method of social research. The core idea is that investigators can learn about the causation of particular events and sequences by examining the events of the case in detail and in comparison with carefully selected alternative examples. Here is how George and Bennett describe the case study method:

> The method and logic of structured, focused comparison is simple and straightforward. The method is "structured" in that the researcher writes general questions that reflect the research objective and that these questions are asked of each case under study to guide and standardize data collection, thereby making systematic comparison and cumulation of the findings of the cases possible. The method is "focused" in that it deals only with certain aspects of the historical cases examined. The requirements for structure and focus apply equally to individual cases since they may later be joined by additional cases. (George & Bennett, 2005: 67)

The case study method is designed to identify causal connections within a domain of social phenomena. How is that to be accomplished? The most important tool that George and Bennett describe is the method of process tracing. "The process-tracing method attempts to identify the intervening causal process—the causal chain and causal mechanism—between an independent variable (or variables) and the outcome of the dependent variable" (206). Process tracing requires the researcher to examine linkages within the details of the case they are studying and then to assess specific hypotheses about how these links might be causally mediated.

2.4.2 Quantitative Research Based on Observational Data

Quantitative studies of large populations are supported by this theory of causation, if properly embedded within a set of hypotheses about causal relations among the data. In his presentation of the logic of "structural equation modeling" (SEM) and causal inference, Judea Pearl (2000, 2021) is entirely explicit in stating that pure statistical analysis of covariation cannot establish causal relationships. In particular, Pearl argues that a causal SEM requires:

> A set A of qualitative causal assumptions, which the investigator is prepared to defend on scientific grounds, and a model MA that encodes these assumptions. (Typically, MA takes the form of a path diagram or a set of structural equations with free parameters. A typical assumption is that certain omitted factors, represented by error terms, are uncorrelated with some variables or among themselves, or that no direct effect exists between a pair of variables.) (Pearl, 2021: 71)

Aage Sørensen takes a similar view and describes the underlying methodological premise of valid quantitative causal research in these terms:

> Understanding the association between observed variables is what most of us believe research is about. However, we rarely worry about the functional form of the relationship.

> The main reason is that we rarely worry about how we get from our ideas about how change is brought about, or the mechanisms of social processes, to empirical observation. In other words, sociologists rarely model mechanisms explicitly. In the few cases where they do model mechanisms, they are labeled mathematical sociologists, not a very large or important specialty in sociology. (Sørensen, 2009: 370)

Purely quantitative studies do not establish causation on their own; but when provided with accompanying hypotheses about the mechanisms through which the putative causal influences obtain, quantitative study can substantially increase our confidence in inferences about causal relationships among factors. Quantitative methods for research on causation advanced significantly through the development of structural equation models (SEMs) and the structural causal model methodology described by Judea Pearl and others (Pearl, 2000; Pearl, 2009, 2021). This approach explicitly endorses the notion that quantitative methods require background assumptions about causal mechanisms: "one cannot substantiate causal claims from associations alone, even at the population level—behind every causal conclusion there must lie some causal assumption that is not testable" (Pearl, 2009: 99).

2.4.3 Randomized Controlled Trials and Quasi-experimental Research

The method of randomized controlled trials (RCT) is sometimes thought to be the best possible way of establishing causation, whether in biology or medicine or social science. An experiment based on random controlled trials can be described simply. It is hypothesized that:

(H) A causes B in a population of units P.

An experiment testing H is designed by randomly selecting a set of individuals from P into G_{test} (the test group) and randomly assigning a different set of individuals from P into $G_{control}$ (the control group). G_{test} and $G_{control}$ are exposed to A (the treatment) under carefully controlled conditions designed to ensure that the ambient conditions surrounding both tests are approximately the same. The status of each group is then measured with regard to B, and the difference in the value of B between the two groups is said to be the "average treatment effect" (ATE). If the average treatment effect is greater than zero, there is prima facie reason to accept H.

