CAUSAL MECHANISMS IN THE SOCIAL SCIENCES AS EVIDENCE FOR HIGHER-ORDER CAUSAL RELATIONS

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Abstract
The idea that knowledge of causal mechanisms is important for social scientists is very common in the methodological literature in the social sciences. On the one hand, it is often said that knowledge of causal mechanisms in the social sciences has an explanatory role: it is important because it provides insight into how causal relations at the higher level come about. On the other hand, it is often claimed that knowledge of mechanisms also has an evidential role: it helps to establish causal relations. In this chapter I discuss this evidential role and spell out some of the details by formulating two theses about this role.

Keywords
Causal inference, causal mechanisms, direction of causation, problem of confounders.

Biographical note
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Key readings
- De Bal, I. & Weber, E. (2019) "Causation, Time Asymmetry and Mechanistic Evidence in the Social Sciences," in S. Kleinberg (ed.) *Time and Causality Across the Sciences,* Cambridge: Cambridge University Press.
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Key messages
- In the social sciences, knowledge of causal mechanisms is important because of its explanatory value but also because of its evidential value.
- In some contexts, knowledge of causal mechanisms significantly aids causal inference because it strengthens arguments based on controlling for potential confounders.
- In other contexts, knowledge of causal mechanisms significantly aids causal inference because it is a way to establish causal direction.

CAUSAL MECHANISMS IN THE SOCIAL SCIENCES AS EVIDENCE FOR HIGHER-ORDER CAUSAL RELATIONS

1. Introduction

To clarify what higher-level causal relations are in the context of this chapter, consider the following examples:

- Universal suffrage stimulates the development of socialist political parties.
- Democratic government structures prevent countries to start a war with other democratically organised countries.
- Increase of real per capita income leads to a relative increase of state expenditure.
- Structural differentiation in organisations enlarges the administrative component.
- The degree of social cohesion in a society influences its suicide rate.

These claims link properties that cannot be attributed to individual human agents. They relate properties of groups or organisations, including states. They come from a variety of social science domains: domestic and international politics, macroeconomics, business & public administration and sociology.[1]

The overall view in which this chapter is embedded is that knowledge of causal mechanisms is important for social scientists for two reasons:

1) *Mechanisms as Explanation*
   Knowledge of causal mechanisms in the social sciences is important because it provides insight into how causal relations at the higher level come about.
2) *Mechanisms as Evidence*
   Knowledge of causal mechanisms in the social sciences is important because it can be part of the evidence for the existence of higher-level causal relations.

In the formulation of the first thesis, we see that 'explanation' refers to insight in how causal relation are produced. The idea is that, as a social scientist, you are convinced (based on research) *that* there is a causal relation between X and Y, and you want to *understand why* this causal relation exists in the relevant part of the social world. The first thesis says that knowledge of causal mechanisms is crucial in such endeavours. In the second thesis, the idea is that you are not yet convinced *that* there is causal relation. The second thesis says that knowledge of causal mechanisms can play a role in a different type of endeavour: establishing the existence of causal relations.

Such an overall view – in which knowledge of mechanisms has a double role – is expressed in e.g. Marchionni 2018 and Ylikoski 2018. Other methodologists of the social sciences stress the first role (e.g. Goertz 2017 and Little 2012) or the second role (e.g. Steel 2004)[2]. In this

[1] As we see in the last example (due to Durkheim in *Le Suicide*) the effect variable is sometimes a population average, such as labor force participation rate or participation rate in cancer screening. These averages are properties of the groups, not of individuals.

