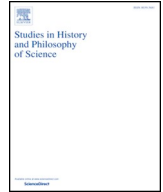




Contents lists available at ScienceDirect

Studies in History and Philosophy of Science

journal homepage: www.elsevier.com/locate/shpsa

Mechanism-based theorizing and generalization from case studies

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HIGHLIGHTS

- Mechanism-based theorizing provides a basis for generalization from case studies.
- The generalization from case studies is theory-mediated rather than direct empirical generalization.
- The distinction between causal scenarios and mechanism schemes is important for understanding mechanism-based theorizing.

ABSTRACT

Generalization from a case study is a perennial issue in the methodology of the social sciences. The case study is one of the most important research designs in many social scientific fields, but no shared understanding exists of the epistemic import of case studies. This article suggests that the idea of mechanism-based theorizing provides a fruitful basis for understanding how case studies contribute to a general understanding of social phenomena. This approach is illustrated with a reconstruction of Espeland and Sauder's case study of the effects of rankings on US legal education. On the basis of the reconstruction, it is argued that, at least with respect to sociology, the idea of mechanism-based theorizing captures many of the generalizable elements of case studies.

1. Introduction

Generalization from a case study is a perennial issue in the methodology of social sciences. The case study is one of the most important research designs in many social scientific fields, but no shared understanding exists of the epistemic import of case studies. While a case study aims to gain insight into a broader phenomenon by focusing intensive attention on a single example, it is often taken to be

a “mere” case study, and is often identified with loosely framed and nongeneralizable theories, biased case selection, informal and undisciplined research designs, weak empirical leverage (too many variables and too few cases), subjective conclusions, nonreplicability, and causal determinism (Gerring, 2007, p. 6).

Gerring does not agree with this characterization, but the frequency of these doubts suggests that there is room for a better understanding of the nature of case study research and its contributions to social scientific knowledge. This paper will address this broad issue by focusing on generalizations from case studies in sociology. As it will turn out, generalization is often based on theoretical ideas about social mechanisms, not on formal empirical generalization to similar cases. Important similarities exist between the uses of case studies in different

disciplines, but these similarities should not be taken for granted. Thus, the claims of this paper are restricted to sociology. How widely the observations are applicable to other social science disciplines is to be determined by later studies.

One source of confusion about case study research is the common practice of talking about case study method. It would be more accurate to talk about a research design. Case studies are “in-depth studies of particular situations, organizations, or kinds of events”¹ (Becker, 2014, p. 2). The distinction between a method and a design is important. For example, sociological case studies typically employ multiple methods for finding, generating, and analyzing data about the phenomenon of interest. A sociologist may do interviews, make participatory observations in the field, collect historical or contemporary documents, as well as social media discussions, and analyze these materials using a variety of methods. Similarly, while case study research is often associated with qualitative research, in many cases some of the data sources and the ways of analyzing them are quantitative. This indicates that a case study researcher is not typically driven by the choice to employ a particular method, but by the goal of a comprehensive understanding of the particular phenomenon of interest using whatever data is available. This applies at least to intensive case studies with explanatory aims, which are the topic of this paper.

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¹ When Becker talks about kinds of events, he is not suggesting that case studies are studies of types of phenomena, but that they are in-depth studies of instances of those types of phenomena. Thus, for example, one could do a case study of a particular initiation ritual. In other words, that would be a study of a case of initiation rituals.

<https://doi.org/10.1016/j.shpsa.2018.11.009>

Received 15 December 2017; Received in revised form 9 July 2018; Accepted 29 November 2018
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Case studies can be approached from two perspectives. The first focuses on the aims of the research, while the second is concerned with the final product and its epistemic contribution. We could call the first the producer's perspective and the latter the user's perspective. Methodological literature is concerned with providing guidance for the research process, so it is understandable that it usually adopts the producer's perspective. However, from the point of view of understanding what can be learned from case studies, the user's perspective is more appropriate. The distinction is important as the goals and the achievements of the study might not be the same. Like all studies, a case study might fail to achieve its goals, and in some cases, the epistemic contribution of the study is much larger than originally planned. Both of these situations might happen at the same time. For example, the study might ultimately fail to give an empirically adequate explanation for the social phenomenon it originally set out to explain, but it could still produce explanatory ideas that are of great theoretical interest and might be applicable to other cases. This article will exclusively employ the user's perspective. The key question is how case studies contribute to general social scientific understanding irrespective of what the authors of these studies planned to do. The author's statements provide valuable clues as to what to expect from the study, but they do not determine its epistemic contribution.

The structure of the paper is the following. In the next section I will describe the problem of analytical generalization, that is, the problem of how case studies contribute to a general understanding of social phenomena. The main argument of the section is that an adequate solution to this problem requires ideas about what theory is in social scientific research. The third section continues this topic by presenting the idea of mechanism-based theorizing as it has been developed in analytical sociology. The key contributions of this approach are the distinction between causal scenarios and mechanism schemes and the toolbox view of the growth of theoretical knowledge. These ideas are put into action in section 4, where some of the key theoretical contributions of Wendy Espeland and Michael Sauder's (2016) study of law school rankings are reconstructed using mechanistic concepts. Section 5 summarizes the key results and suggests some implications of the mechanism-based approach to case study research in sociology.

2. The problem of analytical generalization

Sometimes a case study is just a case. It simply provides a description of an interesting event, process, or social object. Such a study does not explain anything, nor does it make any theoretical contribution. Studies like this might be valuable, as the facts described could be interesting. Furthermore, the findings of the study could be used as material for further studies. However, purely descriptive studies like these are not the reason for why case studies are important in sociology. John Walton formulates the more general sociological ambition as follows:

At bottom, the logic of the case study is to demonstrate a causal argument about how general social forces take shape and produce results in specific settings (Walton, 1992, p. 122).

This formulation contains three important things. The first is the sociological goal of providing explanations for social phenomena. Sociology is an explanatory enterprise, and mere description is not sufficient. The second is the concern with micro–macro relations, in other words, connecting local events to more large-scale social processes. The ability to connect micro and macro processes is often one of the key motives for doing case study research in sociology. The third is the concern with the relation between the general and the particular. Sociologists expect to learn something more general from case studies and are disappointed if the study is limited to describing particulars.

