Evidential pluralism and evidence of mechanisms in the social sciences

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Abstract

Is evidential pluralism possible when we move to the social sciences, and if so, to what degree? What are the analytical benefits? The answer put forward in this article is that there is a tradeoff between how serious social science methodologies take the study of mechanisms and the analytical benefits that flow from evidential pluralism. In the social sciences, there are a range of different approaches to studying mechanisms, differentiated by 1) the degree to which the 'process' is unpacked theoretically, and 2) whether the approach takes seriously the particular nature of social phenomena and the epistemological consequences that flow from this, as in realist approaches to the study of mechanisms, or whether more neopositivist -based foundational assumptions are adopted. Depending on which approach to study mechanisms is used, evidential pluralism is either: easy but superficial, very productive but challenging, or almost impossible because of the fundamental differences between the types of claims being made and the forms of evidence used.

1. Introduction

The argument that evidence of causal effects and mechanisms serve complementary functions in substantiating causal claims is well-established in the natural sciences (e.g. Russo and Williamson, 2007; Illari, 2011; Clarke et al, 2014). *Evidence of causal effects[1]* relates to evidence of a probabilistic dependence between a cause (X) and outcome (Y), ideally garnered from a randomized controlled trial (RCT) (Clarke et al, 2014: 340). *Evidence of a mechanism* binding X and Y together involves tracing empirically the linkages between them, often by unpacking processes into parts composed of entities and activities, thereby also providing information about the organization and operation of the parts (Illari, 2011: 145). The two types of evidence substantiate two different aspects of an overarching claim that X and Y are causally related; the causal effect is that X and Y co-vary, whereas the mechanistic claim focuses on a causal arrow that links X and Y together.

Evidential pluralism involves combining evidence of causal effects and mechanisms together in order to compensate for the weaknesses of the other type of evidence.[2] Causal effect evidence is evidence of an average net causal effect of X on values of Y, but it is unable to address four issues relating to: 1) *internal validity* of the causal claim and the potential presence of *confounders* that produce a found correlation, 2) lack of information relating to *how* X is causally related to Y, 3) inability to predict whether X will *work in a particular case*, and 4) *external validity* and whether X will work in the same manner outside of the studied sample. Evidence of mechanisms can in principle provide strong evidence of a causal linkage *and* how it works, thereby addressing issues 1 and 2. Further, by tracing processes in particular cases, mechanistic research sheds light on contextual factors required for the process to function, thereby increasing the external validity of causal claims. At the same time, evidence of mechanisms runs into the issue of masking, which describes a situation where multiple mechanisms link X and Y together with

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[1] - In this article I use the term causal effect instead of the term 'correlation', which is often used in the literature about evidential pluralism. A claim about a correlational association is not necessarily causal. A causal effect includes a *correlational* claim, but also flags that a *causal* claim is being made also. A more strategic reason is to avoid the association with the oft-quoted statement 'correlation is not [necessarily] causation'.

[2] - Note that in contrast to the epistemic focus of the original Russo-Williamson thesis (2007), the discussion of evidential pluralism in this article discusses both the underlying ontology of causal claims being made (counterfactual versus mechanisms) and the epistemology of how they can be properly evidenced.

different effects on Y. If masking is present, tracing mechanism M1 between X and Y does *not* enable an inference about the net causal effect of X on Y (Illari, 2011: 145-6).

In this article I focus on the social sciences, and whether the possibilities and challenges of using evidence of mechanisms to compensate for the four identified issues of evidence of causal effects are similar to what we know from the natural sciences. The answer put forward in this article is that there is a tradeoff between how serious social science methodologies take the study of mechanisms and the analytical benefits that flow from evidential pluralism.

There are few differences between the natural and social sciences as regards methodologies for working with evidence of causal effects. In both fields, research methodologies are situated squarely within a neopositivist understanding of science. In the social sciences, a causal effect claim is widely understood to be at the foundational, ontological level a *counterfactual* claim about a causal dependency between X and Y across the studied sample of cases (Morgan and Winship, 2007; Angrist and Pischke, 2009; Gerring, 2011). The epistemological implication of a counterfactual understanding of causation is that they have to be evidenced by assessing the *difference* that variation in a cause has for an outcome across a number of cases, using a controlled experimental design (e.g. an RCT) that results in evidence of (average) causal effects.

But what is the character of evidence of mechanisms in the social sciences? Unfortunately, there is no consensus position. Instead there are (at least) three methodological positions that can be identified based on how they understand the ontological character of mechanistic causal claims and the epistemological implications that these choices have for their methodology. Here there are two relevant distinctions related to how mechanisms are understood; both of which have implications for the ability of a methodology for studying mechanisms to engage in meaningful evidential pluralism. The first distinction relates to whether mechanisms should be decomposed into their constituent parts in order to evidence mechanistic claims, or whether the theoretical mechanism can be analytically grey-boxed, focusing thereby almost solely on the epistemic question relating to how a linkage can be evidenced. The second distinction relates to the degree to which theories of mechanisms – if unpacked at all - take seriously

the particular nature of social phenomena and the epistemological consequences that flow from this, as in *realist* approaches to the study of mechanisms, or whether more *neopositivist*-based foundational assumptions are adopted that result in a focus on theorizing the more directly observable aspects of mechanisms without attempting to tap into the distinct social dimension of human interactions within causal processes.

Based on these distinctions it is possible to identify three different mechanism-focused methodologies in the social sciences: 1) a *minimalist* position in which the underlying mechanistic claim being made is not unpacked theoretically, but instead often treated as if it is an intervening or mediating variable; 2) an *in-depth* mechanistic position that argues for unpacking mechanisms theoretically into parts composed of entities engaging in activities that are then traced empirically, and 3) a *realist* position that attempts to unpack mechanisms theoretically in ways that *also* capture the *social dimension* of action and context through the addition of hermeneutic (interpretivist) methods aimed at understanding what action and interactions mean to actors and how actors understand the underlying social 'game' they are playing.

The degree to which evidential pluralism is possible in the social sciences then becomes a product of the position taken by social science methodologists on these two distinctions. When working with a minimalist position, it is relatively easy for evidence of mechanisms to communicate with evidence of causal effects, especially if large-n tools like mediation analysis are utilized to evidence mechanisms (see Imai et al, 2011; also Humphreys and Jacobs, 2015; Goertz, 2017). However, the tradeoff is that because the actual process remains within an analytical grey-box, the distinct methodological advantages of mechanism-focused designs cannot be fully reaped. This means that there is limited ability for minimalist designs to compensate for the four identified issues of causal effect evidence, with the result what can be termed *superficial evidential pluralism*.