[2] This does not imply that they reject the other role; they just pay less attention to it in their methodological and philosophical reflection.

chapter I discuss the second, evidential role of knowledge of mechanisms. I spell out some of the details by elaborating two specific theses, which will be presented later. I acknowledge that there is also an explanatory role, but I do not discuss it.[3]

While philosophers and methodologists of the social sciences often talk about 'causal mechanisms', scholars in general philosophy of science usually simply talk about 'mechanisms'. The concept of 'mechanism' is then defined in such a way that mechanisms are intrinsically causal. That will be clarified in Section 2, where I explain what 'mechanisms' in general are and how 'social mechanisms' constitute a subclass. Later in this chapter I characterise two specific situations in which knowledge of mechanisms plays a significant evidential role in establishing causal relations at the higher level. I call these 'PC-type' and 'CD-type' situations. 'PC' stands for 'Problem of Confounders' and 'CD' for 'Causal Direction' The exact meaning of the label will become clear in Section 3 and in Section 5. For now, it suffices to announce that I first elaborate a specific thesis that catches how knowledge of mechanisms plays its evidential role in PC-type situations (Sections 3 and 4) and then do the same for CD-type situations (Sections 5 till 7).

From my overview it should be clear that I focus on philosophical questions about epistemology and methodology. I do not make substantial claims about the metaphysics of causation, though this chapter rests on the inevitable metaphysical assumption of mechanistic philosophy, which is that (causal) mechanisms are particulars that exist in the world (see e.g. Glennan 2017: 86-88).

With respect to the scientific problems, it is clear that inference and reasoning are at the focus of this chapter. There is a connection with to the topic of explanation (cf. the complementary thesis on explanation by means of mechanisms) and also with the topic of control. The latter will become clear in Section 3. In the concluding section, I will highlight that my chapter sheds light on the interconnections between these four scientific problems of causality.

2. Mechanisms and social mechanisms

What is a mechanism? In this chapter I adopt a definition that is widespread in the mechanistic literature in the philosophy of science (e.g. Glennan 2017: 17; Glennan & Illari 2018: 2; Glennan, Illari & Weber 2022: 145). It goes as follows:

> A mechanism for a phenomenon consists of entities (or parts) whose activities and interactions are organized so as to be responsible for the phenomenon.

This is a minimalistic characterization since not much is required for something to be a mechanism. Many types of mechanisms can exist. The most important constraint is that mechanisms are compounds: they can be decomposed into entities and activities. What entities and activities are can be clarified as follows:

> Grammatically, entities are referred to by count nouns (or sortals). Examples of entities include proteins, organisms, congressional committees, and planets. Entities are […] objects—things that have reasonably stable properties and boundaries. Activities on the

[3] Defenders of multi-method research (MMR) in the social sciences often emphasise this explanatory role. See e.g. Gerring 2010 and Goertz 2017.

> other hand are referred to by verbs. They includ[e] anything from walking to pushing to bonding (chemically or romantically) to infecting. They are a kind of process—essentially involving change through time. (Glennan 2017: 20)

Interactions are activities that involve more than one entity.

An example of a mechanism in physics is the one that produces the macro-behaviour of gases (e.g. Boyle's law). The relevant entities are the gas molecules and the walls of the container. The molecules move around (activity) and collide with each other and with the walls (interactions). This produces the behaviour described in the regularities that relate macro-variables such as volume and pressure. The latter are properties of the gas sample as a whole, not of the molecules that compose it.

Mechanistic philosophers in general philosophy of science emphasize the importance of organization for the production of the higher-level phenomenon. A common example is the lawn mower: a pile of lawn mower parts is not a well-functioning lawn mower. A lawn mower has a spatiotemporal organization that enables the right causal interactions between the parts so that the machine as a whole has the capacity to cut grass. In the gas example, the crucial organizational tenet is that the number of molecules moving in any one direction is, on average, the same as that moving in any other direction (i.e., the motion is on average random). If the organization were different, the result at the macro-level would be different.

Types of mechanisms can be identified by imposing constraints on the types of entities and activities. Social mechanisms are such a type. Daniel Steel characterizes them as follows:

> Social mechanisms in particular are usually thought of as complexes of interactions among agents that underlie and account for macro-social regularities. (2011: 298)

Social mechanisms usually involve categorization of agents, and the behaviour of agents is at least partly determined by the social roles they occupy.