This research methodology is often thought to capture the logical core of experimentation and is sometimes thought to constitute the strongest evidence possible for establishing or refuting a causal relationship between A and B. It is thought to represent a purely observational way of establishing causal relations among factors. This is so because of the random assignment of individuals to the two groups (so potentially causally relevant individual differences are averaged out in each group) and because of the strong efforts to isolate the administration of the test so that each group is exposed to the same unknown factors that may themselves influence the outcome to be measured. As Handley et al. (2018) put the point: "Random

allocation minimizes selection bias and maximizes the likelihood that measured and unmeasured confounding variables are distributed equally, enabling any differences in outcomes between the intervention and control arms to be attributed to the intervention under study" (Handley et al., 2018: 6). The social and policy sciences are often interested in discovering and measuring the causal effects of large social conditions and interventions—"treatments", as they are often called in medicine and policy studies. It might seem plausible, then, that empirical social science should make use of random controlled trials whenever possible, in efforts to discover or validate causal connections.

However, this supposed "gold standard" status of random controlled trials has been seriously challenged in the last several years. Serious methodological and inferential criticisms have been raised of common uses of RCT experiments in the social and behavioral sciences, and philosopher of science Nancy Cartwright has played a key role in advancing these criticisms. Cartwright and Hardie (2012) provided a strong critique of common uses of RCT methodology in areas of public policy, and Cartwright and others have offered convincing arguments to show that inferences about causation based on RCT experiments are substantially more limited and conditional than generally believed.

A pivotal debate among experts in a handful of fields about RCT methodology took place in a special issue of *Social Science and Medicine* in 2018. This volume is an essential reading for anyone interested in causal reasoning. Especially important is Deaton and Cartwright (2018). The essence of their critique is summed up in the abstract: "We argue that the lay public, and sometimes researchers, put too much trust in RCTs over other methods of investigation. Contrary to frequent claims in the applied literature, randomization does not equalize everything other than the treatment in the treatment and control groups, it does not automatically deliver a precise estimate of the average treatment effect (ATE), and it does not relieve us of the need to think about (observed or unobserved) covariates" (Deaton & Cartwright, 2018). Deaton and Cartwright provide an interpretation of RCT methodology that places it within a range of comparably reliable strategies of empirical and theoretical investigation, and they argue that researchers need to choose methods that are suitable to the problems that they study.

One of the key concerns they express has to do with extrapolating and generalizing from RCT studies (Deaton & Cartwright, 2018: 3). A given RCT study is carried out in a specific and limited set of cases, and the question arises whether the effects documented for the intervention in this study can be extrapolated to a broader population. Do the results of a drug study, a policy study, or a behavioral study give a basis for believing that these results will obtain in the larger population? Their general answer is that extrapolation must be done very carefully. "We strongly contest the often-expressed idea that the ATE calculated from an RCT is automatically reliable, that randomization automatically controls for unobservables, or worst of all, that the calculated ATE is true [of the whole population]" (Deaton & Cartwright, 2018: 10).

The general perspective from which Deaton and Cartwright proceed is that empirical research about causal relationships—including

experimentation—requires a broad swath of knowledge about the processes, mechanisms, and causal powers at work in the given domain. Here their view converges philosophically with that offered by Pearl above. This background knowledge is needed in order to interpret the results of empirical research and to assess the degree to which the findings of a specific study can plausibly be extrapolated to other populations.

These methodological and logical concerns about the design and interpretation of experiments based on randomized controlled trials make it clear that it is crucial for social scientists to treat RCT methodology carefully and critically. Deaton and Cartwright agree that RCT experimentation is a valuable component of the toolkit of sociological investigation. But they insist that it is crucial to keep several philosophical points in mind. First, there is no "gold standard" method for research in any field; rather, it is necessary to adapt methods to the nature of the data and causal patterns in a given field. Second, Cartwright (like most philosophers of science) is insistent that empirical research, whether experimental, observational, statistical, or Millian, always requires theoretical inquiry into the underlying mechanisms that can be hypothesized to be at work in the field. Only in the context of a range of theoretical knowledge is it possible to arrive at reasonable interpretations of (and generalizations from) a set of empirical findings.