In the in-depth position, mechanisms are unpacked theoretically in more detail (e.g. Waldner, 2014; Beach and Pedersen, 2019), often building on the productive account of mechanisms from the work of Craver, Darden and Machamer and others (Machamer, Darden and Craver, 2000; Machamer, 2004; Groff, 2011; Kaiser, 2017; Piccinini, 2017). In this understanding, mechanistic claims are unpacked theoretically into parts

composed of social actors (aka entities) engaging in activities that transfer causal forces to next part of process that are traced empirically *within* actual cases. By providing evidence of the operation of each part of a mechanism – and in particular the activities that provide the causal linkages – relatively strong inferences about a causal linkage are made possible, while at the same time shedding light on *how* the linkage works. Further, the act of tracing a mechanism in a case also sheds light on the contextual conditions required for its operation, thereby also increasing the external validity of the causal claim. At the same time, there are significant tradeoffs and challenges created by in-depth tracing of mechanisms in terms of the *scope* of inferences possible. In-depth tracing of mechanisms involves studying mechanisms in a small number of cases; often only a single case. This means that the evidence from a mechanistic study has a very narrow scope in relation to the overarching causal claim, making evidence of mechanisms only applicable to a small set of the cases. This means that it can be problematic to extrapolate the evidence of mechanisms to many other cases unless strong assumptions can be made about homogeneity in the broader population. Simply put, in in-depth mechanistic research in the social sciences, we learn a lot about a little, thereby making it difficult to communicate meaningfully with evidence of causal effects, which typically has a much broader scope.

A final variant of working with mechanisms can be identified in realist-based methodologies that take the theoretical and epistemic implications of the 'social' much more seriously than neopositivist methodologies (e.g. Sayer, 2000; Maxwell, 2012; Edwards, O'Mahoney and Vincent, 2014; Danermark, Ekström and Karlsson, 2019; also Archer, 1995; Emirbayer, 1997). Realists view the social world as one where social actors produce, reproduce and reason about the social relations and interactions that form the causal processes under investigation. Whereas more radical social constructivist approaches argue that *all* social reality is constructed (strong social constructivist position) (e.g. Bevir and Blakely, 2018) – thereby making the nature of the claims being made completely incompatible with neopositivist-based designs – realists adopt a moderate social constructivist position in which there exists a more 'objective' world out there independently of our knowledge of it that is composed of relatively stable structures. At the same time, realists posit that to understand the operation of causal processes in the *social* world, the analyst needs *both* to observe what activities actors are

performing using what can be thought of as 'experience-distant', observational evidence of activities associated with mechanisms and the context within which they operate, but that it is also important to tap into actor understandings of why they did things (intentionality and meanings) and their intersubjective understandings of the underlying social 'game' that they are participating through gathering what can be termed 'experience-near' evidence (Geertz, 1974; Sayer, 2000, 2010; Danermark et al 2019). Experience-near evidence is a critical part of the evidential picture for realists studying social processes and how they play out in actual cases. This type of evidence is gathered using hermeneutic methods that are very different from the methods used in neopositivist-based approaches to studying mechanisms.

While realist designs enable strong causal inferences to be made about mechanisms, and shed even more light on how a given process works in a case in a manner that take seriously the distinct nature of the social world, there are a series of challenges created that make evidential pluralism almost impossible. First, the *scope* of actual causal inferences in realist studies is restricted to the case in hand, making it very difficult to communicate with large-n, cross-case claims about causal effects. Second, the distinct character of hermeneutic methods for collecting and interpreting experience-near evidence means that the positionality of the researcher themselves also become important. However, the impact of positionality also makes it very difficult to communicate with evidence of causal effects that is purely 'experience-distant' and 'objective'.

The article proceeds in three steps. In the first section, I present briefly the consensus position about what evidence of difference-making looks like in the social sciences, followed by a section that discusses the challenges of combining evidence of difference-making with neopositivist understandings of mechanistic evidence used in minimalist and in-depth PT. In the third section, I discuss realist approaches to studying causal mechanisms, arguing that taking the social dimension more seriously at both the ontological and epistemological levels creates severe challenges for combining mechanistic evidence of social processes in actual cases with evidence of difference-making that applies to many cases and that lacks a social dimension. The conclusions summarize the arguments about evidential pluralism in the social sciences, flagging also

the many unanswered questions related to evidential pluralism in the social sciences to which we do not have good answers yet.

2. Evidence of causal effects in the social sciences and evidential pluralism

2.1. Evidence of causal effects and the problems that create the need for evidential pluralism
Evidence of causal effects as it is used in the social sciences relates to counterfactual-based causal claims (Woodward, 2003; Morgan and Winship, 2017; Angrist and Pischke, 2009; Gerring, 2011). Counterfactual-based causation is understood ontologically as a causal claim where a cause is a cause of an outcome when its absence would result in the absence of the outcome, all other things being held equal (Woodward, 2003). The epistemological implication of counterfactual causal claims is that without evaluating the difference a cause can make between the actual case and a counterfactual *non-treated* case, no causal inferences about the counterfactual are possible. However, given that a single case is either treated or not, it is impossible to directly observe difference-making in the *same* case at the *same* time. The result is that we are forced to engage in a second-best assessment of the counterfactual causal claim by comparing the impact of the treatment and its absence across a set of cases, holding the impact of all other potential causes of difference as constant as possible. This is best done using a RCT that enables us to compare values of the outcome in cases that receive the treatment with those in the experimental control group that do not (i.e. the counterfactual state), holding other factors constant. The resulting *evidence of a causal effect* (or lack thereof) enables us to infer that treatment X – on *average* – has a net causal effect for values of Y across the studied population. Naturally, there can be different types of causal effects lurking underneath an *average* effect *across* cases. In a simple example in which there are either strong or weak effects, and positive or negative effects, there would be four different types of effects. We might find that on average there was a weak positive effect, but this might obscure much variation in the type of causal effect across the population of cases.

