

Mayntz, Renate

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## Mechanisms in the analysis of macro-social phenomena

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## **MPIfG Working Paper 03/3, April 2003**

### **Mechanisms in the Analysis of Macro-Social Phenomena**

Renate Mayntz (mayntz@mpifg.de), Max Planck Institute for the Study of Societies

#### **Abstract**

The paper is a contribution to a forthcoming special issue of the Journal Philosophy of the Social Sciences, edited by Andreas Pickel. The term (social) mechanism can be found frequently in recent social science literature, but only few authors have attempted to spell out systematically what exactly the term refers to. The paper begins by trying to close this gap. Use of the term (social) mechanism is the hallmark of an approach that is critical of the emphasis on correlational analysis, and on the covering-law model of explanation. The term mechanism, it is argued, should be used to refer to recurrent processes generating a specific kind of outcome or event; mechanism statements are accordingly statements about recurrent processes. Explanation of social macro phenomena by mechanisms typically involves causal regression to lower level elements, as stipulated by methodological individualism. But while we already have a good-sized tool-box of mechanism models at hand to explain emergent effects of different forms of collective behavior, we lack a similarly systematic treatment of generative mechanisms where structural configurations and corporate actor constellations play the decisive role in the production of an effect.

#### **Zusammenfassung**

Das Papier wird als Aufsatz in einem von Andreas Pickel herausgegebenen, in Vorbereitung befindlichen Sonderheft der Zeitschrift Philosophy of the Social Sciences erscheinen. Der Begriff (sozialer) Mechanismus findet sich relativ häufig in der neueren sozialwissenschaftlichen Literatur, aber nur wenige Autoren widmen sich einer systematischen Begriffsklärung, wie sie hier einleitend versucht wird. Mit der Verwendung des Begriffs (sozialer) Mechanismus ist gewöhnlich eine Kritik am korrelationsanalytischen Ansatz und an nomologisch-deduktiver Erklärung verbunden, die den Prozesscharakter sozialer Wirklichkeit ausblenden. Der Begriff Mechanismus, so wird argumentiert, sollte speziell zur Bezeichnung wiederkehrender Prozesse dienen, die am Zustandekommen bestimmter Makrophänomene beteiligt sind. Eine Erklärung von Makrophänomenen durch Mechanismen geschieht gewöhnlich durch kausale Regression auf eine niedrigere Systemebene. Das entspricht dem Modell des methodologischen Individualismus, der allerdings durch die Reduktion auf individuelles Handeln jenen Transformationsmechanismen kaum gerecht wird, bei denen strukturelle Konfigurationen und Akteurkonstellationen die kausal entscheidende Rolle spielen.

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### 1 Why Study Mechanisms?

Thinking in terms of mechanism has a venerable tradition. It can be traced to seventeenth century realist philosophy "which brought with it a much closer attention to the mechanics of scientific experimentation and laid great stress on how physical laws are explained by the action of *underlying*, microscopic mechanisms" (Hedström/Swedberg 1996, 285). In today's social sciences, an explicit search for and interest in mechanisms is typically advocated by sociologists and philosophers of science who oppose the dominant tradition of correlational (or multivariate) analysis in quantitative research. The critique of correlational analysis has been aptly summarized by Mahoney (2001, 575-577); correlations, even non-spurious correlations in which the time order is well established, are inherently limited representations of causal processes. "[P]ositivists since Hume ... have redefined causation as regular conjunction or succession", Bunge (1997, 423) states, but the aim is "to step away from the description of regularities to their explanation" (Pawson 2000, 288) and to look for the mechanisms underlying such associations. This argument is made in similar form by most authors who are critical of the explanatory power of correlational analysis, the variable-centered type of theorizing.

The general methodological problem of the explanatory potential of correlational analysis is particularly acute for research dealing empirically with such macro-phenomena as regime transformation, the welfare state crisis, or European integration. Where research on such topics aims to go beyond description and produce general theoretical statements, it is confronted by the well-known small-N problem. To solve this problem, techniques have been developed that permit the formulation of general statements on the basis of a systematic and preferably quantitative comparison of a small number of cases. Examples are the increasingly popular pooled time-series cross-section analysis (Beck/Katz 1995), and Ragin's analytical techniques based on Boolean algebra and fuzzy set theory (Ragin 1987, 2000). These formalizing and quantifying approaches have been criticized on technical grounds such as the validity of their operationalizations, but also because they only permit to make statements about the co-variation of properties, while the nature of the causal relationship involved remains a black box. To overcome this explanatory deficit, an approach that has variously been called "systematic process analysis" (Hall 2003) or "causal reconstruction" (Mayntz 2002) is being advocated. Causal reconstruction does not look for statistical relationships among variables, but seeks to *explain* a given social phenomenon - a given event, structure, or development - by identifying the processes through which it is generated. Causal reconstruction may lead to a (more or less complex) historical narrative, but in its theoretically more ambitious version, causal reconstruction aims at generalizations - generalizations involving processes, not correlations. The identification of causal mechanisms is the hallmark of such an approach.