From early on, social scientists have recognized that case studies cannot produce statistical generalizations and that statistical measures of representativeness are not adequate for the purposes of case study research (Gobo, 2008; Small, 2009). But it has proven difficult to

articulate a generally acceptable alternative view. The early and highly influential idea of *analytical induction* first presented by Znaniecki in 1930's was later seen to be based on strong assumptions, necessary causes, and Aristotelian essences (see Hammersley, Gomm, & Foster, 2000; Lieberman, 1992). In contrast, Stake's (1978) idea of *naturalistic generalization* and Lincoln and Guba's (1985) idea of *transferability*, apart from criticizing some inapplicable ideas about generalization, do not really explain what makes some aspects of cases 'transferable' nor do they provide much guidance for justifying such inferences (Gomm, Hammersley & Forster 2000). They seem to leave the making of generalizations to the reader's subjective discretion, a move that makes the grounds for justifying generalization from case studies even more mysterious. Finally, the notion of *moderatum generalization* (Payne & Williams, 2005; Williams, 2000) is much better at highlighting the limitations of social scientific generalizations than describing how they work. Social scientific generalizations do have a limited scope and are held only provisionally, but this negative characterization is hardly sufficient for understanding the workings of generalization from cases. Due to these shortcomings, none of these accounts has achieved wide acceptance (see Gobo, 2008; Gomm, Hammersley, & Foster, 2000). The current situation seems to be that sociologists (and other social scientists) continue to draw general lessons from case studies, but they do not have an adequate account of the conditions under which it justified, nor do they seem to care.

Many accounts emphasize the role of theory in generalization from case studies. However, the relation between case studies and theory can be variable. Sometimes a case study is a quite direct application of a pre-existing theory to a case. A case study like this could be valuable as it *illustrates* the theory by highlighting and exemplifying its central elements. Illustrations are highly valuable in contexts of pedagogy and popularization, but they do not really provide support for a theory. For this to happen, a case should provide a *challenge* for a theory. If the applicability of the theory was not anticipated, a successful application of a theory can *provide support* for it. A case study can also provide a *counterexample* or an *anomaly* for an existing theory (Flyvberg 2006), when it shows that the theory cannot explain the case. In addition, a case study can make an important contribution by *demonstrating the existence* of a social situation that has not been anticipated by existing theories, but for which an adequate theory should be able to accommodate.

All these types of contributions to theory are important. However, none of them are directly related to generalization from a case study. What is missing is how a case study contributes to the development of a theory. To start, let us begin with testimony from an experienced case study researcher. Howard Becker (2014, p. 3) describes the generalizations produced by case studies as follows:

[M]y work doesn't produce timeless generalizations about relations between variables. It results instead in the identification of new elements of a situation, new things that can vary in ways that will affect the outcome I'm interested in, or new steps in a process I thought I'd understood until a result different from what I expected occurred. I can use these new elements of organization and process to direct my next inquiry. For me, that's the way social science works.

The quote highlights two important elements. First, Becker denies the possibility of making a direct extrapolation from one case to another, as the social world has too much variance for this to work. In addition, Becker's inferential goals are not limited to empirical generalizations about very similar social settings; rather, he is aiming to identify general elements that would work in other contexts too. What is articulated here is a quite general idea about sociological theorizing: it aims to understand how social processes work and how the contexts in which these processes unfold produce different outcomes. Unlike many other sociologists, Becker connects the study of cases to the notion of mechanism:

Like physiology, sociology explains how an underlying mechanism produces a great variety of experiences, depending on all the other processes whose results feed into the process producing those results. (Becker, 2014, p. 4, p. 4)

The notion of mechanisms seems to be the key element in Becker's account of case study generalization. However, Becker does not provide a more extensive discussion of mechanisms. The same problem can be found in the political science debates about process tracing. Methodologically reflective political scientists (Beach & Pedersen, 2013; Bennett & Checkel, 2014; George & Bennett, 2005) present the process tracing of causal processes and mechanisms as crucial elements both in theory testing and theory development, but they do not have much to say about what these mechanism-based theories should look like. To get an idea of mechanism-based theorizing,² we have to turn to analytical sociology.

3. Mechanism-based theorizing

The word of mechanism belongs to the non-technical causal vocabulary of many social scientists. The word 'mechanism' could refer to a cause, a causal pathway, or an explanation without explicit theorizing about the nature of the mechanism. This casual and occasional mechanism-talk probably explains much of the intuitive appeal of mechanistic imagery, both in the social sciences and elsewhere. The intuitive idea can be developed in multiple directions. The literature on social mechanisms notoriously abounds with apparently incompatible definitions of mechanisms (Hedström & Ylikoski, 2010; Mahoney, 2001; Ylikoski, 2017a). Some critics (e.g., Norkus, 2005) have regarded this multiplicity as a serious problem for mechanism-based thinking. I don't take this problem to be fatal. Much of the confusion is generated by attempts to do too many things at the same time and from an excessive level of abstraction.

I will set aside questions of whether it is possible to provide a general and informative definition of 'mechanism' and whether such a definition would be useful (Hedström & Ylikoski, 2010). I will instead use a functional characterization: a mechanism-based explanation provides an answer to a *how*-question underlying a causal *why*-question. In other words, a mechanism-based explanation tells us how the cause produces its effects by describing the process by which this happens. This characterization makes it possible to distinguish between simpler (difference-making) causal claims and mechanism-based explanations. Both might be called explanations, but there is a difference: while the first only identifies what makes a difference to the outcome (e.g. vitamin C-containing foods or dietary supplements prevent scurvy), the latter provides additional information on *how* this happens by describing the key characteristics of the causal process that connects the cause and the effect. The advantage of the functional approach is that one does not need to commit oneself to the idea that the notion of mechanism is somehow fundamental in analyzing causation. The characterization also ties mechanisms directly to singular causal processes, thus making it understandable why people intuitively make a connection between process tracing and a mechanism-based explanation.

Social scientists refer to causal mechanisms, both in the context of explaining particular causal outcomes and in the context of developing theories about social mechanisms. To avoid confusing these two uses, it is useful to distinguish between causal scenarios and mechanism schemes (Ylikoski, 2011; Ylikoski & Aydinonat, 2014).

A *causal scenario* is a (selective) representation of a particular causal

process responsible for some concrete event or phenomenon. In this context, a causal mechanism refers to a causal narrative that describes the process responsible for the *explanandum*. The narrative (Crasnow, 2017) may be highly detailed or a mere sketch, but in every case it involves more than just a simple connection between the cause and effect: it describes the key elements of the causal chain leading to the outcome. This means that the causal scenario is not an exhaustive description of the causal process, but a description that captures the explanatorily relevant aspects of the process. What is explanatorily relevant depends on what is to be explained (Ylikoski, 2011), and a typical case study does not only focus on one precise *explanandum*. Rather, case studies are rich causal narratives that address bundles of *explananda* at the same time.