To illustrate the idea of social mechanism, consider the following very sketchy explanation of the causal relation in my third example above:

> [D]ue to the complexity of the democratic process and the requirement of securing a broad base of support for risky policies, democratic leaders are reluctant to wage wars, except in cases wherein war seems a necessity or when the war aims are seen as justifying the mobilization costs. The time required for a democratic state to prepare for war is far longer than for nondemocracies. Thus, in a conflict between democracies, by the time the two states are militarily ready for war, diplomats have the opportunity to find a nonmilitary solution to the conflict. (Maoz & Russett 1993: 626)

In this example, the entities of the mechanism are political leaders, diplomats and citizens that have to be mobilized. The activities are mainly intentional actions, e.g. negotiations, threats, decisions to mobilize and to declare war. Section 7 contains more examples of social mechanisms.

Now that I have clarified what social mechanisms are, we move on to the main topic of this chapter, viz. arguing that knowledge of causal mechanisms can play a role in establishing causal relations at the higher level.

3. Correlation and confounders: the problem

A typical inference challenge in the social sciences is this: given a statistical association between variables X and Y, argue that there is causal relation from X to Y. The origin of this inference challenge is that a correlation established in an observational (non-experimental) study is in principle compatible with three scenarios: a causal relation from X to Y, a causal relation from Y to X, and a so-called *confounder*, i.e. a common cause Z that influences both X and Y (without a causal relation from X to Y or vice versa). Practical and ethical restrictions make randomised experiments very unusual in the social sciences. This is why causal inference from observational studies is a common challenge in the social sciences (see De Bal & Weber 2019 for more information on this issue).

Philosophers and methodologists of the social sciences often discuss a specific subtype of the inference challenge sketched above. In this subtype, the challenge has the following structure:

(PC) (1) A correlation between variable X and Y is established in a non-experimental study.
(2) The goal is to argue that there is a causal relation from X to Y.
(3) Because of the design of the study, the observed correlation cannot be explained by a causal relation from Y to X.
(4) To reach the goal in (2) the remaining alternative – a common cause Z without a causal relation from X to Y – has to be excluded.

As I have mentioned above, 'PC' stands for 'Problem of Confounders'; this is the standard label for this type of challenge. What is important in this subtype of the inference challenge is that one of the scenarios that is in principle possible, viz. a causal relation from Y to X, is not a viable option – see clause (3). The focus lies on excluding common causes. That is *not* an a priori decision, but a valid consequence of the kind of observational study that has been done. In the remainder of this section I explain that PC-type situations arise if scientists do observational studies with a built-in time-asymmetry: prospective or retrospective designs. In the next section I discuss solutions for the problem, with attention for the role of mechanisms. In Sections 5 till 7 I discuss the other subtype of the inference challenge. Not surprisingly, the second subtype arises if there is no time-asymmetry in the observational study. The label 'CD' (Causal Direction) for this second type refers to the extra difficulty: causal relations in both directions (from X to Y and vice versa) have to be considered.

Suppose that we are following 10000 people with healthy lungs (i.e. they have no indications of lung cancer) for 10 years and passively monitor their smoking habits. Of our 10000 people, 4000 regularly smoke (they are the 'experimental' group) while the others never smoke (the control group). After those 10 years, we determine the amount of lung cancer cases in the experimental group and in the control group. That would be prospective study design. These are characterised by the fact that, at the start of the study, no one in the experimental group nor the control group exhibits the effect under investigation. All occurrences of the effect are in the future relative to the time the sample was selected. This is what the 'time-asymmetry' consists of. In a retrospective design, the experimental group is a sample of people who already have the effect under investigation. This group is compared to a control group in which the investigated effect is absent. The aim of the study is to find out whether the suspected causal factor occurred more frequently (in the close or more distant past) in the experimental group than in the control group.

To construct a social science example of a PC-type situation I use the study on the relation between parental separation and smoking initiation as it is presented in Kirby 2002. One of the claims put forward is:

> Parental separation (X) is a positive causal factor for smoking initiation at adolescent age (Y).

