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## Response to Commentaries

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We would like to respond to several of comments made by the other contributions to this symposium. First, and most generally, we would like to state that our book on process-tracing (PT) was heavily inspired by George and Bennett's chapter on PT (2005). In many respects our book can be understood as our take on what the result would have been if George and Bennett, instead of only using a chapter, had the luxury of devoting a book-length manuscript to developing PT, where they would have had more space to both develop the ontological and epistemological foundations of PT, and develop practical guidelines for its use.

We therefore are quite surprised that some qualitative scholars do not view our take on PT as "mainstream," especially our focus on tracing causal mechanisms. However, we have a difficulty seeing what PT, understood as a social science method, would be tracing unless it is explicitly tracing causal mechanisms. If we are not tracing a theorized mechanism, what then is the "process" between X and Y? If we are merely tracing events that are not the manifestations of an underlying mechanism (a theory), then what we are engaging in is a narrative of events that "just happened" between the occurrence of X and Y. While relevant for making descriptive inferences, we can make no causal claims based upon this type of narrative story. Therefore, if we are engaging in theory-guided social science with ambitions to make causal claims, we should be tracing the theorized process between a cause and an outcome—which is exactly what a causal mechanism is. This is why PT is widely defined in the methodological literature as a case study method for tracing causal mechanisms (Bennett 2008b; Bennett and Checkel forthcoming; Mahoney 2012; Waldner 2012).

Where we do diverge slightly from recent interpretations of PT is that we make explicit the distinction that can be found within qualitative case-study research regarding whether our focus is on generalizable theorization or is case-centric. This distinction captures a core ontological and epistemological divide with the social sciences, where we find on the theory-centric side both neo-positivist and critical realist positions, and analyticism and pragmatism on the case-centric side (Jackson, 2011). Case-centric scholars operate with a very different understanding of the social world, viewing it as very complex and extremely context-specific, making generalizations become difficult, if not impossible. Therefore the ambition for PT in this understanding becomes to account for particularly puzzling and historically important outcomes. PT case studies focus on

explaining a particular historical outcome, for example by working backward from the known outcome to uncover the causal mechanisms that can account for the outcome. Outcomes here are not understood to be a “case of” some theoretical concept (e.g. a war), but instead are understood in a much more inclusive, holistic fashion as the Cuban Missile Crisis, or World War I. The shared core of case-centric PT is well expressed by Evans, who writes, “Cases are always too complicated to vindicate a single theory, so scholars who work in this tradition are likely to draw on a mélange of theoretical traditions in hopes of gaining greater purchase on the cases they care about.” (1995: 4). Given these large differences in how theories are used and the analytical goals of research across this ontological and epistemological divide, we chose to make these differences clear in our book, at the same time acknowledging as suggested by Goertz and Mahoney that one can proceed in more testing or building modes of analysis when engaging in theory-centric PT.

Returning to the question of mechanisms, Rohlfing objects to our understanding of mechanisms as being invariant systems. Here we would like to clear up several misunderstandings. Machamer does not claim that mechanisms need to be regular; indeed he explicitly states that they do not need to be regular in the first endnote in his 2004 article. Further, our understanding of mechanisms is not just a curious idea imported from the natural sciences, but is an understanding widely used by social scientist scholars who take the study of mechanisms seriously, and in particular the idea that mechanisms are *systems* that cannot necessarily be reduced to their individual components (e.g. George and Bennett 2005: 222; Bennett 2008b; Waldner 2012). Beyond this systems-orientation we are inherently pragmatic about the nature of mechanisms in our book, and believe it should be our research questions and the nature of our theories that drive our methodological choices about factors such as the level of analysis we choose when conceptualizing mechanisms (macro, micro, or a mix).

Finally, we question whether frequentist reasoning can be appropriate when engaging in within-case analysis using process-tracing. To make an inference based on frequentist reasoning requires variation, which we per definition do not have when we are tracing a mechanism within a case using an invariant, single case design. This being said, numbers and patterns can be relevant to make inferences depending upon what type of empirical predictions we are making when testing whether a part of a mechanism is present or not. If part of our mechanism hypothesizes that an international institution had privileged information relative to governments in a given negotiation, one way we could test this would be to put forward the prediction that we should find that the institution had more study papers in key issues than governments, and that the content would be longer in the institution’s papers. However, the actual inference would still be made using Bayesian reasoning, and in particular by evaluating the likelihood ratio where we would evaluate how likely it is we would find this pattern in the evidence in light of what we know about the case ( $p(e|h)$ ) in relation to the likelihood of finding this evidence if any other plausible explanation was valid ( $p(e|\sim h)$ ). Bayesian reasoning

gives us a helpful language for describing the research process where we update our confidence in the validity of a given theory based on the strength of empirical tests that we are able to deploy.

However, as qualitative scholars we do not believe that we possess the type of data that would enable us to make “objective” predictions regarding prior probabilities and likelihood ratios that quantitative Bayesian statisticians can make, which is why we chose not to engage with this literature—especially given that our audience is qualitative case study scholars and not quantitative statisticians. Instead, we refer our readers to discussions about Bayesian reasoning and subjectivity to Howson and Urbach (2006: 265–272) and Chalmers (1999: 177–192). Here we pragmatically suggested, as many social scientists before us, that Bayesian reasoning focuses our attention on what elements our tests need to include that we need to evaluate qualitatively in order to make as strong causal inferences as possible. This is why many process-tracing methodologists either explicitly (Bennett 2008a) or implicitly (Mahoney 2012) refer to Bayesian reasoning.

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