When political scientists talk about process tracing, they are addressing causal scenarios. The definition of process tracing presented by Bennett and Checkel makes this clear:

the analysis of evidence on processes, sequences, and conjunctures of events within a case for the purposes of either developing or testing hypotheses about causal mechanisms that might causally explain the case (Bennett & Checkel, 2014, p. 7).

In process tracing, causation is understood as a continuous process leading to the singular event to be explained. To provide an explanation, the researcher has to identify the crucial sequences of events and describe the mechanisms that are involved in the unfolding of the process. This is precisely what causal scenarios do.

A central idea in mechanism-based theorizing is the possibility of alternative causal scenarios for the same *explanandum*. This gives rise to the distinction between *how possibly* and *how actually* explanations (Ylikoski & Aydinonat, 2014). The competing *how possibly* scenarios describe the different ways in which the outcome to be explained could have come about. The challenge for researchers is to find evidence that could discriminate between these alternatives and enable them to make a judgment about which scenario is the true explanation.

The other key notion is that of a (causal) *mechanism scheme*. When analytical sociologists talk about social mechanisms, they most often refer to mechanism schemes. For example, when they talk in the abstract about self-fulfilling prophecies or cumulative advantage, they have mechanism schemes in mind. These are abstract representations of mechanisms that could bring about effects of a certain kind. A typical *explanandum* of a mechanism scheme is quite abstract (or stylized). This reflects the fact that mechanism schemes are not primarily explanations of particular facts, but building blocks for constructing them. They are abstract sketches of causal configurations that can be adapted and combined to serve as parts of causal scenarios. A single causal scenario might be a combination of multiple mechanism schemes and could even contain mechanism schemes that have opposite causal effects. Because mechanism schemes can be combined, one could talk about molecular mechanisms that consist of simpler elements. Thus, any combination of mechanisms is also a mechanism. Furthermore, abstract mechanism schemes can be adapted to particular cases in multiple ways. The skeleton provided by a mechanism scheme allows many, often incompatible, ways of building a representation of a particular causal scenario. Thus, it would be a mistake to assume that causal scenarios are just instantiations of mechanism schemes.³

Mechanism schemes are objects of theoretical interest. A case study

² Bengtsson and Hertting's (2014) ideas are an important precursor to my approach. Their idea of 'rationalistic generalization' can be regarded as a special case of the more general approach articulated here. Their approach works nicely with cases where the social mechanism is based on 'the logic of the situation', but is less useful when the mechanism involves more substantial assumptions about cognitive processes.

³ While there is much similarity between the ideas presented here and Darden's (2006) discussion about mechanism schemes, it should be noted that she does not employ the notion of causal scenarios. She contrasts mechanism schemes with particular mechanisms, but the latter are different from causal scenarios primarily for two reasons. First, her particular mechanisms seem to refer to specific *types* of mechanisms, rather than to particular concrete mechanisms. Second, her particular mechanisms are concretizations of more abstract mechanism schemes, not at all complex combinations of mechanism schemes.

might be interesting for a theorist because it identifies an interesting mechanism that can also be applied in other contexts. Mechanism schemes can also be represented and studied by means of formal (e.g. rational choice, agent-based, etc.) models. These often highly abstract models do not address any particular empirical fact. Rather, they are used to explore the properties of the modeled mechanisms and their combinations: what kinds of things they *could* explain. Here the notion of *generative sufficiency* is important (Epstein, 2006). The idea here is to demonstrate that the proposed mechanism at least in principle is capable of bringing about the outcome to be explained. This is a far from trivial task. Complex social processes involve multiple agents, interdependencies between the agents, complex structural presuppositions, all sorts of feedback processes, and the processes often unfold over a long time. All of this poses serious challenges both for verbal theorizing and formal modeling.

From the point of view of constructing causal scenarios, mechanism schemes provide a menu of elements that can be adapted for the purposes of explaining the empirical facts of interest. Known mechanism schemes represent knowledge about causal possibilities: what kinds of things could explain outcomes of a specified type. They also tell which parts of the causal process are important for the explanatory purposes at hand and how they could affect the outcome of the process. For this reason they are important in the construction of alternative causal scenarios and in the search for evidence that could discriminate between them.

Mechanism schemes are at the core of analytical sociology's account of the growth of theoretical knowledge. According to this view, social scientific knowledge grows through the development and articulation of different types of mechanism schemes. This provides an interpretation of what Robert Merton referred to as 'middle-range theories' (Merton, 1968). Merton contrasted middle-range theories with simple empirical hypotheses that arise in everyday social research and general sociological theories that are more like theoretical orientations than specific claims about how social processes work. Merton's original discussion left the precise nature of middle-range theories relatively vague, but analytical sociologists have attempted to clarify this by specifying that these theories should be about social mechanisms (Hedström & Udén, 2009). In this view, the core theoretical knowledge in sociology is comprised of a collection of mechanism schemes that can be adapted to particular situations and explanatory tasks. This *toolbox view* of theoretical knowledge (Elster, 2015; Hedström & Ylikoski, 2010) replaces older ideas about the nature of social scientific theory: general social scientific knowledge does not consist of collections of empirical generalizations or highly general principles, as in the older views, but of a growing body of mechanism schemes. In this view, theoretical understanding of the social world accumulates when the number of known mechanisms increases or the understanding of particular mechanism schemes becomes more detailed. There is also room for progress via systematization; mechanism schemes should be mutually compatible, so knowledge progresses as new ways of combining mechanism schemes are developed.

According to the mechanism view, the value of case studies is contingent on their contributions to the toolbox of mechanism schemes. Such theoretical generalization does not require direct empirical generalization from one case to another. This makes the domain of generalization broader: the mechanism scheme learned from a case study might be applicable to situations that are quite dissimilar to the original case. In addition, the outcome does not have to be exactly the same as long as it is produced by the same mechanism. On the other hand, mechanism-based thinking also calls for caution: different mechanisms can produce very similar looking outcomes, and the outcome might be produced by mechanisms working in parallel. This means that although the cases might look superficially the same, they might be quite different in their inner workings. And, of course, because the presence of the same mechanism does not guarantee the same outcome, the mechanism-based approach makes one cautious with respect to predicting

the outcomes of social processes. This implies that while the insights produced by the case study might be broader than non-mechanistic approaches to generalization acknowledge, the mechanism-based approach has a principled reason to be more circumspect with respect to direct empirical generalizations and extrapolations.