2.2. Evidential pluralism and the uses of evidence of mechanisms
As in the natural sciences, there are (at least) four issues related to the ability of evidence of causal effects in the social sciences to establish and refine causal claims that can be

helped with the complementary use of evidence of mechanisms. The first two issues relate to our ability to make and interpret causal claims based on evidence of causal effects. First, evidence of causal effects have - even in the best designed RCT - issues relating to *potential unknown confounders* that might have produced the effects instead (e.g. Clarket et al, 2014; Deaton and Cartwright, 2018). Using observational data that has the character of an RCT (i.e. a natural experiment) to make inferences about causal effects has the additional problem that we are *assuming* that there are no confounders. Evidence of mechanisms can serve a complementary function in relation to both situations by enabling the inference that there is *a* causal linkage between a given cause and outcome. Note that evidence of mechanisms does *not* establish that the traced process is the *only* linkage, nor does it enable the researcher to rule out that *other causes* might also matter.

Second, even the best designed RCT does not tell us *how a cause works* – only that there is an average causal effect (Machamer, 2004; Russo and Williamson, 2007; Dowe, 2011; Illari, 2011; Baetu, 2016). By tracing a mechanism, we shed more light on how a given cause can produce an outcome, thereby telling us about how causal factors and processes are organized in a particular case. But as with the first issue, evidence of a particular mechanism only tells us about one pathway, but there might be other causes and mechanisms also operative – in particular across different types of cases (e.g. different mechanisms operative in weak positive versus strong positive effect cases).

The third and fourth issues relate to our ability to make causal inferences beyond the studied sample. Nancy Cartwright (2011) has succinctly defined the essence of evidence of casual effects garnered from an RCT as enabling the inference that 'it works somewhere'. We have evidence of the *average* difference variation in X makes for values of Y, i.e. a probabilistic dependence relationship. However, with this type of evidence we have difficulties in making inferences about whether the causal relationship works in any particular case (issue 3), or being externally valid outside of the bounds of the original studied sample (issue 4). The only situation where these issues would not hold is if studied and the broader population of the phenomena exhibits a high degree of causal homogeneity in terms of types of causal effects. Here we could reasonably expect that the found average causal effect in the sample would hold both in any given individual case *and* across the whole population.

For both issues, evidence of mechanisms can be used. Tracing a mechanism in a particular case provides evidence that there is at least a causal linkage between a given cause and outcome in the studied case. More importantly, tracing a mechanism empirically that is unpacked into its constituent parts and, in particular, tracing the activities that provide the actual causal linkage between a given cause and outcome sheds light on the *contextual* conditions required for the activities to actually do something. This information – which comes as an analytical by-product of detailed evidence of mechanisms operating in actual cases – can then be used to refine expectations about the cases in a population where we might expect the evidence of causal effects to be valid (Steel, 2008; Khosrowi, 2019).

3. Neopositivist approaches to evidence of mechanisms and evidential pluralism

3.1. Neopositivist approaches to studying mechanisms

Within social science, neopositivist assumptions form the 'mainstream' within which much of the methodological debate plays out (Jackson, 2016: 76-80). In particular, *phenomenalism,* with its focus on what is empirically observable and evidence that is external to the researcher, is a central assumption for many social science methodologists both as regards claims about causal effects (e.g. King, Keohane and Verba, 1994; Gerring, 2011) and many approaches to studying mechanisms (e.g. George and Bennett, 2005; Bennett and Checkel, 2014; Beach and Pedersen, 2019). Here theories are evaluated based on their *correspondence* with the empirically observable world, using experience-distant evidence either in the form of difference-making across cases or the empirical traces left behind in cases. Attempts to go beyond this to uncover deeper, non-observable social structures or intersubjective understandings are therefore viewed as unfruitful metaphysics.

In the following, two neopositivist social science approaches to studying mechanisms - minimalist and in-depth - are evaluated in relation to their contribution to evidential pluralism.

3.2. Minimalist mechanism-focused approaches and evidential pluralism

The term minimalist is used here to refer to social science approaches to studying mechanisms where the underlying causal linkage is not unpacked in any detail (e.g. Bennett and Checkel, 2014; Elster, 1998). The 'mechanism' in-between X and Y is often theorized using simple terms such as 'societal mobilization' or 'lobbying' that do not tell us more about what is going on in the linkage between a given cause and outcome. The result is that the process itself remains in an analytical grey-box (Bunge, 1997; Beach and Pedersen, 2019). Beyond this grey-boxing, there is though considerable variation across minimalist approaches, including both large-n and small-n (or even focused on a particular case) designs, along with a variety of different methods relating to the types of empirical material that can evidence a mechanistic claim, from evidence of difference-making across cases to within-case 'traces' or 'clues'.

Large-n minimalist approaches in the social sciences are best seen in *causal mediation methods* (e.g. Imai et al, 2011), where causal mechanisms are treated as a form of intervening variable that, in effect, collapses back down onto lower-level counterfactuals claims that have to be assessed by analyzing the *difference* that variation in the intervening variable(s) has for values of Y *across* a large set of cases, controlled for other variables. As an example, in a 2018 article in the journal *American Political Science Review*, Szakonyi explores which minimalist mechanism links Russian businessmen becoming legislators (cause) with economic benefits for their firm while they serve in office (outcome). He hypothesizes two 'mechanisms': either bank lenders look more favorably on businessmen with political success (M1), or political success opens doors to the bureaucracy that results in favorable treatment in regulations and procurement (M2) (p. 323). He then tests which of the two mechanisms are operative in a statistical mediation analysis, using an empirical proxy for each mechanism across a large number of cases. He finds that when controlled for a range of factors, the empirical proxy for M2 is present in more cases (p. 333). Note that neither mechanism is unpacked in any more detail.