Many issues of causation in the social and policy sciences cannot be addressed in a controlled laboratory environment. In particular, in many instances, it is impossible to satisfy the condition of random assignment of individuals to control and treatment groups. Much data available for social science and policy research is gathered from government databases (Medicaid, Department of Education, Internal Revenue Service) and was assembled for statistical and descriptive purposes. Hypotheses about the causes of failing schools, ineffective prison reforms, or faulty regulatory systems are not amenable to the strict requirements of randomized controlled trials. However, social and policy scientists have developed practical methods for probing causation in complex social settings using natural experiments, field experiments, and quasi-experiments.

Quasi-experiments, field experiments, and natural experiments are sometimes defined as "randomized controlled trials carried out in a real-world setting" (Teele, 2014: 3). This definition is misleading, because the crucial feature of RCTs is absent in a quasi-experiment: the random assignment of units to control and treatment groups. What quasi-experiments have in common is an effort to replace random assignments of units to control and treatment groups with some other way of stratifying available data that would permit inference about cause and effect. Quasi-experiments involve making use of observational data about similar populations that have been exposed to different and potentially causally relevant circumstances. The researcher then attempts to discover treatment effects based on statistical properties of the two groups. In this volume, Battistin and Bertoni (Chap. 3) describe an ingenious set of constructs to uncover the effects of cheating on educational performance examination scores in Italy, based on what they refer to as "instrumental variables" and "regression discontinuity design." The former is a component of the composition of the control group that can be demonstrated to be random. The

authors show how this randomness can be exploited to discover the magnitude of effects of the non-random components in the composition of the control group. The latter term takes advantage of the fact that some data sets (class size in Italy, for example) are "saw-toothed" with respect to a known variable. The example they use is the government policy in Italy that regulates class size. School populations increase linearly, but government policy establishes the thresholds at which a school is required to create a new class. So class size increases from the minimum to the maximum, then declines sharply, and continues. This fact can be exploited to examine school performance in classes currently near the minimum versus classes currently near the maximum. This approach removes school population size from the selection and therefore succeeds in removing a confounding causal influence, which is exactly what randomization was intended to do.

The reasoning illustrated in Battistin and Bertoni (Chap. 3) is admirable in the authors' effort to squeeze meaningful causal inferences out of a data set that is awash with non-random elements. However, as Battistin and Bertoni plainly demonstrate, it is necessary to be rigorously critical in developing and evaluating these kinds of research designs and inferences. Stanley Lieberson's *Making It Count* (1985) formulates a series of difficult challenges for the logic of quasi-experimental design that continues to serve as a cautionary tale for quantitative social and policy research. Lieberson believes that there are almost always unrecognized forms of selection bias in the makeup of quasi-experimental research designs that potentially invalidates any possible finding. Cartwright and Hardie (2012) extend these critical points by underlining the limitations on generalizability (external validity) that are endemic to experimental reasoning. So selection bias is still a possibility that can interfere with valid causal reasoning in the design of a quasi-experiment.

What conclusions should we draw about experiments and quasi-experiments? What is the status of randomized controlled trials as a way of isolating causal relationships, whether in sociology, medicine, or public policy? The answer is clear: RCT methodology is a legitimate and important tool for sociological research, but it is not fundamentally superior to the many other methods of empirical investigation and inference in use in the social sciences. Methodologies supporting the design and interpretation of quasi-experiments are also subject to important methodological cautions in the social science and policy studies. It is necessary to remain critical and reflective in assessing the assumptions that underlie any social science research design, including randomized controlled trials and sophisticated quasi-experiments.