The generalization from the cases occurs through the theoretical toolbox, and a case study can contribute in multiple ways. First, a case study might provide evidence about a completely new mechanism or about a new combination of already known mechanisms. In other words, it gives rise to a new mechanism scheme or to a way to combine existing mechanism schemes. Second, a case study might help with gaining a deeper understanding of a particular mechanism. For example, it could tell something new about the necessary background conditions for a mechanism scheme or about the factors that moderate its operation. Third, the case study might tell about other effects of the mechanisms that could turn out to be important diagnostic evidence about their operation. Finally, even if a case study fails to contribute to the toolbox, it might influence future theoretical development by bringing to the fore puzzles that show the limits of the current theoretical ideas.

The toolbox view also provides a way to think about how social scientific knowledge could become better integrated. Mechanism schemes are something various subfields of sociology (or more generally social sciences) could share. While the subfields of sociology are currently increasingly distant from each other and develop their own local theoretical vocabularies and theories, the shared toolbox of causal mechanisms could provide the means to integrate the fields in a fruitful manner. The various subfields could employ and develop the same theoretical toolbox and thereby benefit from each other's work. This was in fact one of the original ideas motivating Robert K. Merton's (1968) call for theories of middle range, and some of his most famous notions, such as the self-fulfilling prophecy and the Matthew effect, have turned out to be good examples of mechanism schemes that have applications in a wide range of domains of social enquiry.

4. Reactivity and rankings

A sociological case study of US law school rankings by Wendy Espeland and Michael Sauder (Espeland, 2016; Espeland & Sauder, 2007, 2016; Sauder & Espeland, 2009) provides a good illustration for our purposes. The authors spent over ten years studying *U.S. News and World Report* rankings and their impacts on legal education. The empirical data collected is both extensive and diverse: over two hundred in-depth interviews and observational data about schools, job fairs, and professional meetings together with documentary materials consisting of school statistics, newspaper reports, online bulletin board discussions, and organizational documents (Espeland & Sauder, 2016, p. 4). The goal was to understand the full extent of the intended and unintended effects of rankings through an intensive examination of how they change law schools and influence the people working and studying within these institutions. While the authors don't employ the term, they are clearly engaged in process tracing: each of the four empirical chapters trace the effects of rankings for one of the crucial groups in the process (the applicants, the admission officers, the deans, and people working in career services).

The authors chose US law schools as their subject of study for a number of reasons. First, in contrast to many other fields, in legal education one ranking has a monopoly on public perception, and the same ranking metrics are employed for all law schools. This makes it easier to observe how particular criteria used in the rankings are related to school actions and whether the school responses vary depending on their standing. Second, the importance of status in the legal field and the tendency of lawyers to speak their mind make it easier to document the effects of rankings for the students, faculty, and administrators of law schools (Espeland & Sauder, 2016, p. 5). Thus, while legal education is rather an exceptional, or even extreme, case to be studied, it is

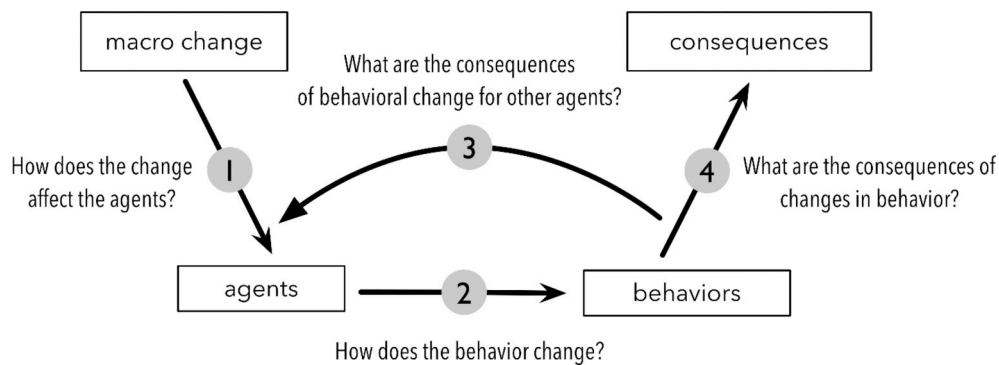


Fig. 1. The improved Coleman diagram.

also an ideal case for observing what the effects of rankings could be. The outlier status of the case makes it impossible to make direct empirical generalizations, but the authors believe that the dynamics created by rankings are similar in other contexts where rankings are employed.

According to Espeland and Sauder, the key to the far-reaching and transformative effects of rankings is the *reactivity* of social measures. In the case of law school rankings, the measures do not simply reflect the social hierarchy of schools but play a crucial role in creating this hierarchy by changing how people think about legal education. The observation about the importance of the reactivity of social measurement is not in itself new; it is a commonplace in social scientific studies of rankings. As early as the 1970s, Donald T. Campbell presented the following pessimistic ‘law’:

The more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor (Campbell, 1979, p. 85).

The key to the novel contribution of Espeland and Sauder's case study is the documentation and analysis of the processes through which the reactive effects are produced. In other words, it describes the relevant causal scenario responsible for the reactive changes in US legal education. This explanatory narrative is complex, and Espeland and Sauder themselves identify four mechanisms of reactivity that constitute the backbone of their theoretical analysis of the case: commensuration, self-fulfilling prophecies, narrative, and reverse engineering (Espeland & Sauder, 2016, p. 7). In the terminology of the previous section, these four are mechanism schemes. To understand how they work, we have to reconstruct the key elements of the explanatory narrative provided by Espeland and Sauder.

To keep the story concise and to build a connection to debates about social mechanisms, I will reconstruct the core argument of Espeland and Sauder's study by using Coleman's diagram (Coleman, 1987, 1990). The diagram helps to focus on the core elements of the explanatory narrative: the micro–macro relations and the interdependence of the agents. The diagram also helps us to divide the larger research question of the study into a series of smaller questions. I will employ an enhanced version of the diagram (Fig. 1) that explicitly incorporates the causal feedback loops from the consequences of agents' behaviors (Ylikoski, 2016).