Small-n minimalist approaches in the social sciences are variants of *process tracing methods.* In minimalist process tracing, the focus is almost exclusively at the epistemic level, with the underlying mechanistic claims themselves not unpacked (e.g. Brady and Collier, 2011; Bennett and Checkel, 2014; Humphrey and Jacobs, 2015; Mahoney, 2015;

Fairfield and Charman, 2017; Goertz, 2017). Scholars use terms like 'causal process observations' (Brady and Collier, 2011) or 'diagnostic evidence' (Bennett and Checkel, 2014) to refer to within-case traces that function as evidence of mechanisms because they provide, '…information about timing and sequencing, actors' goals and intentions, and other aspects of causal mechanisms, as obtained from a wide range of sources including interviews, archives, media records, and secondary literature.' (Fairfield and Charman, 2017: 368). For example, in an article from 2013 in the journal *World Development*, Fairfield uses a minimalist process tracing approach to study a hypothesized 'mobilizing public support' mechanism linking equity appeals by politicians (cause) with tax reforms (outcome) (2013: 44). One empirical observation that Fairfield suggests is particularly strong evidence (a 'smoking gun') for the mobilizing public support mechanism in her case study of a Chilean reform process is, '…statements by right politicians. The two right senators on the Finance Committee told the press that they abstained instead of voting against the reform because: "otherwise, President Lagos would have said that the opposition is against combatting tax evasion," … One of these senators later elaborated: "the [bill's] title—evasion—it suggests going after criminals. It's very difficult to oppose someone who presents that framing," (Fairfield, 2013: 48). In a later analysis of the evidence for the mechanism (Fairfield and Charman, 2017: 16), she claims that this evidence "captures the causal mechanism … more completely than any of the pieces of evidence previously analyzed".

What implication does the use of minimalist approaches – be they large-n or small-n - have for our ability to engage in evidential pluralism? Many of the advocates of minimalist approaches claim that they enable a seamless form of evidential pluralism in which the researcher moves back-and-forth between evidence of causal mechanisms and cross-case causal effect type causal claims (e.g. Humphrey and Jacobs, 2015; Goertz, 2017). Humphrey and Jacobs for example claim that 'clues' about mechanisms from a set of studied cases can be used to update our confidence in the average causal effect being present in the rest of the population based on the proportion of studied cases to the whole population (Humphreys and Jacobs, 2015). Goertz (2017) advocates a strong version of evidential pluralism in which the cross-case evidence of causal effects from either experiments or observational comparisons can be easily merged with evidence of mechanisms from minimalist case studies. However, given that minimalist approaches in

effect grey-box the causal mechanisms under investigation, I contend that the actual result is a superficial form of evidential pluralism that sheds little light on the four issues discussed above.[3]

As regards the issue of <u>internal validity of causal claims and potential confounders</u>, grey-boxing a mechanism reduces the strength of the causal inferences that can be made. Minimalist approaches *by design* do not trace each part of a mechanism that links X and Y together, which means that we do not have the evidence of the processual linkages that would enable stronger causal inferences to be made (Illari and Williamson, 2013; Green et al, 2010). Most problematically, in situations in which there plausibly can be *multiple* mechanisms linking X and Y together, it can also be difficult to evaluate *what* mechanism a given piece of evidence (i.e. a 'clue') is evidence of.
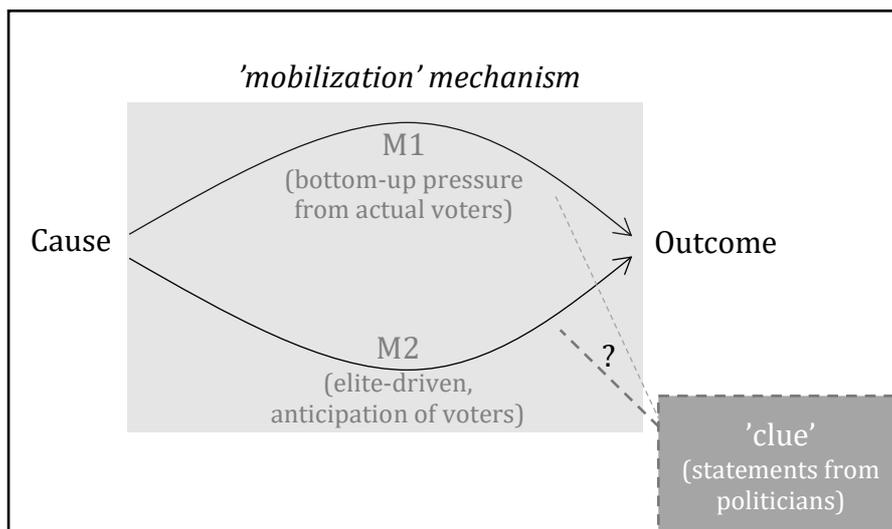

Figure 1 – Minimalist PT and evidential ambiguity because of grey-boxed processes.

This situation is illustrated in figure 1, in which there are two potential mechanisms linking a cause and outcome together (M1 and M2). If we are not told anything about the process beyond a simple one-liner like 'mobilization', it can be difficult to evaluate whether a given piece of evidence (a 'clue') is evidence of M1 or M2. Note that this is by

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[3] - This should not be understood as saying that minimalist approaches have no analytical use. On the contrary, they can be very relevant early in a mechanism-focused research process, where the analyst is in the dark about potential mechanisms. Here finding mechanistic evidence of some linkage helps in the identification of a potential mechanism. For more, see Beach and Pedersen, 2019; Bennett and Checkel, 2014.

no means a hypothetical problem. Returning to the example of Fairfield (see above), there are multiple ways that a 'mobilizing public support' mechanism could plausibly work. One way that it might work is as a *bottom-up* reaction to *actual pressure* from voters, in which voters let their voices be heard to policy-makers (M1 in the figure). However, another plausible process could be more *elite-driven*, with party leaders *anticipating* a potential public reaction before it happens, meaning that the *actual* mobilization of voters does not need to take place (M2 in the figure). These are two quite different mechanistic claims, but *both* would be compatible with the pieces of evidence (e.g. the statements by the right-wing politicians) provided by Fairfield in her article (2013). Indeed, the evidence she provide appears to be more compatible with a more elite-driven, anticipatory process. By not telling us more at the theoretical level about how the process works, it is difficult to know what mechanistic claim the empirics are actually evidence of, thereby reducing the strength of inferences that are possible.

Minimalist approaches also by design shed little light on <u>how causal processes work</u>. Returning to the article of Szakonyi (2018) discussed above, his analysis does not shed light on *how* political success led to more state contracts in actual cases because we do not know what activities the businessmen, bureaucrats and other politicians were doing in the process that can have led to the award of state contracts. In other words, we have no evidence of the actual interactions between businessmen and bureaucrats; instead, we have evidence of a *correlation* between the presence of the empirical proxy for one or the other processes and the outcome.

Turning to the issue of whether a causal relationship is present in a particular case (issue 3), large-n minimalist approaches run into the same issues as causal effect analysis because *averages* are used across a number of cases, meaning we gain no information about how the mechanisms actually operate within any *particular* case (Leamer, 2010; Green et al, 2010). In contrast, a small-n (i.e. single case) minimalist study provides at least some suggestive evidence that a given causal relationship might be present in a case.