If mechanisms are crucial in the causal reconstruction of social macro-phenomena, the concept should be fashioned as a sharp analytical instrument. But a survey of the relevant empirical and methodological literature soon bogs down in a mire of loose talk and semantic confusion about what "mechanisms" are. There are not many social scientists or philosophers of science who have tried to deal with the topic more systematically. Among social scientists, the names most frequently mentioned in this connection are Boudon, Coleman, Elster, Hedström and Swedberg, Merton, and Stinchcombe. Even among these

authors there is no agreement about the defining criteria of "(social) mechanism". A still incomplete list of definitions assembled by Mahoney (2001, 579-560) counts 24 different definitions by 21 authors. Mechanisms are considered to be lawful processes, yet they are also opposed to laws. The term mechanism is moreover applied to a host of highly diverse phenomena - from rational choice to the French revolution, from driving forces (or factors) such as social norms (e.g. Elster 1989, Petersen 1999, 63) to outcomes of interaction processes such as voluntary agreement (Knight 1995, 105). Part of the semantic noise thus created follows from the ambiguity of many of our basic social science concepts, concepts that can refer both to a process and to a (static) outcome. "Cooperation" and "competition" are but two of many examples. Of course it is entirely legitimate to *label* a mechanism that has been spelled out in detail by a noun that refers to a process, an outcome, or a factor. But to use a terminological label merely to *allude* to a process that remains unspecified has no more explanatory value than the simple statement of a correlation. This article is a plea for a more disciplined use of the concept of social mechanism. To this purpose, I shall discuss some of the more confusing issues in the use of the concept, especially as it is used in the causal reconstruction of social macro-phenomena. The distant goal of this discussion is an analytical frame to guide explanation in terms of mechanisms. This goal can of course not be reached in this article, but hopefully a road leading towards it will have been charted in the end.

## 2 What Mechanisms Are, and What They Are Not

The term "mechanism" is used both to designate a certain class of real phenomena (mechanisms *are* such and such, they *do* such and such), and to designate a class of (causal) propositions referring to such phenomena. Statements about social mechanisms are often considered to be the building blocks of middle-range theories, advocated by Merton (1957) to avoid the vain search for social laws. Merton's view that mechanisms constitute the middle ground between description and social laws was quickly taken over by Karlsson (1958), and has since been reiterated, among others, by Hedström and Swedberg (1996, 282-284), Elster (1998), Pawson (2000), and Esser (2002). To contrast mechanisms to social "laws" means to oppose an explanation by mechanisms to the covering-law model of causal explanation. The covering-law model is often criticized for the same reason brought against correlational analysis: A nomological-deductive explanation involving lawlike propositions "supplies no understanding" (Bunge 1997, 412), it "give(s) no clue whatsoever as to *why*" a relationship exists: "Covering-law explanations in the social sciences therefore normally are 'black-box' explanations" (Hedström/Swedberg 1996, 287). Unlike correlations, however, the "laws" used in nomological-deductive explanations are (often implicitly) taken to be characterized by a high degree of generality, if not universality. This is a second, and different, issue raised by the covering-law model: In the social world we do not find anything like the universal laws of physics. Physical laws presuppose elements that are invariant in time and space, but in the social world, elements vary substantially in historical time and cultural space. Instead of vainly looking for "laws" that do not exist in the social world, we are advised to look for social mechanisms, which are perceived as regularities of a less general scope than laws. [1] This middle-ground argument is, however, only plausible if the terms "law" and "lawful" refer to propositions of near-universal applicability. But the logic of a nomological-deductive explanation does not necessarily require universal and deterministic laws; the law-like proposition "If A, then B" may explicitly include a *ceteris paribus* clause that limits its applicability in time and space. On the other hand, the middle-ground argument also ignores the fact that statements of mechanisms vary widely in their degree of generality (or abstraction). The main difference between a mechanism

approach and a covering-law approach is not that mechanism statements are less general than the propositions in a nomological-deductive explanation, but that in the analytical theory of science (e.g. Nagel 1961, Hempel 1965), "laws" are basically general statements about co-variation, i.e. "laws" point out causal *factors*, and not processes.

Ontologically speaking, the term mechanism refers to *recurrent processes* linking specified initial conditions and a specific outcome. This holds for mechanisms in general; in the case of social mechanisms, social phenomena are to be explained. If social mechanisms refer to recurring processes, mechanism concepts must be "truncated abstract descriptions" (Machamer/Darden/Craver 2000, 15). Statements of mechanisms are accordingly *generalizing* causal propositions. This criterion is, however, not unanimously accepted. Occasionally the term mechanism is also applied to unique (historical) causal chains. Boudon even includes this possibility in his definition when he calls a social mechanism (SM) "the well-articulated set of causes responsible for a given social phenomenon. With the exception of typical simple ones, SMs tend to be idiosyncratic and singular" (Boudon 1998, 172). Helmström and Swedberg (1996, 289) on the other hand require "some generality" in their definition, and at least implicitly most authors agree that mechanism statements are *causal generalizations about recurrent processes*. In this sense the term shall be used in this article.