The starting point of the diagram is the observed, or suspected, causal relation between a macro change (the upper left corner) and a certain macro social outcome (the upper right corner). In the Espeland and Sauder case, the first change is the introduction of the US News rankings of law schools, and following that are the various changes in the US system of legal education they identify. The purpose of the diagram is to designate the necessary elements of the causal scenario that explains *how* the first brought, or could have brought, about the second. The diagram is built around the idea of action-based

explanation⁴: the macro changes are connected to changes in agents' opportunities, psychological attributes (such as routines, dispositions, cognitive schema, heuristics), and mental states (such as beliefs, desires, goals, emotions), which in turn affect agents' behaviors, which ultimately bring about the macro change to be explained. What the enhanced version adds to Coleman's original diagram is the third feedback arrow. It makes explicit an important dynamic element that remained implicit in Coleman's original discussion: in the most interesting social processes, the agents' behaviors are interdependent. This interdependence is captured by the third arrow, which represents the causal loops by which the agents influence each other through the consequences of their behaviors.⁵ As the Espeland and Sauder case shows, understanding these interdependencies is crucial for an explanation of the observed outcome.

Thus, Espeland and Sauder's causal scenario begins with the introduction of the US News rankings of law schools. Treating the introduction of the ranking as a macro change is analytically useful as it is a large-scale change affecting all relevant agents (Ylikoski, 2012). The next question (arrow 1) is how the specified macro change affects the agents. According to Espeland and Sauder, the ranking provided a *cognitive map* for applicants and others who were interested in comparing law schools. Before the rankings were introduced, the choice of a school was a formidable task. The applicants and their parents had to choose from a couple of hundred schools, all of which were attempting to highlight their characteristic advantages. This made the decision very difficult: the schools can be compared on many dimensions, and the decision-maker has no expertise in legal education, so even choosing which dimensions are important is a hard task. At same time the choice is consequential: it influences the student's career opportunities. Furthermore, tuition and other costs can be a source of significant financial strain. The introduction of rankings can have a decisive impact on such situations.

The ranking gives the impression of being both impartial and objective: it is produced by an independent party (a newspaper), and it is based on numerical scores that measure all schools exactly the same

⁴ It should be noted that the idea of action-based explanation does not imply commitment to some sort of reductionism. The way in which the macro change under investigation influences the agents is usually dependent on various sorts of structural and institutional background conditions. The same goes for arrows 3 and 4. This means that the use of the diagram does not by itself signal a commitment to any especially problematic form of methodological individualism. It should also be noted that apart from being persons, the agents in the diagram could also be – in some circumstances – artificial agents such as organizations. For the multiple meanings of methodological individualism, see Ylikoski, 2017b.

⁵ Where arrow 3 ends is purposefully ambiguous. The behavioral consequences could either affect other agents directly or via the institutional and structural conditions. This is an empirical question; the purpose of the arrow is simply to remind the researcher that it is important to look for these feedback loops as they are often key to the process of social change.

way. Most importantly, the ranking simplifies the comparison of the schools dramatically: all schools can be directly compared to each other without presupposing any expertise about legal education. Espeland and Sauder call this effect the mechanism of *commensuration*. They do not claim that people began to choose their school solely on the basis of the ranking. However, the wide availability and the easy use of the rankings made them an influential factor in choosing law school. This is an answer to the second question (arrow 2): how did the agents' behavior change? The use of the cognitive map provided by the ranking changed how the applicants evaluated their options, and this significantly influenced where they chose to apply. However, these cognitive aspects are only the beginning of the reactive process that transformed US legal education.

The crucial element in the explanatory narrative is the *interdependence of the agents*, in other words, the impact the changes in the applicants' behavior had on other agents. This interdependence is captured by the third arrow representing the causal loops by which the agents influence each other through their behavior. Thus, while most deans originally regarded the *US News* rankings as both incompetent and harmful, their adoption by the applicants made the rankings relevant to them. When the deans started to worry about the rankings, the rankings became also increasingly important for people working in admission and career services. The attention to rankings changed both the content of their work and how it was evaluated. Similarly, once applicants started to make decisions based on rankings, the rankings became more salient for employers; now they could use the rankings as a significant source of information about the quality of job applicants. Furthermore, when the employers started to use the rankings (or were widely believed to do so), the school rankings became an increasingly important part of the market value of the student's degree. This in turn increased the pressure felt by deans, as the students and alumni started to demand actions to improve the school's rank. This created a dynamic in which the importance of the rankings was amplified as increasing number of groups started to react to them.⁶

This dynamic is crucial for the long-standing changes in legal education produced by the rankings (arrow 4). Because the rankings became increasingly important to outsiders, such as applicants and employers, student, alumni, and university administrator groups who were involved with the schools started to put increasing pressure on deans to do something about the rankings and to justify their actions. Deans were required to provide increasingly detailed justificatory *narratives* (one of Espeland and Sauder's mechanisms) that both explained the recent changes in the school's rank and showed how the rank could be maintained or improved in the future. These attempts to improve the school's standing involved, among other things, changes in how students were admitted, how the schools utilized their resources, to whom the schools targeted their marketing, and how the career services advised fresh graduates. The structural changes in US legal education generated by the rankings are results of the schools' attempts to improve their relative position in the rankings. These effects include transformations of the legal curriculum, changes in the composition of the student body, the decreasing work morale of school employees, an increasing similarity between schools, and increased status competition between the schools (Espeland & Sauder, 2016, Chapter 7).

What are the general lessons that can be learned from this causal narrative? It is clear that observations about US law schools cannot be directly generalized to other educational fields or other domains where rankings are employed. The case study does not identify empirical generalizations or theoretical laws about the effects of rankings. In other words, one does not generalize the whole causal scenario. Espeland and Sauder's own suggestion is that they identify some relevant mechanisms

of reactivity. To make their idea clear, they introduce a distinction between mechanisms and their effects (Espeland & Sauder, 2007, p. 33): the same mechanisms might have different effects depending on context, and similar effects could be produced by different mechanisms. In other words, what they call mechanisms identify crucial elements of the causal process that influence whether reactive effects are produced, what those effects are, and how strong they are. The generalization is that these elements are important, not that they will always produce similar results. In the vocabulary of analytical sociology, these mechanisms are (sketches of) mechanism schemes. Their instances are crucial parts of the causal process studied, and they are the elements of the causal scenario that a sociologist typically generalizes from the case study.