Because of the potential harm of parental separation (for parents as well as for children) this causal relation cannot be investigated by means of a randomised experiment (in which we would force some couples to divorce). For ethical reasons, only observational studies can be done in order to gather empirical evidence to support this claim.

Kirby takes his data from the National Longitudinal Study of Adolescent Health (see Kirby 2002, p. 59 for details). American high school students were interviewed twice with approximately a 1-year interval. Kirby's sample contains students who at wave 1 (the first interview) reported living with two parents and never having tried cigarettes. His 'experimental' group consists of those students who experience divorce or separation by wave 2 (the second interview). The control group consists of students who still live with two parents at wave 2. For both groups, the relative frequency of smokers at wave 2 was calculated. The results showed a clear correlation: in the experimental group about 27% started smoking, in the control group only about 16%. Because of the prospective nature of the design (the initial sample contained non-smokers only, and the smoking initiation was monitored) this correlation cannot be explained by a causal relation in the opposite direction: the fact that an adolescent smokes at a given time *t* cannot be a cause of the fact that his/her parents divorced in the year *t-1.* We would have to assume that there is a (biological or psychological) mechanism by means of which the smoking behaviour of children can have a retroactive (backwards-in-time) effect on the previous divorce of their parents.

The inference challenge for Kirby is as follows:

> (1) A correlation between "parental separation" (X) and "smoking initiation" (Y) is established in a non-experimental study.
> (2) The goal is to argue that there is a causal relation from "parental separation" (X) to "smoking initiation" (Y).
> (3) Because of the design of the study, the observed correlation cannot be explained by a causal relation from "smoking initiation" (Y) to "parental separation" (X).
> (4) To reach the goal in (2) the remaining alternative (a common cause Z without a causal relation from X to Y) has to be excluded.

In general, the time-asymmetry that is built-in in prospective designs is crucial for obtaining a PC-type situation. Without this time-asymmetry the 'no backwards-in-time causation' argument that I have used cannot be given. The same applies for retrospective designs.

4. Correlation and confounders: solutions and the evidential role of mechanisms

In quantitative social science research the standard way to handle PC-type situations is 'conditioning on potential confounders'. Every variable that is correlated to both X and Y is a *potential* confounder. For each such variable we can – in principle – run a statistical test. The simplest test involves stratification: create strata in which the value of the potential confounder is fixed; then check whether there is a correlation between X and Y in the strata (see e.g. Pourhoseingholi et al. 2012 for this and other techniques).

If the correlation between X and Y disappears if we hold the value of Z fixed, we have identified a real confounder that blocks causal inference. The correlations we have found (in the sample as a whole and in the strata) can be explained by the conjunction of the following hypotheses (where the arrow represent a causal relation):

Z→X	Z→Y	not(X→Y)

This blocks the intended causal inference, because the third alternative cannot be excluded.

If the correlation between X and Y is still present if we hold the value of Z fixed, the set of hypotheses above does not explain all the established correlations: the correlations in the strata where Z is fixed are not explained. Hence, the correlations still suggest a causal relation between X and Y; Z was a *potential* confounder, but the test revealed that it is not a *real* confounder.

In the study discussed in Section 3, Kirby checked three potential confounders: household income, parental education and smoking status of parents (2002, p. 61). None of them was a real confounder: parental education as a common cause (without a causal relation between parental separation and smoking initiation) cannot explain the correlation between parental separation and smoking initiation because that correlation is still present in the strata where the value of that variable is fixed (this holds also for the two other potential confounders Kirby considers).

The procedure of conditioning on potential confounders has practical limitations. If we were able to run a test for *all* potential confounders, the procedure would be perfect. But in practice it is impossible to test all potential confounders because some of them may be unknown. Completeness would require that for every variable we can think of we would check whether it is a potential confounder (i.e. check whether it is correlated to both X and Y). It is common practice in quantitative social science research to run the test for some potential confounders (selected based on theoretical considerations and past experience) and then consider the causal relation to hold until proven otherwise.