Substantively speaking, mechanisms state *how*, by what intermediate steps, a certain outcome follows from a set of initial conditions. A mechanism provides a clear causal chain, it is "concrete, lawful, scrutable" (Bunge 1997, 439). While we may designate or label such processes by a single term, a mechanism is only *identified* when the process linking an outcome and specific initial conditions is spelled out. Causal propositions about mechanisms are correspondingly complex formulations. It is, for instance, not enough to state *that* ideas etc. influence behaviour; interpretive theories require "a plausible mechanism to account for *how* symbols, traditions, rituals, and myths influence social and political interaction" (Johnson 2002, 227; emphasis added). The specification of causal chains is what distinguishes propositions about mechanisms from propositions about correlations.

The notions of "causal chain" and "underlying process" imply that there should not be too much proximity between cause and effect. If a cause produces an effect without intermediate steps, no mechanism is involved, and the stated relationship even runs the danger of being a tautology (Kitschelt 2003). The term mechanism should therefore be reserved for processes involving linked activities of several units or elements, and not applied to "unit acts". As Elster (1989, 7) puts it, a causal mechanism typically has "a finite number of links". Most authors seem to share this view, even if only implicitly, as when they say that a mechanism involves a *series* of events linking certain initial conditions with a given effect (e.g. Little 1991, 15). In general discussions of the mechanism concept, the links are conceived of as "entities" and "activities" - still very much in the seventeenth century tradition of early mechanistic thought, but applicable also to social mechanisms. Entities and activities are organized in a process that leads "from start or set-up to finish or termination conditions" (Machamer/Darden/Craver 2000, 3). Craver, who uses examples from biology, adds that mechanisms have an "active organization", which is "... sustained by their characteristic spatial and temporal organization" (Craver 2001, 60).

Whereas the spatial organization of the components is of obvious importance for biological mechanism, its role in social mechanism has never been systematically discussed. Temporality, on the other hand, is clearly a characteristic of social

mechanisms: social mechanisms are recurrent processes taking place in time. This, however, does not mean that mechanisms are always organized in a linear way, causal chains in which one element after the other is activated, as in a wave rippling through a lake, or a chain reaction involving each component only once. Mechanisms may consist of a sequence of actions involving different social elements, as in a diffusion process. But they can also involve repeated actions of the same elements, as in an escalation process. The causal chain can contain feedback loops, and each unit involved in the process may undergo changes (Büthe 2000, 485). The causal structure of mechanisms can, in other words, be linear as well as non-linear.

In addition to the defining criteria just discussed, mechanisms are occasionally defined as unobservable, and as processes that only occur in a system. In both cases I would argue that just as mechanisms can be, but must not be linear, they also can be, but must not be unobservable and part only of systems. The view that mechanisms are unobservable is held, for instance, by Mahoney. For him, "[c]ausal mechanisms are *posited* relations or processes that the researcher *imagines* to exist", they are "unobservables" (Mahoney 2001: 581; emphasis added). This view has its roots in seventeenth and eighteenth century realist philosophy, which reacted to the failure to actually *observe* causes in experimental research that had previously been conceived as external forces. [2] Observability is, however, a variable: it varies between segments of reality, and in the natural sciences it also improves over time with the development of sophisticated research technology. Social mechanisms are de facto often theoretically constructed, but they are not necessarily and by definition unobservable. This also seems to be the position of Bunge (1997, 420: "most mechanisms are hidden") and of Hedström and Swedberg (1996: 290).

Bunge (1997, 414) defines mechanism as "a process in a concrete system", and throughout the article he talks only about processes within systems. If, however, we take the concept of system seriously and define systems restrictively, it is obvious that mechanisms do not logically presuppose a systemic context - even if they do play a crucial role in system functioning. Unless everything social is by definition considered to constitute a system or to be part of a (social!) system, we must admit that mechanisms can also operate outside of a systemic context. Just as has been argued for observability, the embeddedness of mechanisms in a systemic context should be seen as a variable, a property that may, but need not be there in order to call something a social mechanism.

### **3 Mechanisms as Causal Links**

If the aim of a study is the causal reconstruction of a specific macro-phenomenon or a class of macro-phenomena (e.g. contentious episodes), the search for mechanisms starts not with a correlation, but with the identification of an *explanandum*. The term "*generative* mechanism" underlines this explanatory strategy. Processes generally do not come as discernable, "given" units; they have no naturally given beginning and end. We artificially pick out a sequence, a part of the ongoing process, and try to explain how it has come to the particular point that is our *explanandum*. Especially in historical research, the clear specification of the *explanandum* is the only methodological justification for making choices about where to begin an analysis (Büthe 2000: 487-488). The *explanandum* may be an event like a riot or a specific policy decision, a rate (e.g. of unemployment), a relational structure (e.g. neo-corporatism), a statistical distribution (e.g. the demographic structure), and even a process (e.g. of technological development or institutional change). In each case, explanation means causal reconstruction, a retrospective process-tracing that ends with the identification of crucial initial conditions.