Finally, on the issue of external validity, tracing minimalist mechanisms provides little information about contextual factors for when a causal relationship might hold in a broader population because so little information is gained about how the process works.

On the other hand, when a large-n analysis is conducted in which the studied cases do not fully overlap with those studied in the causal effects analysis, this provides suggestive evidence that a given effect might be present across a broader population of cases.

Concluding, evidential pluralism appears to be very easy if we keep vague the nature of the causal claims we are making by grey-boxing mechanisms. However, minimalist PT only enables a superficial form of evidential pluralism in which we are unable to reap fully the analytical benefits of working with mechanistic evidence.

3.3. In-depth approaches and evidential pluralism

A second distinct social science approach involves the in-depth process tracing of mechanisms, a method that draws on the ontological vocabulary of the productive account of causal mechanisms (e.g. Machamer, Darden and Craver, 2000; Machamer, 2004; Groff, 2011; Kaiser, 2017; Piccinini, 2017). This variant of process tracing is often – but not exclusively - used when the analyst is more interested in a particular case than cross-case claims. In this type of design, more abductive research practices are often utilized, involving an iterated dialogue between theory and empirics (Beach and Pedersen, 2019: 269).

Here the argument is that we cannot trace mechanisms empirically unless we unpack the theoretical process into its constitutive parts and how they are organized (e.g. Waldner, 2014; Beach and Pedersen, 2019). At its core, a mechanistic explanation attempts to explain theoretically how things work *within* a case or set of cases within a particular context (Cartwright, 2011). In the conceptual language of the productive account as it is used in the social sciences, mechanisms are unpacked into distinct parts composed of social actors (aka entities) engaging in activities. Instead of assuming linkages as in minimalist approaches, unpacking mechanistic explanations in theoretical, more abstract terms forces the analyst to make transparent the *causal logics* that are theorized to bind the activities of an actor with an actor in the next part of the process. The ambition is to unpack a causal mechanism into a blow-by-blow theory of the causal process linking a cause and outcome together that explains how the activities of social actors transfer causal forces to the next part of the process, along with their spatio-temporal organization (Craver and Darden, 2013; Beach and Pedersen, 2019). In the social

sciences, actors can be micro-level (i.e. individuals) or macro-level (i.e. collective social actors), with the requirement being that the later have properties and orientations that enable them to do things that can impact other actors in a process. Activities are what social actors actually do, and can take the form of speech acts, voting, paying bribes etc.

Evidence of mechanisms typically involves tracing each part of the process empirically using observational data within a particular case, although in principle, experimental 'wiggling' of parts could be used if it is possible to study the process in a controlled setting. Ideally, the operation of each of the parts of the process is traced empirically, focusing on the social actors and the activities they perform. A good theorized mechanism has productive continuity, understood as an unbroken causal linkage between the cause and outcome (Machamer, Darden and Craver, 2000). A strong causal inference about a causal mechanism linking X and Y together is then possible when there is empirical evidence for each part of the process.

Taken as a whole, an in-depth process tracing case study design can be visualized as in figure 2. An unpacked mechanism (M1) is theorized and evidence is gathered for each of the activities that provide the linkage, ideally in a form that is relatively direct, observational evidence of the actual transfer of causal forces to the next actor in the process.
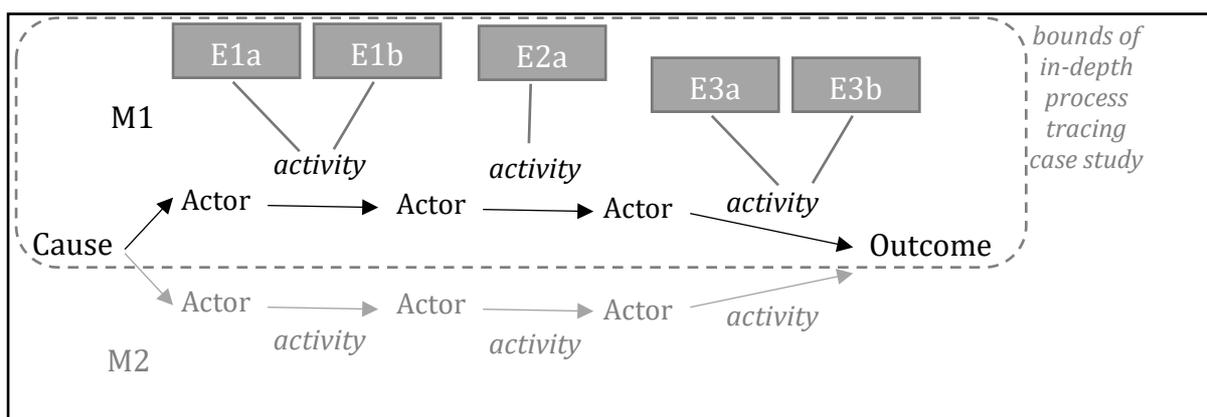

Figure 2 – In-depth process tracing: unpacking and evidencing causal processes

Given the focus on tracing M1, the analysis does *not* provide evidence of other mechanisms that might be operative at the same time (M2 in figure 2). The exception is

situations where M1 and M2 interact in ways that make understanding M1 impossible without also tracing M2 (Rohlfing, 2014; Beach and Pedersen, 2019: 41-44). Further, given that M1 is being traced within a particular case, no cross-case inferences are possible after a single PT case study. Mechanistic generalizations are only possible after multiple PT case studies that find similar processes at work in a representative sample of cases within a bounded population of cases.

An example of what in-depth process tracing can look like in practice can be found in an article by Winward (2020), published in the journal *Comparative Political Studies.* Winward first theorizes a causal process that can link a cause (low intelligence capacities of security forces in a conflict area) with the outcome (increase in state violence on the local population). Given the lack of existing theories at the level of process, he first hypothesizes a theory that explains how low intelligence capacities can trigger an interactive process that leads to large-scale violence (see table 1).

Cause/ trigger	*Theorized causal mechanism*			Outcome
	Part 1	Part 2	Part 3	
Low intelligence capacity of security forces in a civil conflict situation	Security forces *approach* local elites for collaboration about information	Local civil elites both *provide false information* targeted against specific group and *encourage* civilian violence against members of group	Security forces mass detainment strains capacities, leading to *increase in executions* Security forces *use torture* on detainees, resulting in more false information that leads to *more detainment, etc…*	Mass categorical violence targeted against particular group

Table 1 – Winward's process theory of mass categorical violence.
Source: adapted from Winward, 2020: 6-10 (activities are in italics).