Consider first the mechanism of *commensuration* (Espeland & Sauder, 2016, pp. 28–30) which is a precondition for any reactive effects of rankings: if the relevant agents are not facing a difficult decision-making situation, they do not need help from the rankings; if they do not trust the source of the rankings, they will not make use of it; and if similar cognitive tools were already available, the effects of the new ranking would be much smaller. Clearly, this is one crucial element of the causal narrative about the effects of rankings. It links the macro change (the introduction of the rankings) to local decision-making processes of relevant agents by showing how the rankings can influence their behavior. A more detailed study of this mechanism helps to articulate some of the conditions under which the rankings could have a reactive effect.

Consider next the mechanism of justificatory *narrative* (Espeland & Sauder, 2016, pp. 36–38). If the deans did not feel the external pressure to be accountable, the rankings would not have had the effects they did. Depending on the position of the school in the rankings, the demands on the narrative are different; thus, the narrative is a crucial variable to look at when considering *how* deans (or other relevant decision-makers) change institutional practices. The mechanism of narrative clearly modulates the effect of rankings and plays an important role in the causal scenario. It can also be expected that something similar will happen in other contexts where rankings are employed, so it makes sense to articulate this to a more explicit mechanism scheme.

Finally, *reverse engineering* (Espeland & Sauder, 2016, pp. 33–35) provides yet another mechanism that plays a crucial role in the causal scenario: only if the key agents (such as the deans) can figure out how the rankings work will it be possible for them to take measures that might improve the position of their school in the rankings. In other words, one cannot game the system if one does not know the rules. Furthermore, without the possibility of reverse engineering, some self-fulfilling effects of the rankings would be prevented. Again, the idea of reverse engineering provides an important insight into how rankings work, not only in this particular case, but also in others. Thus, it makes sense to regard the authors' conception of reverse engineering as a (basis for) causal schema that can have various applications.

Together these three mechanisms provide a kind of checklist of mechanisms for analyzing reactive processes: if they cannot be found, the reactive effects are missing (or some alternative mechanisms for reactivity would have to be in place). Furthermore, the strength of the reactive effects will depend on the details of the mechanism. In other words, aspects such as the gravity of the decision, the uniqueness of the cognitive aid provided, the intensity of the pressure for justificatory narratives, and the transparency of the ranking methodology all affect how the reactive effects are generated. Thus, for example, we could predict that when there are multiple prominent rankings available and these rankings are based on different principles, their reactive effects would be much less pronounced. This is because a single ranking in a multiple-ranking world would have less influence on relevant parties, and the signal provided by multiple rankings would be a more 'noisy' target to be reverse engineered.

All this suggests that these three mechanisms are important parts of the causal scenario that explains the effects of rankings on US law schools. They are crucial, difference-making parts of the causal narrative. Furthermore, in the light of the above reconstruction, they are pivotal in connecting macro changes to micro-scale individual and organizational

⁶ In addition, as deans started to improve the rank of their school by gaming the system, the *US News* team was forced to adopt counter-measures and to change the principles by which the performance scores are composed.

behavioral changes. While they might not be fully articulated mechanism schemes, they at least identify some crucial features of the need for mechanism schemes to explain the reactivity to rankings.

While the mechanisms of commensuration, narrative, and reverse engineering are especially important in the context of rankings (and other measures of accountability), the study also contributes to a more general toolbox of social mechanisms. One of the most well-known social mechanisms is the above-mentioned self-fulfilling prophecy (Biggs, 2009; Merton, 1968). However, the label only identifies a particular kind of effect: to be actually explanatory, the notion presupposes an idea of *how* the self-fulfilling outcome is produced. As it turns out, this can happen in many different ways, in other words, through alternative causal mechanisms. Espeland and Sauder define the self-fulfilling prophecy as a situation in which “an expectation, once defined as real, amplifies or confirms the prophecy’s effect” (2016, p. 30), and their case study contributes to the literature by identifying four different self-fulfilling mechanisms:

- 1) The school rankings may magnify statistically insignificant differences in scores by influencing future scores in the same direction. For example, the school’s rank might change due to a measurement error in the raw scores, but the resulting change in rankings affects the number and quality of applications a school receives and the proportion of accepted students who attend that school. Thus, a small technical difference between schools could be amplified to become a real difference (Espeland & Sauder, 2016, p. 31).
- 2) Earlier rankings may directly influence later ones. An important component of the *US News* rankings is the reputation score. There are 190 accredited law schools, so it is impossible for the respondents of the reputation survey to have detailed knowledge about most of them. In these circumstances it is plausible to assume that they make their judgments based on a school’s reputation, which is mostly based on its earlier ranking position (Espeland & Sauder, 2016, p. 31).
- 3) The rankings may influence the school’s resources. If other benchmarks are lacking, university administrators employ rankings in resource allocation, and the consequences of a change in the rankings might well turn out to be self-fulfilling, as the school’s opportunities to improve or maintain its rank in the future are highly dependent on available resources (Espeland & Sauder, 2016, p. 32).
- 4) The rankings encourage the schools to revise their profiles and practices to match the ranking criteria. This makes the conception of legal education embedded in the ranking criteria increasingly important. This happens especially when the schools adopt improvement in rankings as an explicit goal. By responding to rankings, the schools reinforce the validity of the measure (Espeland & Sauder, 2016, pp. 32–33).

Even if one could doubt their explanatory importance in this particular case study, these mechanisms are contributions to an expanding toolbox of mechanism schemes underlying self-fulfilling prophecy effects. Thus, while it is not a new idea that reactivity may involve self-fulfilling prophecies, the more detailed accounts of the alternative mechanisms that could produce these effects are welcome contributions to the theoretical toolbox.

All this suggests that although Espeland and Sauder are not self-identified analytical sociologists, their account is perfectly compatible with an analytical sociology account, as shown by the fact that the key concepts of analytical sociology can be utilized to reconstruct the central elements of their explanatory narrative. Furthermore, the results seem to align with Becker’s ideas quoted earlier. Naturally, the short summary given here does not capture everything that is interesting and possibly generalizable from their rich case study. However, it suggests that the idea of mechanism-based theorizing captures something important about the way in which sociologists learn more general lessons from case studies.