There is no agreement in the literature whether the formulation of a mechanism includes or excludes initial conditions and outcomes, i.e. whether the term "mechanism" refers to a (recurrent) process from beginning to end, or only to that part of it which "*links*" beginning and end. Machamer, Darden and Craver (2000) use the term explicitly for entire processes; for them, a mechanism consists of set-up conditions, intermediate activities, and termination conditions. Hedström and Swedberg (1996) on the other hand use the term "mechanism" to refer to that part of a process that "*links*" cause (or input, as they say) and effect (outcome), or formally expressed: I - M - O. The mechanisms M serves to *explicate* an observed relationship between specific initial conditions and a specific outcome. Pawson's formula "context - mechanism - outcome" can be understood in the same way (Pawson 2000). The notion of mechanisms as *intervening* between I = the *explanans* and O = the *explanandum* takes correlational analysis visibly as point of departure, and critically develops an alternative to it by adding the causal link M. But care must be taken not to equate an intervening mechanism with an intervening *variable*, as it is used in correlational analysis. As Mahoney states, quoting seven authors as evidence, "[a] causal mechanism is often understood as an intervening variable or set of intervening variables that explain why a correlation exists between an independent and a dependent variable". But, he continues, "this definition unfortunately does not go beyond correlational assumptions" (Mahoney 2001, 578). In fact, an intervening variable is a variable that is added to increase the total variance explained in a multivariate analysis. Intervening variables are not process links. [3]

If a mechanism is represented as *linking* two events or system states, contingency resides in the initial (or context) conditions that are not part of the mechanism itself. The difference between the definition of mechanisms as processes merely *linking*, or *including*, variable initial and terminal conditions may be moot, but it does reflect two different cognitive interests: the interest in that which is constant in a mechanism, or the interest in the variability of its operation. The first perspective, expressed in the I - M - O model, also underlies Elster's often quoted definition of mechanisms as "frequently occurring and easily recognizable causal patterns that are triggered under generally unknown conditions or with indeterminate consequences" (Elster 1998, 45 ). The apparent impossibility to say when a mechanism will be triggered is the result of not including an important initial condition in its formulation. A virus cannot start an epidemic in a fully immunized population, nor is a spark enough to trigger an explosion; the powder must also be dry.

It does not make any difference for a substantive analysis whether outcomes and initial conditions are included in the formal definition of a mechanism or not, as long as we look at the whole process and recognize that "inputs" and "outputs" can vary, making outcomes contingent on variable initial conditions. The initial conditions in a proposition are stated explicitly; they are known conditions, and outcomes vary in predictable ways with changes in these conditions. Of course there is also some contingency in outcomes following from unknown factors included in the *ceteris paribus* clause that holds for mechanism statements as for all except truly universal propositions, but this is evidently not what the "I" in the I - M - O model refers to. Though in different ways, both the I - M - O model and Elster's definition suggest that there is something constant in mechanisms, something that may not change if the mechanism under review is not to lose its identity and become a different mechanism altogether. If inputs and outcomes are permitted to vary, it is the sequence of steps, the causal structure of the generative mechanism that must remain constant.

#### 4 Causal Regression and the Limits of Methodological Individualism

To bring some order into the confusing variety of phenomena called "mechanisms", it is useful to distinguish between a) the level of reality they refer to, b) their degree of conceptual abstraction, and c) their assumed scope of application. If social phenomena are explained by psychological mechanisms and psychological phenomena by neurological processes, causal regression from a higher to a lower level of reality is involved. Elements on different levels of reality can stand in a part-whole relation, like cells to an organism, or human actors to a social system. System level phenomena are then explained by the activities of the parts. Mechanisms, accordingly, exist in a "nested hierarchy": The activity of an entity at a given level may be looked at (1) in isolation, (2) constitutively, i.e. by identifying the lower level mechanisms that generate its activity, or (3) contextually, by showing how it fits into the organization of a higher-level mechanism (Craver 2001, 65-71). In the philosophy of science it is generally held that "(f)or a higher-level law to be mechanically explicable, it must be realized by some lower-level mechanism" (Glennan 1996, 62).

In contrast, conceptual abstraction takes place on a single level of reality; the concepts "United Kingdom in 1990", "twentieth century West European states", and "modern states" all refer to the same kind of social unit. It is possible to develop highly general concepts of mechanisms if we pare down complex concrete processes to the bare bones of basic interaction types, such as cooperation, competition, negotiation and subjugation. Karlsson (1958), Elster (1989), and Bunge (1997) have all spoken of such basic social processes and called them mechanisms. Propositions about mechanisms can form conceptual hierarchies, ranging from the particular to the highly general. "Path dependent technological innovation", "increasing returns", and "positive feedback" are increasingly general concepts that can be applied to the same case, for instance the frequently cited QWERTY case of the typewriter keyboard (David 1985).