In the theorized process, the cause (low intelligence capacity) spurs the security forces to approach local civilian elites for assistance in gathering information (part 1). The local

civilian elites then exploit this dependence to settle scores in relation to pre-existing local conflicts with a particular group by providing false information targeted against individuals from the group, and also by encouraging other locals to take matters into their own hands by perpetrating violence against members of the targeted group. The security forces use the (false) information provided to detain and interrogate individuals from the targeted group, resulting in an escalating cycle of torture and violence in which the many false confessionals from torture lead to even more detained and tortured individuals. Further, an increase in the number of detainees strains the capacities of the security forces, leading them to take extreme steps like extra-judicial killings to clear out prisons. Taken together, the process produces a marked increase in mass categorical violence by state security forces targeted against a particular group. The theorized mechanism is then investigated in-depth empirically in the case of the conflict in Central Java in Indonesia in 1965-66, supplemented by more cursory case studies of conflicts in two neighboring provinces (Winward, 2020).

Can evidence of mechanisms garnered from in-depth approaches perform the complementary functions required for effective evidential pluralism? Regarding the issue of confounding and non-causal correlations, in-depth approaches enable relatively strong inferences about causal linkages to be made in the studied case. Unpacking a theoretical causal process and tracing it empirically enables a more transparent assessment of the evidence for a mechanistic claim because we can identify clearly what part of a process a given piece of evidence is postulated to be evidence of, thereby increasing the internal validity of our mechanistic causal inferences. At the same time, evidence from an in-depth approach only applies *within* the bounds of the studied case. In this respect, in-depth mechanistic studies of individual cases are only evidencing local (*token*) causal claims, where the evidence of a causal effect is per definition evidencing cross-case regularities, i.e. *type* causal claims. Given that evidence of causal effects typically deals with an average effect across cases, it is difficult to see what evidence of causation from a single case tells us about the cross-case effect unless there is such a high level of causal homogeneity in the population of cases that studying one case is truly representative of all cases. Further, in-depth process tracing involves tracing linkages in cases where X and Y are both present, meaning that causal inferences are restricted to *positive* on X and Y cases. In

cases where X and Y are not present, there is no process to trace, meaning that no inferences are possible in negative cases due to the lack of evidence.

Mechanistic inferences across cases are not impossible, although they are always dependent on how causally homogeneous the broader population is. It would only be through multiple mechanistic case studies of the process in a set of cases that represent the diversity of the population that evidence of mechanistic causal claims is gained that would enable some communication with the claims backed by evidence of causal effects. But even here the scope of inferences is still quite divergent, meaning that the two approaches are still talking past each other; one about mechanistic linkages in a small set of positive on X and Y cases, and the other about average causal effects across a large number of cases that might mask many different types of effects (strong/weak, positive/negative).

Second, unpacking the theoretical mechanism *and* tracing it empirically sheds more light on how a cause can produce an outcome, although again only within the scope of the studied case. How the parts of a process are arranged in relation to each other can be vital for how the causal linkage works; knowledge that can only be gained by studying in-depth how it actually worked in a case. Similarly, tracing a process within a particular case enables an inference to be made that there was a causal linkage in the case, i.e. it worked 'here'.

Finally, in-depth process tracing of mechanisms can help shed light on the contextual conditions within which a given causal relationship works.[4] In the Winward (2020) example above, existing research was unable to explain why similar state security forces in a context of civil unrest ended up targeting an identified population group in some areas more than in other, similar areas of the conflict zone. By unpacking a plausible process theoretically and exploring how it worked empirically in a case, Winward's research provided a plausible, evidence-based explanation for why it did *not* work in other cases. For example, he found that part 2 of the process required that the local

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[4] - Note that this deals primarily with the conditions under which a given mechanism works and not conditions for a net causal effect across cases.

civilian elites are in a local political conflict with a particular group, otherwise they would have no motivation for targeting false information against them.

Multiple in-depth mechanism-focused case studies that are compared can be used to shed even more light on contextual conditions. Most useful for this purpose are follow-up studies of cases of mechanism break-down (aka a deviant case) – i.e. cases where we a priori should have expected it to break down (Anderson, 2012: 421-22; Beach and Pedersen, 2019: 274-275). By comparing the process and context in the cases where the mechanism worked with the process in the deviant case, we learn even more about the conditions required for the theorized mechanism to function.

Taken together, by attempting to unpack causal mechanisms theoretically and then tracing each of their parts empirically, in-depth mechanistic approaches are arguably better suited to tackling questions related to 'how does it work' and 'under what conditions does a given mechanism work'.

There is a tradeoff though, for as we lower the level of abstraction of the theorized mechanism to strengthen our ability to make causal inferences in the case, we reduce the scope of the potential population within which a given mechanism linking a given X and Y works. Logically, the more we know about a process, the more contextually specific the process becomes, other things equal.

Concluding, evidential pluralism is quite difficult when working with in-depth approaches for studying mechanisms, but the potential gains regarding an increased ability to answer the 'how does it work' and 'under what conditions does a mechanism work' questions do in many circumstances outweigh the tradeoffs in terms of reduced scope of our mechanistic inferences.

4. Realist approaches to studying mechanisms and evidential pluralism

At their core, realists contend that studying the social world is fundamentally different from the natural world (Bhaskar, 1978; Sayer, 2000; Maxwell, 2012; Porpora, 2015; Danermark, Ekström and Karlsson, 2019). The key reason for the difference is that social actors produce and reproduce the social world within which they operate. Because they are *sentient* beings, they are able to reason about the world. At the same time, realists contend that humans are *social* creatures, meaning that all activity takes place in a social relational context that imbibes action with meaning and effects. It is the social dimension of mechanisms and human interaction that neopositivist approaches neglect, but that realists contend is vital to understand actual social processes as they play out in real-world cases.