Daniel Steel has argued that knowledge of mechanisms can help here:

> [S]ocial scientists are rarely able to measure all potential common causes. Indeed, the inability to exhaustively consider all potential common causes is a basic element of the problem of confounders, to which mechanisms are being considered as a partial solution. (2004: 63)

He distinguishes two possible roles for mechanisms in relation to the problem of confounders. The first possible role is a negative one: if we do not find a plausible mechanism linking two variables, we can conclude that the correlation between them is spurious (i.e. there is a common cause). Steel thinks that this negative role does not work, because we can always

find plausible mechanisms in social science contexts. The second possible role is positive: if we find a mechanism for which we have good evidence we can conclude that there is a causal relation between the two correlated variables. Because the second role does work, Steel is convinced that "mechanisms significantly aid causal inference in the social sciences" (2004: 63).

Based on what I have said in Section 3 and in this section I put forward my first specific thesis:

> *Mechanisms & Confounders*
> In PC-type situations knowledge of causal mechanisms significantly aids causal inference because it strengthens arguments based on controlling for potential confounders.

We can get a long way without knowledge of mechanisms, but this knowledge is useful to finalise the argument. The idea is that one starts with conditioning on potential confounders. If the hypothesis that X causes Y survives several obvious checks, one should start a theoretical investigation into underlying social mechanisms.

One may wonder why we need correlations if in the end we invoke knowledge of mechanisms. The answer is that multiple mechanisms can cancel each other out. This is usually called 'masking'. Phyllis Illari explains it as follows.

> Increased exercise leads to more calories being burned, via well-known mechanisms. But it also leads to increased appetite. Until we investigate further, we do not know the overall effect of exercise on fatness or thinness, and we cannot claim either that exercise makes you fat or makes you thin. The operation of one mechanism might *mask* or hide the operation of the other. (2011: 146; italics in original)

If we have established a mechanism according to which X can have a positive effect on Y, we should not yet conclude that there is a causal relation from X to Y. We need a correlation to argue that there are no masking mechanisms (i.e., there are no counteracting mechanisms or they are less strong than the positive mechanism). Steel acknowledges this (2004: 71-72). This is why in his proposal we start with correlations and conditioning on potential confounders, while mechanisms enter at a later stage.

5. An additional evidential role for knowledge of mechanisms

In my second thesis, I refer to 'CD-type situations'. These are to be understood as follows:

(CD) (1) A correlation between variable X and Y is established in a non-experimental study.
(2) The goal is to argue that there is a causal relation from X to Y.
(3) The empirical data support the inverse causal relation (from Y to X) equally well as the causal relation from X to Y that one wants to establish. A common cause Z (without causal relation from X to Y or vice versa) is also possible.
(4) To reach the goal in (2) a theoretical argument in favour of a causal relation from X to Y has to be constructed.

Situations with this structure are common in the social sciences and constitute a second subtype of the general inference challenge. As mentioned before, 'CD' refers to the 'Causal Direction'. CD-type situations are common in the social sciences because many observational studies investigate a possible correlation without any temporal direction in the design. These 'purely correlational' studies are clearly distinct from prospective and retrospective studies. The argument mentioned in (4) is 'theoretical' because the empirical evidence cannot make a difference. That is part of the definition of CD-type problems.

I give an example. Suppose you are interested in the relation between marital satisfaction (X) and job satisfaction (Y). You find a positive correlation in a study in which X and Y are measured simultaneously. The correlation can be explained in four ways, which can be schematically represented as follows:

1	X→Y	not(Y→X)		
2	not(X→Y)	Y→X		
3	X→Y	X→Y		
4	not(X→Y)	not(Y→X)	Z→X	Z→Y

In the third case, you believe that there is mutual influence between the variables X and Y. In the fourth case you have to bring in Z because there is no causal relation from X to Y or vice versa. The idea behind CD is that you develop a theoretical argument for X→Y, so that only the first and third option remains. Later on you may consider the other direction (Y→X) to choose between these remaining options.