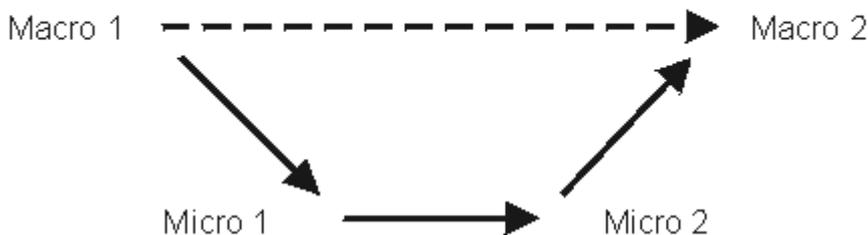
More abstract concepts are often called more general, and indeed their scope of application is wider than that of their more specific sub-categories. There are more cases of positive feedback, for instance, than of path dependent technological innovation, more cases of "cooperation" than, say, of neo-corporatism. But there are also possible differences in the scope of application independent of the degree of conceptual abstraction. Such differences would be based on differences in the inherent regularity between, for instance, physical reality on the one hand, where (near-)universal regularities can be found, and organisms and social systems on the other hand. In fact, this has been argued by biologists and social scientists alike. Conceivably, the general concept of negative feedback, the threshold-dependent balancing of activating and inhibiting forces, has a more restricted scope of application in the social than in the organic world. Any given mechanism statement can, then, be characterized by a) the level of reality it refers to, b) its degree of conceptual abstraction, and c) the scope of its claimed applicability at a given level of abstraction. Of these distinctions, the first plays the most significant role in the discussion about mechanisms.

Complex social units are seen as part-whole hierarchies, with human actors and their actions as elements. Hedström and Swedberg (1996, 299) state peremptorily that "there exist no macro-level mechanisms". According to Büthe (2002, 483), causal mechanisms "are usually derived from very general theories of the constraints, motivations, and cognitive processes employed in decision making and thus shaping human agency". Little argues that social regularities are emergent phenomena not directly governed by any laws;

the only *governing* regularities in social reality are regularities of individual agency (Little 1993, 188). These quotes express the basic tenet of methodological individualism; it calls for causal regression in the explanation of social macro-phenomena on the assumption that system properties are not caused directly by other system properties, but by the activities of the system elements.

The principle of methodological individualism is often illustrated by the macro-micro-macro model of sociological explanation. Developed by Coleman (1986, 1990) and adopted among others by Esser (1993, 2002) and Hedström and Swedberg (1996), this model states that the connection between two macro phenomena (e.g. protestant ethic and capitalist economy, improved social conditions and revolution) must be explained by going down to the level of motivated human beings and their activities. The model can also be applied to processes of change in a given social structure or institution. Micro1 stands for individual reactions to situational givens determined by Macro1, Micro2 for the behavior thus induced. The "fixed kernel" (Coleman 1990, 11) of the model at the micro level is a theory of action, whether perceived in terms of rational choice or in terms of interpretive social science (Little 1991: 11); a mechanism based account is quite compatible with different social theories of action. Some authors (as for instance Elster 1989) go even a step further and explain social action by cognitive and other psychological mechanisms (e.g. frustration-aggression, reactance).

**Figure 1**



Adapted from Coleman (1986, 1990).

For purely pragmatic reasons, it is of course often not possible to go down to the level of individual behavior in empirical research that tries to account for a macro-event or change process. If the macro-effect to be explained is for instance the result of bargaining among formal organizations (unions, business organizations, governments) one would not go down to the level of the individual organization members to explain the strategic choices of the corporate actors - not only for pragmatic reasons, but also because causal regression to the micro level of individual action is not necessary as long as it is possible to attribute actor quality to larger social units. Stinchcombe makes a similar point when he doubts the explanatory surplus value of seeking an explanation of collective patterns of magical practice at the individual level. He concludes:

Where there is rich information on variations at the collective or structural level, while individual-level reasoning (a) has no substantial independent empirical support and (b) adds no new predictions at the structural level that can be independently verified, theorizing at the level of [individual level] mechanisms is a waste of time. (Stinchcombe 1991: 379-380).

But even where going down to the level of individual behavior is feasible, it would be a fateful misunderstanding to believe that macro-phenomena follow directly from motivated individual behavior.

Let us return for a moment to the I - M - O model of mechanisms. If we project this model onto the full macro-micro-macro model of sociological explanation, "M" refers to the whole sequence of steps linking Macro 1 and Macro 2. However, the I - M - O model can also be applied separately to all of the three relations making up the macro-micro-macro model. Thus, the outcome "O" in the I - M - O model can be an action situation as well as a type of behavior (such as divorcing; see Esser 2002), or a macro phenomenon. Looked at more closely, the macro-micro-macro model of sociological explanation therefore consists of three different types of mechanisms: macro-micro, micro-micro, and micro-macro. Macro-micro mechanisms are involved in the generation of action situations; micro-micro mechanisms generate individual behavior; and micro-macro mechanisms generate macro-phenomena. These three kinds of mechanisms are the basis of the typology most often adopted by authors who try to make typological distinctions at all, something that is the exception rather than the rule.