For realists, the term 'real' refers to the underlying structure that forms the context for all social action, enabling and constraining actors. While this underlying structure cannot be directly observed, for realists it can be theorized and studied 'as if' it has a real existence that is independent of our knowledge of it (Danermark et al, 2019). The underlying structure of the social world is composed of *both:* 1) a *material dimension* that is the physical manifestations of context, including physical or human resources as they are embedded in rules, roles and institutions in a particular social setting, and 2) an *ideational dimension* that is the cultural side of these rules, roles and institutions that shape human behavior through what they *mean* to actors (e.g. Archer, 1995; Sewell, 1992). Combined, the material and ideational dimension can be thought of as the *social context* for agency that produces *situational logics* that both create actor interests based on their positions, predisposing agents towards specific actions, *and* also shape the ability of actors to achieve these interests (Archer, 1995: 200-17; Porpora, 2015: 120). Using a metaphor, social context can be thought of as the social 'game' undergirding any social process (Archer, 1995: 151-2).

The 'actual' is the realm of people doing things in social processes, i.e. the realm of agency. Underlying structure produces situational logics that are 'actualized' through the actions and interactions of agents in *causal processes* that *produce* particular outcomes in specific cases (Danermark et al, 2019: 46; Sayer, 2010: 104). Given that causal processes take

place in *particular situated* social contexts and relations, they are ephemeral, meaning causality for realists is fundamentally local (i.e. token) (Sayer, 2000: 114-8). This means that realists do not assume a social world infused with regularities, in which whole structures and causal sequences repeat themselves time after time in essentially the same form.

Actual processes are composed of social actors performing activities, as in in-depth process tracing. But while activities in the natural science are physical acts (e.g. a human heart expands, thereby drawing blood from the liver into its left atrium), realists contend that human beings are *reasoning* beings that attempt to make sense of their interactions with other social actors (Porpora, 2015: 159; Danermark et al, 2019: 20, 33). To understand social processes, realists posit that we cannot reduce them to their physical manifestations; otherwise we would risk creating a impoverished account of social interaction (Archer, 1995: 195; Porpora, 2015: 160-1).

In contrast, neopositivist approaches to studying mechanisms utilize only the 'observable traces' of structure and the physical moves made by actors as evidence. This type of evidence can be termed 'experience-distant' because the researcher imposes outside categories onto observables of a social process (Geertz, 1974: 28-29; Schaffer, 2016). The evidence that is missed is the 'experience-near' accounts of how the 'moves' of actors are *interpreted* by the actors themselves and those impacted by them, and how the actors *understand* the underlying social 'game' they are situated in (Fujii, 2018: 73; Maxwell, 2012: 20; Sayer, 2010;). Gathering experience-near evidence is not merely a question of gathering more information, but involves an epistemological commitment to more hermeneutic methods that try to, '...glean the meanings that the people under study attribute to their social and political reality' (Schatz, 2009: 5). Fujii writes that, '...meaning and action are so closely intertwined that it would be impossible to explain differences in behavior without taking into account differences in how people make sense of the situations they face.' (2018: 75). For example, if we are trying to explain processes related to support for oil drilling amongst rural residents who would be adversely impacted by pollution from gas drilling on their land (fracking), one observed activity could be 'residents rallying their neighbors and local politicians in support of drilling'. But merely observing that rallying by residents took place does not explain the actions. Instead, to

do this we would want to understand the meanings that residents ascribe to their actions by tapping into the ideational dimension through more hermeutic, interpretive methods (Jerolmack and Walker, 2018). Were the actions motived by economic self-interest, or ideological beliefs? A realist would contend that only by understanding these meanings and motivations can we fully explain the rallying activities of residents.

Taken as a whole, a realist approach to studying social processes involves process theories that capture both agency and the impact of underlying social contexts, and at the empirical level combine experience-distant and near evidence. This combination is illustrated in figure 3, where experience-distant evidence (ED) is used to evidence what activities actors are performing (top part of figure). Experience-near (EN) evidence is used to assess the *intentions* and *motivations* that actors had with the activities they performed, as well as their *understanding* of the underlying situational logic. Unpacking how one can combine experience-distant evidence of activities and experience-near evidence of the social context that enabled them is outside of the bounds of this article.[5] Here it is sufficient to note that this combination can be achieved by relating the types of evidence with each other and to the underlying theorized process in an iterative, abductive design that involves reflexivity on the part of the research also (Yanow and Schwartz-Shea, 2012; Tavory and Timmermans, 2014).

As an example, Fujii (2008) in an article in *Security Studies* uses both ED and EN evidence to probe what she terms 'micro-processes' linking actors with social ties with their participation in genocidal killings in Rwanda. One process describes how local leaders draw on social ties like family relationships – sometimes attached with threats – to recruit people into groups that eventually committed killings. Once part of a group, a self-reinforcing escalation process started in which smaller scale bad deeds eventually led to killings. However, it was not pre-determined that a joiner would commit a killing or would save a person when faced with a choice; it depended on who was present at the time. When the group was present, there were pressures to go along, whereas alone many of the same joiners saved victims from being killed in other circumstances. In the article,

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[5] - This is an important but overlooked question in realist approaches to studying the social, which in practice tend to lean more on 'experience-near' forms of evidence. See e.g. the chapters in Edwards, O'Mahoney and Vincent (2014).