5. Conclusion: learning from the case

In this article I have argued that the general lessons sociologists draw from explanatory case studies, like that of Espeland and Sauder, are not

direct empirical generalizations to similar cases. The unique and distinctive features of US law schools and their rankings make them a highly unlikely source of direct empirical generalizations. A concern like this does not explain why people studying the effects of rankings even outside higher education find the study important. Thus, while similar cases might be found, the analytical focus of sociologists is not directed, or limited, to such cases. Sociologists are looking for ideas about social mechanisms that could in principle have a much wider application. For those who are studying the effects of rankings in the context of higher education, the study provides a constellation of social mechanisms (e.g. commensuration, narrative, reverse engineering) that are relevant to other cases, although the specific effects might be different. And while this specific constellation of mechanisms might be missing outside the context of higher education, the individual mechanisms could still be highly relevant for understanding how rankings work. Furthermore, I have argued that conceptual tools – such as the distinction between causal scenarios and mechanism schemes – developed in the context of analytical sociology are useful in reconstructing what is happening when sociologists make general inferences from case studies.

Direct empirical generalization from case studies is tricky, and the mechanism-based approach does not change this widely acknowledged fact. It does not suggest that there is some sort of algorithmic formula that guarantees successful generalization or extrapolation to other cases. Earlier accounts of generalization have been failures mainly because they have not been able to provide a convincing replacement for the lack of such a formula. Furthermore, these failures to legitimize generalization from case studies have raised more general doubts about the social scientific relevance of case studies. The advantage of the mechanism-based approach is that it abandons the pursuit of the direct justification of empirical generalizations and replaces it with a reconstruction of how sociologists reason from cases. While the idea that generalization involves theory is hardly new, the mechanism-based account provides a relatively precise account of such theorizing. The case studies are important not because they contribute to a highly abstract general theory or suggest individual concepts that can themselves be generalized, but because they provide elements that can play a crucial role in causal narratives about other concrete cases. In the vocabulary of analytical sociology, they provide mechanism schemes that can serve as building blocks of causal scenarios. An account like this is important not only because it helps us to understand how sociologists learn from cases, but also because it provides a rationale for why case studies are important.

According to the mechanism-based approach, case studies are important in sociology because they are an important source of ideas for middle-range theories about social mechanisms. The case studies are also important for testing whether mechanistic presuppositions of theoretical hypotheses are fulfilled. Social sciences study historically changing complex causal configurations, so in-depth studies of particular causal processes are necessary. From this perspective, many sociologists doing case study research might miss the full potential of their studies. Sociologists quite often talk about sensitizing concepts (Blumer, 1954) when they describe what they have learned from exemplary case studies. This notion seems to capture the idea that a good case study provides some theoretical ideas that can be fruitfully adapted to at least some other cases.⁷ For example, someone could characterize Espeland and Sauder’s notions of commensuration, narrative, and reverse engineering as sensitizing concepts. While this is right as far it

⁷ In Blumer’s original discussion, the opposite of a sensitizing concept is a definitive concept that “refers precisely to what is common to a class of objects, by the aid of a clear definition in terms of attributes or fixed bench marks” (Blumer, 1954, p. 7). He argues that “every object of our consideration – whether a person, group, institution, practice or what not – has a distinctive, particular or unique character and lies in a context of a similar distinctive character” (Blumer, 1954, p. 7), which forces us to employ sensitizing concepts that only provide general guidance, not definitive essences.

goes, this way of thinking leads to a quite impoverished way of cashing out their contribution: these notions are more than just pointers to potentially interesting things. The mechanism-based account seems to provide a better grasp of what they are offering. From this point of view the highly impoverished conception of a theory – that a theory is just a heuristic concept – which is increasingly popular in some areas of sociology (such as science and technology studies), leads to case studies that are less insightful than they could be and to the continuation of a very loose way of generalizing from particular studies. The adoption of a more mechanism-based approach to theorizing could improve sociological practice both by increasing attention to explicit theorizing and by decreasing the temptation to engage in vague generalization.

Naturally, the account presented in this paper does not demonstrate that all generalization in sociology occurs through mechanism schemes. There could be other ways. It should also be recognized that this approach does not guarantee producing the rich and convincing results as were demonstrated in Espeland and Sauder's exemplary and highly influential sociological case study. Furthermore, it should be recognized that the notion of social mechanism should be further developed. One promising avenue toward articulating the action-based mechanisms found in Espeland and Sauder's study is the idea of *the logic of situation* (Bengtsson & Hertting, 2014; Morgan, 2012). Sociologists (and economists) are often interested not so much in individual agents' beliefs or preferences, but in how the changes in opportunities or available information affect the behaviors of larger groups of agents. The notion of the logic of situation provides an interesting bridge between formal modeling and case study research. In principle, both should be contributions to the same project of theory development, but in practice the two communities seem to live in quite different worlds.⁸

Finally, the concern remains whether these ideas about case study research apply outside sociology. Here we should distinguish between two different questions. The first concerns the general applicability of mechanism-based thinking and the second, the role case studies have in different fields. The answer to the first question is positive. One of the advantages of mechanism-based thinking is that it helps to build bridges between different disciplines and research methodologies. It is not tailored to a specific discipline or research design. Thus, one can expect that, for example, the distinction between causal scenarios and mechanism schemes is applicable to the other social sciences.⁹ The second question is more difficult. Other fields could be less theory- and explanation-oriented than sociology, and the motivation for doing case studies might be different. This is an issue that must be decided on a case-by-case basis.¹⁰

⁸ This is an especially salient point for analytical sociology, which is often associated with modeling methodologies such as agent-based simulation. From the point of view of the future development of analytical sociology as an empirical explanatory project, building fruitful interaction between case- and model-based research strategies is crucial. Case studies are an important source of insight for real world constellations of social mechanisms to be modeled; furthermore, they provide an important avenue for checking the empirical credibility of analytical models (Coleman, 1990, p. 19).

⁹ However, not all ideas might travel as easily. For example, the Coleman diagram might not be a useful tool in all fields. In political science most of the debate about process tracing has occurred in the context of international relations. The contributions to this debate often refer to the Coleman boat (Beach & Pedersen, 2013; Bennett & Checkel, 2014), but it is not clear how it applies to international relations. In sociology, the diagram is mainly a tool for conceptualizing micro–macro relations. The topic of international relations is not similarly focused. Thus, the diagram seems to serve only as a highly general illustration of the general idea that mechanism-based explanation focuses on “underlying” processes.

¹⁰ I would like to thank Peter Hedström, Julie Zahle, and two anonymous referees for useful comments.

Acknowledgement

This research received funding from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013)/ERC grant agreement no. 324233, Riksbankens Jubileumsfond (DNR M12-0301:1) and the Swedish Research Council (DNR 445-2013-7681 and DNR 340-2013-5460).