Prominent among those using this threefold typology are Hedström and Swedberg (1996), who speak of situational (macro-micro), individual action (micro-micro), and transformational (micro-macro) mechanisms (Hedström/Swedberg 1996, 296-298; see also Müller 2001, 55). An independently developed threefold typology is offered by Tilly (2001) and by McAdam, Tarrow and Tilly (2001), who distinguish between environmental, cognitive, and relational mechanisms. Environmental mechanisms (such as resource depletion) produce changes in "the conditions affecting life"; cognitive mechanisms refer to psychological mechanisms driving specific kinds of behavior; and relational mechanisms "alter" the "connections among people, groups, and interpersonal networks" (Tilly 2001: 26). Looked at superficially, this typology seems very similar to the Hedström and Swedberg typology. Cognitive mechanisms driving specific kinds of behavior clearly fall into the category of micro-micro mechanisms. It is less evident that environmental mechanisms correspond to the category of macro-micro mechanisms: They do (by definition) affect action situations, but possibly by non-social factors such as resource depletion. Relational mechanisms, finally, may seem to fall into the category of Hedström and Swedberg's transformational mechanisms. But if one looks more closely at their substantive content, an important difference to the dominant conceptions of micro-macro mechanisms becomes visible. As the term indicates, relational mechanisms emphasize relations, i.e. structures, and not only individual action. This holds for such basic mechanisms as competition (considered as interaction process), and it also holds for the mechanism of brokerage that plays an important role in the social processes leading to contentious episodes analyzed by McAdam, Tarrow and Tilly. Brokerage is not defined as a specific type of action (brokering), but as the process linking "two or more unconnected social sites by a unit that mediates their relation with one another and/or with yet other sites" (McAdam, Tarrow, Tilly 2001, 26).

Relational mechanisms are of crucial importance for the causal reconstruction of social macro-phenomena. This directs attention to a critical weakness of the macro-micro-macro model. As graphically depicted, Coleman's model has a built-in bias in favor of individual action (or agency). Before re-emerging in the description of the outcome, structural and institutional factors appear in the model only as determinants of the action situation of individuals. The micro-macro mechanism seems to generate macro-effects directly from individual action. Such a notion fits quite well where macro-phenomena appear as emergent effects of the interdependent, but uncoordinated actions of many individuals, as

for instance in diffusion or mobilization processes. Not surprisingly, it is exactly such processes that not only Coleman himself, but also Boudon (1979) and most of the authors in the Hedström and Swedberg (1998) collection concentrate on. The same holds for Karlsson (1958), who speaks generally of "interaction mechanisms", of which he distinguishes two subtypes: diffusion mechanisms and choice mechanisms. The latter are determined by the preferences and properties of actors, and generate typically distributional structures such as endogamy or spatial segregation. Even Elster (1989), where he goes beyond the explication of psychological mechanisms, concentrates on aggregate effects [4] of motivated individual behavior.

However, the identification of "micro" with individual action implicitly eliminates structural features from the core of the mechanism directly responsible for a macro-phenomenon. True, Coleman (1990, 11) notes discursively that individual action produces different social phenomena "when located in different social contexts", and lists "various ways in which actions combine to produce macro-level outcomes" (Coleman 1990, 11, 20), but no effort is made to include structural features explicitly in the micro-macro part of the model. [5] In fact, however, macro-structures, i.e. relational constellations that may, but need not be institutionally based, are integral parts of the processes generating social macro-phenomena; they are in fact the *decisive* parts.

This is evident even for aggregate (emergent, interaction) effects following from the actions of the individuals in a given population. In the diffusion of an innovation, a rumor, or a disease, the receptivity of each individual determines only whether, if contacted, she will adopt an innovation, believe and pass on a rumor, or fall ill. But the shape of the whole process, how quickly it extends, how highly it peaks or whether it breaks off at an early point is entirely dependent upon the contact structure in the population and the *profile* of receptivity over all individuals - both undoubtedly macro-structural, and both undoubtedly components of the generative mechanism. This has been clearly recognized by Granovetter who, in his analysis of threshold models of collective behavior, emphasizes the need to "specify the impact of social structure on collective outcomes" (Granovetter 1978, 1430). The mechanism generating the macro-effect "market equilibrium" also depends on structural features, such as the existence of a plurality of competing producers and the absence of political price fixing; the rational decisions of individuals to offer or buy are the "material stuff" of the process, but its shape is determined by these structural elements. Even the famous "tragedy of the commons" does not simply result from the rational behavior of individuals who discount future (or collective) costs against present (or private) profit; this action orientation leads to a "tragedy" only if land for grazing is institutionally defined as common property. Arguing along this line, Ostrom generally emphasizes the importance of institutional rules for the occurrence and solution of common pool resource problems; more recently she even includes structural properties of the social groups in her analysis (Ostrom 1990, 1999). In all of these cases, specific structural (or institutional) features are decisive for the generation of aggregate macro-effects.