2.4.4 Generative Models and Simulation Methods

Advances in computational power and software have made simulations of social situations substantially more realistic than in previous decades. An early advance took place in general equilibrium theory, leading to a set of models referred to as "computable general equilibrium models." Instead of using a three-sector model to

illustrate the dynamics of a general equilibrium model of a market economy, it is now feasible to embody assumptions for one hundred or more industries and work out the equilibrium dynamics of this substantially more realistic representation of an economic system using a computable model (Taylor, 1990). Of special interest for political scientists and policy scholars is the increasing sophistication of agent-based models (de Marchi and Page, 2008). Kollman et al. (2003) provide a highly informative overview of the current state of the field in their *Computational Models in Political Economy*. They describe the chief characteristics of an agent-based model in these terms:

The models typically have four characteristics, or methodological primitives: agents are diverse, agents interact with each other in a decentralized manner, agents are boundedly rational and adaptive, and the resulting patterns of outcomes comes often do not settle into equilibria…. The purpose of using computer programs in this second role is to study the aggregate patterns that emerge from the "bottom up" (Kollman et al. 2003: 3).

An often-cited early application of agent-based models was Thomas Schelling's segregation model. Schelling demonstrated that residential segregation was likely to emerge from a landscape in which two populations had tolerant but finite requirements for the ethnic composition of their neighborhoods (Schelling, 1978). A random landscape populated with a mix of the two populations almost always develops into a segregated landscape of the populations after a number of iterations. Agent-based models can be devised to provide convincing "generative" explanations of a range of collective phenomena; and when developed empirically by calibrating the assumptions of the model to current empirical data, their results can result in reasonable predictions about the near-term future of a given social phenomenon (Epstein, 2006).

We can look at ABM simulation techniques as a form of "mechanisms" theory. A given agent-based model is an attempt to work out the dynamics of individual-level actions at the meso- and macro-level; and this kind of result can be interpreted as an empirically grounded account of the mechanisms that give rise to a given kind of social phenomenon. This feature of agent-based model methodology gives researchers yet another tool through which to probe the social world for causal relations among social features.

2.5 Realism and Methodological Pluralism

Let us draw to a close. Here are some chief features of social science research that proceeds in ways consistent with this realist view of causation in the social world:

- Productive social science research makes use of eclectic multiple theories and do not expect a unified social theory that explains everything.
- Realist social scientists are modest in their expectations about social generalizations.

- They look for causal mechanisms as a basis for social explanation.
- They anticipate heterogeneity and plasticity of social entities.
- They are prepared to use eclectic methodologies—quantitative, comparative, case study, ethnographic—to discover the mechanisms and mentalities that underlie social change.
- Causal reasoning requires background theories about causal relationships in the domain under study. These theories are corrigible, but some set of assumptions about "the causal structure of the world" is unavoidable.

Central in these ideas is the value of *methodological pluralism*. The ultimate goal of research in the social and policy sciences is to discover causal relationships and causal mechanisms. We want to know how the social world works and how we might intervene to change outcomes that are socially undesirable. There are a wide range of methods of inquiry and validation that are used in the social sciences: ethnographic methods (interviews and participant observation), case study analysis, comparative case study research, models and simulations of social arrangements of interest, and large-scale statistical studies. The philosophical position of methodological pluralism is the idea that there is a place in social and policy research for all of these tools and more besides. What holds them together is the fact that in each case, our ultimate concern is to discover the causal relationships that appear to hold in the social world and the mechanisms that underlie these relationships.

The central conclusion to be drawn here is that multiple methods of empirical investigation are available, and our research efforts will be most productive when we are able to connect empirical findings with hypotheses about social-causal mechanisms that are both theoretically and observationally supported. And equally importantly, it is crucial for researchers from different methodological traditions to interact with each other so that their underlying assumptions about causation and causal inference can be refined and validated.

Review Questions

1. What is an "actor-centered" approach to social explanation and policy research?
2. What is a social mechanism? Can you give an example or two?
3. Why is the assumption of random assignment of subjects to control and treatment groups so important for the design of an experiment?
4. What is an agent-based model? Why is it useful in trying to discover causes in the social world?
5. What is the difference between "ontology" and "methodology" in the social sciences?

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Suggested Readings

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