she uses a combination of more ED evidence (court records etc) to shed light on what people did, but also a series of interpretive interviews with joiners and witnesses to understand the particular social contexts and stated intentions behind particular actions. Taken together, she paints a compelling, highly situated account of the micro-processes linking social ties with participation in genocidal killings in Rwanda.
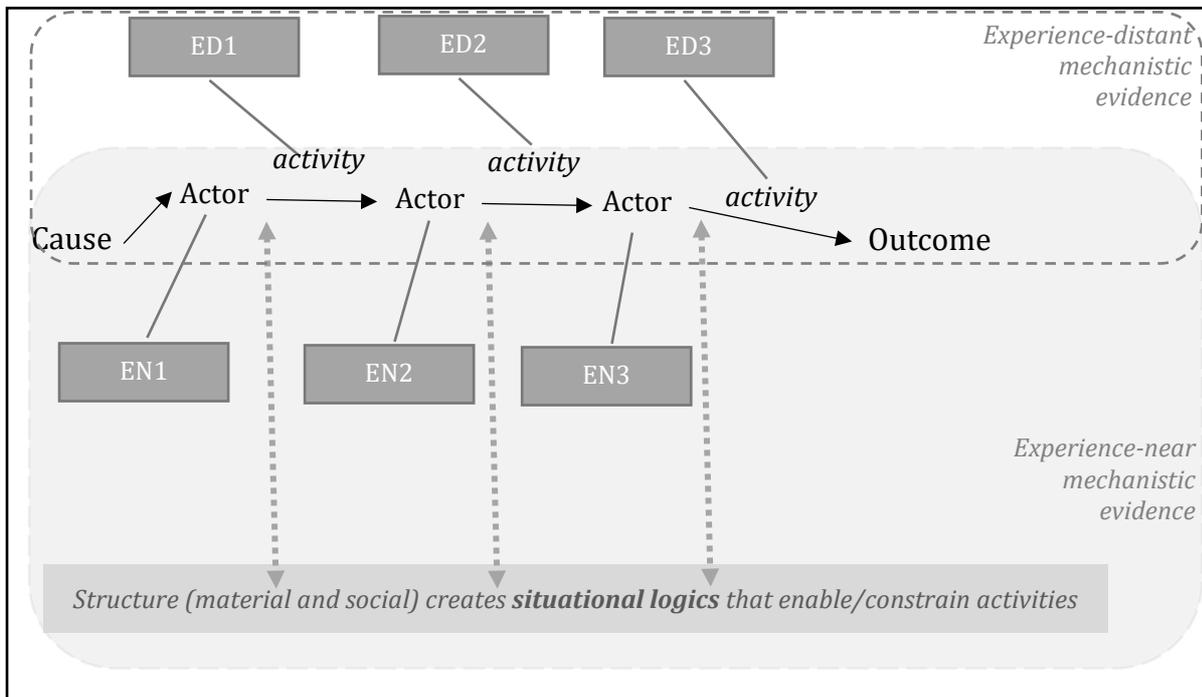

Figure 3 – Realist approaches and types of evidence.

What are the prospects of combining evidence of mechanisms from realist process tracing with evidence of causal effects? On the one hand, realist approaches produce strong explanatory accounts of how processes actually play out in particular contexts. However, taken as a whole, a realist approach operates with such different types of causal claims evidenced with such different empirics that evidential pluralism is difficult, at best. First, realist process tracing enables strong causal inferences to be made; inferences that are arguably even stronger than in-depth approaches because evidence is *also* collected about the mindsets of actors and their intentions, shedding even more light on the causal linkages through activities in the process by providing explanations of why actors engage in particular activities, and how they are understood by others (Danermark et al, 2019: 46; Sayer, 2000: 20-21).

At the same time, this type of process tracing focuses on actualized processes that are even more local (aka token) causal claims than those of in-depth approaches. Indeed, to study causation in a realist approach means *preserving* the links with the *particular* social context for action (Maxwell, 2012: 44). This makes it very difficult to communicate with evidence of causal effects that build on the assumptions that there are stable, regular causal effects in the world. Further, at the evidential level, the inclusion of 'experience-near' evidence of the social dimension results in fundamental incompatibilities with the purely experience-distant evidence of causal effects. Evidence of causal effects (correlations) gathered through controlled comparisons is for instance blind at the epistemic level to the actor understandings that form a critical component of the evidence that constitute causal explanations about process for realists, especially when quantified (Maxwell, 2012: 20-21; Sayer, 2010). Further, the importance of *positionality* of the researcher when working with experience-near evidence is vital, but completely overlooked when working with experience-distant evidence (be it of mechanisms or causal effects). It is outside the scope of this article to explore further whether this as a whole results in fundamental incommensurability, or, if some dialogue is possible, how this can be achieved.

Additionally, given that causation is fundamentally local in realist approaches, they cannot strictly speaking contribute to improving the external validity of causal effects claims. However, when used in a more pragmatic fashion, they can shed light on the underlying social conditions required for causal processes to work. In the example of Fujii (2008), she contends that evidence of causal effects linking ethnicity and participation in mass killings overlooks the importance of social context, and in particular the role played by situational and social dynamics in particular situations that she is able to shed light on through careful tracing of 'micro-processes' in particular cases.

5. Discussion and ways forward

The seamless integration of evidence of causal effects and mechanistic evidence is difficult in the social sciences because of the distance between the types of theoretical causal claims we are making and the types of empirical material used to evidence them. The argument is summarized in table 2, below.

Ability of mechanistic evidence to address:	Minimalist approaches	In-depth process tracing	Realist process tracing
1) Enabling causal inferences based on evidencing causal linkages	<u>Low</u> Grey-boxing of mechanisms makes it difficult to determine what empirical material is actually evidence of	<u>Medium/high</u> Mechanistic explanation unpacked and evidenced for each part (ideally)	<u>High</u> Same as in-depth, with the addition of EN evidence of social dimension of process
2) How does it work?	<u>Low</u> Grey-boxing of mechanisms means little light is shed on how process actually works	<u>Medium/high</u> Mechanistic explanation unpacked (ideally), shedding light on how process works	<u>High</u> Mechanistic explanation unpacked, including social dimension
3) Will it work here? (population-> individual case)	<u>Low</u> Little information about context generated, resulting in inability to predict whether causal relationship is present in any given case	<u>Medium</u> Information about context generated, helping generate predictions about whether causal relationship will hold in a particular case	<u>Low</u> Unless actual case traced, unable to predict whether causal relationship will be present in any given case because of contextuality of claims
4) Will it work there? (studied population ->target population)	<u>Low/medium</u> Little information about context generated from studies, although large-n approaches can	<u>Medium</u> Information about context generated, but bounded nature of claims reduces ability to extrapolate broadly about causal effect	<u>Low</u> Unless numerous case studies are performed, unable to extrapolate due to extreme contextual sensitivity
Overall conclusion	**Superficial evidential pluralism possible**	**Evidential pluralism difficult but possible**	**Evidential pluralism almost impossible**

Table 2 – Three variants of PT and the prospects for evidential pluralism.

Concluding, evidential pluralism is possible in the social sciences, although often more difficult than in the natural sciences. In particular, if the nature of 'the social' is taken seriously, evidential pluralism becomes very difficult, if not impossible.

When we move beyond the question of *whether* it is possible to *how* evidential pluralism can actually be done in the social sciences, despite the large amount of work on multi/mixed-method research designs, there is precious little guidance that takes seriously the distinct nature of the different causal claims and empirical evidence of mechanistic versus causal effects focused approaches. This article has just scratched the surface regarding the challenges and how they could be managed in evidential pluralist designs in the social sciences.

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