This is even more evident when we deal with outcomes resulting from specific types of actor constellations. A classical example is Elias' *Königsmechanismus* which operates in the sociogenesis of the modern state (Elias 1969). The basis of this mechanism is a hierarchical relationship between a central authority and a plurality of lower level power centers envious of their autonomy. As the power of the central authority increases, the lower level units shift from competition among each other to cooperation, thus weakening the central authority; this eases pressure on the lower level units, which revert to competition among each other. This particular actor constellation thus generates a

repeated oscillation between centralization and decentralization. Or to take a present-day example: policy blockades (as outcomes) that occur in federal states are the consequence of a structure of constitutionally defined veto points that offer a regional or political minority the opportunity to deny the passage of legislation. Structural factors are also decisive when experts can find a problem solution on the basis of technical arguments in a negotiation structure where the resolution of distributional conflicts is organizationally separated from the technical discourse. Of course structures exert their effect through the actions of individuals, but assuming a general action orientation of individuals (for instance rational choice), it is the nature of the structural arrangements within which they act that determines the effect. If the *explanandum* is a macro phenomenon, or the connection between two macro phenomena such as a contribution based welfare system and a growing unemployment rate, the main cognitive challenge is therefore to identify the structural and institutional features that *process* (or organize, in the terminology of Craver) the actions of different actors so as to produce the macro effect.

## 5 Social Mechanisms as Theoretical Building Blocks

The preceding discussion has hopefully dispelled some of the confusion besetting the use of the mechanism concept in the social sciences. At this point we can return to the question that originally motivated this exercise, i.e. to clarify the - presumably crucial - role that propositions about mechanisms play in the causal reconstruction (and thus explanation) of social macro-phenomena.

To put the question this way means to start with circumscribed empirical fields, not to search for a general social theory à la Niklas Luhmann, in which case we would try to find the most general mechanisms that operate in the social world. Such an effort might in the end lead to some encompassing analytical framework like the one developed by Leopold von Wiese, the major representative of German formal sociology, who classified all social processes into two basic categories, processes of *Zueinander* (coming together) and processes of *Auseinander* (drawing apart) (von Wiese 1933). But "generic mechanisms can explain no particular facts", as Bunge (1997: 451) warns us. To spell out the general interactive dynamic leading to cooperation abstractly defined helps little to explain how cooperation between organized business and organized labor is generated in a neo-corporatist structure of economic policy making. It is not possible to build a substantive theory out of context-free, general mechanisms. Mechanisms explaining concrete macro-phenomena must be much more specific.

The starting point of the search for mechanisms operating in a specific field is always an observed or suspected regularity, a correlation, or a puzzling event, structure, or process. Mechanisms are *links* in theory; they are causal propositions that explain specific outcomes by identifying the generative process which, given certain initial conditions, produces them. If social mechanisms are to *explain* observed phenomena or relationships, this means that the latter are logically prior: The "what" logically precedes the "how"-question. Field-specific theories can *include* propositions about social mechanisms, but by themselves, these propositions do not make a coherent theory. This is in fact recognized in definitions of theory as that offered by Kiser and Hechter (1998), who mention mechanisms as *parts* of theories. Statements about mechanisms can therefore well complement an analysis based on statistical correlations. In fact, this is how they are often discursively used, though mostly more ad hoc than in a systematic manner. There are also cases of sophisticated correlation analysis that come quite close to an analysis in terms of mechanisms without ever using that word (e.g. Hoover 1990). The contrast

between correlational (multivariate) and mechanistic approaches is by no means as stark as some of the latter's advocates maintain. To pit analysis in terms of mechanisms *against* the search for correlations is mistaken.

Processes identified in the causal reconstruction of a particular case or a class of macro-phenomena are transformed into mechanism statements if their causal structure is recognized to apply also to other (classes of) cases. The mobilization process observed in a fund-raising campaign for a specific project can for instance be generalized to cover other outcomes such as collective protest, or a patriotic movement inducing young men massively to enlist in a war. A particular case of technological innovation like the QWERTY keyboard may similarly be recognized as a case in which an innovation that has initially gained a small competitive advantage crowds out technological alternatives in the long run. This is already a mechanism of a certain generality, but it may be generalized further to the mechanism of "increasing returns", which does not only apply to technological innovations but has also been used in the analysis of institutional stability and change (Pierson 2000, Thelen 1999). "Increasing returns", of course, is a sub-category of positive feedback, an even more general mechanism that also operates in the bankruptcy of a firm caused by the erosion of trust, or in the escalation of violence in clashes between police and demonstrators (Nedelmann/Mayntz 1987). If we aim to identify social mechanisms specific enough to have explanatory value for particular observed outcomes or relationships, but at the same time general enough to apply in different empirical fields, it is necessary to spell out the *range* of initial conditions that, through a process with a given causal structure, can generate a range of different outcomes. In this way, a tool-box of more general mechanism models could be built up. And while no particular event can be derived from such a general concept as "positive feedback", the concept can stimulate the researcher to look out for a specific type of causal dynamic in his empirical case or cases.