My second specific thesis is:

> *Mechanisms & Causal Direction*
> In CD-type situations knowledge of causal mechanisms significantly aids causal inference because it is a way to establish causal direction in such situations.

In Sections 6 and 7 I give an example that illustrates how mechanistic evidence can bring in causal direction in CD-type situations.

6. Causation, correlation and mechanisms in the study of electoral systems

I use the causal claims put forward by the French political scientist Maurice Duverger to shed light on the composition of the theoretical argument mentioned in clause (4) of (CD), and to show that mechanistic evidence can lead to a convincing theoretical argument. In this section I provide background information on election studies and show that Duverger was in a CD-type situation. In Section 7 I will explain how Duverger brings in causal direction by means of mechanistic evidence.

Duverger became famous in the 1950s for his work on the relation between electoral systems and the number of so-called 'visible' political parties. The key propositions are the following (Benoit 2006: 70; Duverger 1959: 217 and 239):

(D1) The simple-majority single-ballot system favours the two-party system.
(D2) The majority system with a second-round runoff favours multi-partism.
(D3) Proportional representation favours multi-partism.

The first claim became known as Duverger' Law, but the other claims are equally important. In simple-majority single-ballot systems there is one member of parliament to be elected in each voting district. The candidate who gets more votes than any other candidate is elected (even if the candidate's score is less than 50%). Duverger considers two other systems: the majority system with a second-round runoff (if no candidate receives more than 50% of the initial votes, there is a second round with the two best candidates) and proportional representation (multiple members of parliament for each district; seats allocated based on percentage of votes for each political party). A two-party system is characterised by the fact that two parties have almost all the seats in the parliament (e.g. 95% or more). In election studies, political parties that have less seats than a certain threshold (e.g. 1% or 2% of the total number of seats) are often called 'invisible'. In this terminology, a two-party system has only two visible political parties. Multi-partism means that there are at least three visible political parties.

Duverger performed a comparative study of the relation between electoral systems and number of parties. This empirical evidence shows that there is a correlation. The situation in which Duverger found himself after his comparative research can be schematically represented as follows:

> (1) A correlation between variables "electoral system" (X) and "number of visible political parties" (Y) is established in a comparative study.
> (2) The goal is to argue that there is a causal relation from X to Y.
> (3) The empirical data support the inverse causal relation (from Y to X) equally well as the causal relation from X to Y that one wants to establish. A common cause Z (without causal relation from X to Y or vice versa) is also possible.
> (4) To reach the goal in (2) a theoretical argument in favour of a causal relation from X to Y has to be constructed.

The a-temporal correlations that Duverger found support causal claim (D3), but also:

(D4) Multi-partism (as a result of a given election) favours proportional representation (as an electoral rule in future elections).

Because the correlation is a-temporal, it supports a causal relation from X to Y but also from Y to X. In order to move from correlation to causation, Duverger brings in causal direction by invoking two social mechanisms: the 'mechanical effect' and the 'psychological effect'. These will be discussed in Section 7.

7. Duverger's social mechanisms

The 'mechanical effect' refers to systematic overrepresentation (in the parliament) of large parties, due to the conversion rules. There is always a certain mismatch between share of votes and share of seats. The key to understanding the 'mechanical effect' is that the degree of over-representation of large parties varies: in simple majority single-ballot electoral systems, application of the electoral rules leads, on average, to higher over-representation of large parties than the application of electoral rules in proportional representation systems. The 'mechanical effect' is inherent in the conversion procedure, so it is present in all countries in which votes are correctly processed (i.e. where there is no fraud). The 'psychological effect' is produced by the behaviour of political actors in response to electoral rules. Voters who anticipate that their vote may be wasted, may become what is called 'strategic deserters'; the risk of a wasted vote is higher in a simple majority single-ballot system. The psychological effect occurs if there is a substantial amount of strategic deserters among the electorate. However, the first mechanism (the mechanical effect) is sufficient to produce the causal relations.