References

- Beach, D., & Pedersen, R. B. (2013). *Process-tracing methods. Foundations and guidelines*. Ann Arbor: The University of Michigan Press.
- Becker, H. S. (2014). *What about mozart? What about murder? Reasoning from cases*. Chicago: The University of Chicago Press.
- Bengtsson, B., & Hertting, N. (2014). Generalization by mechanism: Thin rationality and ideal-type Analysis in case study research. *Philosophy of the Social Sciences*, 44, 707–732.
- Bennett, A., & Checkel, J. T. (2014). *Process tracing. From metaphor to analytic tool*. Cambridge: Cambridge University Press.
- Biggs, M. (2009). Self-fulfilling prophecies. In Hedström, & Bearman (Eds.). *The oxford handbook of analytical sociology* (pp. 294–314). Oxford: Oxford University Press.
- Blumer, H. (1954). What is wrong with social theory? *American Sociological Review*, 19(1), 3–10.
- Campbell, D. T. (1979). Assessing the impact of planned social change. *Evaluation and Program Planning*, 2, 67–90.
- Coleman, J. S. (1987). Microfoundations and macrosocial behavior. In Giesen Alexander, Münch, & Smelser (Eds.). *The micro-macro link* (pp. 153–173). Berkeley: University of California Press.
- Coleman, J. S. (1990). *Foundations of social theory*. Cambridge, MA: The Belknap Press.
- Crasnow, S. (2017). Process tracing in political science: What's the story? *Studies in History and Philosophy of Science*, 62, 6–13.
- Darden, L. (2006). *Reasoning in biological discoveries*. Cambridge: Cambridge University Press.
- Elster, J. (2015). *Explaining social behavior. More nuts and bolts for the social sciences* (2nd ed.). Cambridge, UK: Cambridge University Press.
- Epstein, J. M. (2006). *Generative social science. Studies in agent-based computational modeling*. Princeton: Princeton University Press.
- Espeland, W. S. (2016). Reverse engineering and emotional attachments as mechanisms mediating the effects of quantification. *Historical Social Research*, 41, 280–304.
- Espeland, W. S., & Sauder, M. (2007). Rankings and reactivity: How public measures recreate social worlds. *American Journal of Sociology*, 113, 1–40.
- Espeland, W. S., & Sauder, M. (2016). *Engines of anxiety academic rankings, reputation, and accountability*. New York: Russell Sage Foundation.
- Flyvbjerg, B. (2006). Five misunderstandings about case-study research. *Qualitative Inquiry*, 12, 219–245.
- George, A. L., & Bennett, A. (2005). *Case studies and theory development in the social sciences*. Cambridge, MA: The MIT Press.
- Gerring, J. (2007). *Case study research. Principles and practices*. Cambridge: Cambridge University Press.
- Gobo, G. (2008). Re-conceptualizing generalization: Old issues in a new frame. In Alasuutari (Ed.). *SAGE handbook of social research methods* (pp. 193–203). London: Sage.
- Gomm, R., Hammersley, M., & Foster, P. (2000). Case study and generalization. In Hammersley Gomm, & Foster (Eds.). *Case study method* (pp. 98–116). London: Sage.
- Hammersley, M., Gomm, R., & Foster, P. (2000). Case study and theory. In Hammersley Gomm, & Foster (Eds.). *Case study method* (pp. 234–259). London: Sage.
- Hedström, P., & Udéhn, L. (2009). Analytical sociology and theories of the middle range. In Hedström, & Bearman (Eds.). *The oxford handbook of analytical sociology* (pp. 25–49). Oxford: Oxford Univ. Press.
- Hedström, P., & Ylikoski, P. (2010). Causal mechanisms in the social sciences. *Annual Review of Sociology*, 36, 49–67.
- Lieberson, S. (1992). Small N's and big conclusions: An examination of the reasoning in comparative studies based on a small number of cases. In C. Ragin, & H. S. Becker (Eds.). *What is a case? Exploring the foundations of social inquiry* (pp. 105–118). Cambridge: Cambridge University Press.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage.
- Mahoney, J. (2001). Review essay: Beyond correlational analysis: Recent innovations in theory and method. *Sociological Forum*, 16, 5–38.
- Merton, R. K. (1968). *Social theory and social structure*. New York: Free Press.
- Morgan, M. S. (2012). *The world in the model. How economists work and think*. Cambridge: Cambridge University Press.
- Norkus, Z. (2005). Mechanisms as Miracle Makers? The Rise and Inconsistencies of the ‘Mechanistic Approach’ in Social Science and History. *History and Theory*, 44, 348–372.
- Payne, G., & Williams, M. (2005). Generalization in qualitative research. *Sociology*, 39(2), 295–314.
- Sauder, M., & Espeland, W. S. (2009). The discipline of rankings: Tight coupling and organizational change. *American Sociological Review*, 74, 63–82.
- Small, M. (2009). ‘How many cases do I need?': On science and the logic of case selection in field-based research. *Ethnography*, 10, 5–38.
- Stake, R. E. (1978). The case study method in social inquiry. *Educational Researcher*, 7(February), 5–8.
- Walton, J. (1992). Making the theoretical case. In C. Ragin, & H. S. Becker (Eds.). *What is*

- a case? Exploring the foundations of social inquiry* (pp. 121–138). Cambridge: Cambridge University Press.
- Williams, M. (2000). Interpretivism and generalization. *Sociology*, 43(2), 209–224.
- Ylikoski, P. (2011). Social mechanisms and explanatory relevance'. In Demeulenaere (Ed.). *Analytical sociology and social mechanisms* (pp. 154–172). Cambridge: Cambridge University Press.
- Ylikoski, P. (2012). Micro, macro, and mechanisms. In Kincaid (Ed.). *The oxford handbook of philosophy of the social sciences* (pp. 21–45). Oxford: Oxford University Press.
- Ylikoski, P. (2016). Thinking with the coleman boat, the IAS working paper series 2016:1. <http://urn.kb.se/resolve?urn=urn:nbn:se:liu:diva-132711>.
- Ylikoski, P. (2017a). Social mechanisms. In Glennan, & Illari (Eds.). *The routledge handbook of mechanisms and mechanical philosophy* (pp. 401–412). Oxford: Routledge.
- Ylikoski, P. (2017b). Methodological individualism. In McIntyre, & Rosenberg (Eds.). *Routledge companion to philosophy of social science* (pp. 135–146). Oxford: Routledge.
- Ylikoski, P., & Aydinonat, E. (2014). Understanding with theoretical models. *Journal of Economic Methodology*, 21, 19–36.