The majority of macro-phenomena that especially political scientists deal with cannot be explained by applying one particular mechanism model. Instead, the causal reconstruction of macro-phenomena such as non-violent regime change, rising unemployment, or democratization involves a chain of different mechanisms that jointly generate the outcome. Not all of the component mechanism of such a process will be social in the strict sense; in the processes analyzed by McAdam, Tarrow and Tilly, basically psychological (cognitive) mechanisms as, for instance, "identity shift" are important parts of the causal chain. The higher-order processes may themselves be patterned and hence qualify as second-order mechanisms, but whether they do or not is an empirical question. McAdam, Tarrow and Tilly (2001) for instance describe the process of democratization as a second-order process that is composed of a series of mechanisms which may be joined together *in different ways*, but still lead to a comparable "terminal condition". Substantive theories, whether they deal with contentious episodes, institutional stability and change, or varieties of capitalism, typically involve a plurality of mechanisms of a relatively high degree of specificity.

The problem is that our theoretical tool-boxes for different types of mechanisms are very unevenly filled. We have a good-sized, if not very orderly tool-box of mechanism models for different forms of collective behavior - collective in the sense that the uncoordinated, but interdependent actions of many individuals generate aggregate effects. Examples are models of linear and non-linear diffusion, the mechanism underlying spatial segregation in urban housing, the market mechanism, and the mechanism of mobilization where not only thresholds, but also a "production function" (i.e. how many must participate to produce the effect) plays a role [6]. We have as yet no similarly filled tool-box of

mechanisms where specific types of corporate actor constellations and relational structures play the crucial role. Several such mechanisms have been identified by McAdam, Tarrow and Tilly (2001); the brokerage mechanism already mentioned is only one example. Concrete macro-processes involve a large variety of structural and institutional features which it is very difficult to systematize. They range from Simmel's *tertius gaudens*, different network configurations and different kinds of power structure (concentrated or fragmented, centralized or decentralized, single or multi-level etc.), to the rules for the processing of votes in election systems. In this sea of most diverse particulars, game theory is an island of general concepts and models of constellation effects. In game theory it is the pay-off structure that determines whether (rational) actors cooperate. A game like Prisoner's Dilemma or Battle of the Sexes is a relatively simple mechanism, involving mainly the pay-off structure and the rational orientation of players as initial conditions that determine the strategy choices of actors, whose combination in turn produces the outcome of the interaction. But as often pointed out, many actor constellations cannot meaningfully be modelled as games. While neo-corporatist bargaining might be explained in terms of strategic interdependence (i.e. game models), the generation of the basic precondition of such bargaining, i.e. the existence of a particular structure of interest organizations, is the result of a much more complex process, involving technological and legal innovations, a specific form of social differentiation, and authoritative political intervention.

With the exception of game theory, the literature is still devoid of attempts to treat diverse kinds of actor constellations in different fields of macro-social research as systematically as has been done for the emergent effects of collective behavior. If different structural configurations and actor constellations generate indeed typical kinds of social dynamic, it would be worth while to search for mechanism models that go beyond collective behavior and the production of aggregate effects on the one hand and game theory on the other hand. The problem is that in most empirical studies in which structural configurations and actor constellations play a crucial role, very little effort is devoted to distil mechanism models from the analysis. The work of McAdam, Tarrow and Tilly (2001) on contentious episodes is a notable exception. Other fields that might be subjected to a secondary analysis with a similar intention in mind include research on regime transformation with its focus on change processes, research on the varieties of capitalism with its focus on processes of systemic interdependence, studies in historical institutionalism with their focus on institutional continuity and change, and generally, analyses of policy processes in single- and multi-level political systems. It would be of great theoretical interest to see to what extent the social mechanisms identified in such different fields are isomorphic and can be generalized, or remain specific to the type of *explanandum*. This article thus concludes as befits a state-of-the-art analysis: with a call for further work.

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## Notes

1

Following Coleman (1964), mechanisms are occasionally called "sometimes-true theories" to distinguish them from laws; see for instance Stinchcombe 1998: 267. This label, however, applies equally to correlational propositions with an explicit *ceteris paribus* clause. Mahoney (2001: 578) may make the same point when he argues that the notion of mechanisms as mid-level theories does not clearly differentiate the concept from that of a probabilistically formulated hypothesis, i.e. a kind of hypothesis that belongs squarely to correlational analysis.

2

For a more extended discussion see Somers (1998: 725-726) and Calhoun (1998: 851, footnote 5).

3

The confusion is both semantic as well as related to research technology. The word *intervene* can be used with different meanings, including to say that a process or mechanism "linking" cause and effect "intervenes" between them. And social processes such as democratization, economic growth, or mobilization can be *operationalized* in the form of a quantitative variable. The dividing line between analyses in terms of correlations and in terms of mechanism, while logically clear, can practically be quite thin.

4

Following Boudon (1984), who in discussing such effects repeatedly speaks of *agrégation d'actions individuelles*, I use this term not for statistical properties (e.g. mobility rate, income distribution), but for the results of collective action processes producing unintended macro effects such as a panic, a segregated settlement structure, or an unanticipated political revolution (see Kuran 1989).

5

In Esser's explanatory sociology, structural and institutional factors *not* included in Macro 1 are seen to play the role of intervening meso-level variables in the transformational mechanism (Esser 1993), but this does not really fit a model that strictly separates macro = structural from micro = behavioral.

6

For a survey of different kinds of discontinuous processes see Mayntz 1997 (first 1988).

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