Let us look at the 'mechanical effect' in more detail. When polling stations are closed, votes are counted. This is done by people (with all kinds of technological assistance) that perform certain roles in the electoral system. Examples of such roles are 'chairman of totalization office' or 'secretary' or 'assessor' in such offices. The interaction between all these people which count and process votes in a predetermined, highly structured way leads to the proclamation of a result (again by an individual with a specific social role) in terms of seats in the parliament. An important aspect of this mechanism is that it is causally directed. The people involved do not count seats and convert them into votes. They count votes and convert them into seats. And electoral rules are also an input of the process, not an output. The rules are in the heads of the individual (and implemented in the computer programmes they use). They are in no way an output of the vote processing system.

The 'psychological effect' also involves individuals with certain roles ('party leader', 'voter', …) behaving and interacting in certain ways. The mechanism rests on two assumptions about how relevant behaviour is determined:

- What voters do in the polling station is influenced by their knowledge of the electoral system and the degree to which it favours large parties.
- What party leaders do in terms of pre-election coalitions is influenced by their knowledge of the electoral system and the degree to which it favours large parties.

Again, there is a clear temporal and causal order: the electoral rules exist, they influence what is in the mind of voters and party leaders. And the opinions of voters and party leaders determine their behaviour.

Now that we know what Duverger had in mind, some philosophical comments can be made:

1. Mechanisms can only perform their evidential role if their presence is established by means of empirical research. Duverger's mechanical effect was established for all electoral systems in Rae 1967. The psychological mechanisms were investigated empirically in e.g. Blais & Carty 1991 and Dunleavy & Diwakar 2011. Without this research, there would be no *knowledge* of mechanisms – only speculative hypotheses about underlying mechanisms.
2. The correlation from which Duverger started remains crucial to exclude masking mechanisms.

3. Some scholars (e.g. Colomer 2005 and Benoit 2007) have argued that there is mutual dependence (i.e., (D4) is also true).
4. Duverger's mechanisms also allow us to understand why the causal relations at the higher level exist. But explanation is not the focus of this chapter.

8. Conclusions

This chapter has three take-home messages. The first is that, in the social sciences, knowledge of causal mechanisms is not only important because of its explanatory value. It also has evidential value. This insight is captured in the general thesis I have defended here:

> *Mechanisms as Evidence*
> Knowledge of causal mechanisms in the social sciences is important because it can be part of the evidence for the existence of causal relations at the higher level.

The second message is that it is important to distinguish between two types of situations in which social scientists may find themselves when they are in the process of developing an argument for a causal claim after they have done an observational study: PC-type and CD-type situations. Thirdly, in the spirit of the causal pluralism of this book, this chapter reveals that the evidential role of mechanism varies across the two types of situations.

The two last messages are combined into my more specific theses:

> *Mechanisms & Confounders*
> In PC-type situations knowledge of causal mechanisms significantly aids causal inference because it strengthens arguments based on controlling for potential confounders.
> *Mechanisms & Causal Direction*
> In CD-type situations knowledge of causal mechanisms significantly aids causal inference because it is a way to establish causal direction in such situations.

The specific theses are arguments for the general thesis, but also spell out the evidential role of mechanistic in more detail, depending on the type of inference problem.

My chapter also sheds light on the connection between the various scientific problems of causality. On the one hand, it became clear that inference and reasoning are sometimes intimately linked to control (in PC-type situations) while in other contexts (CD-type situations) there is no strong interconnection. On the other hand, inference is closely tied to explanation: causal mechanisms play a role in the explanation of causal relations as well as in the reasoning processes that establish their existence.

Readers interested in the topic of this chapter should also look at (Runhardt, this volume), in which the starting point is that true experiments are usually unethical or impracticable in political science. My chapter investigates the role of mechanistic knowledge in coping with this situation, while Runhardt considers the role of non-experimental interventions

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