Temporal analysis of public policy evolution:
Policy sequences and process tracing

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Abstract
Temporal analysis is now a well-established approach in public policy studies. Numerous studies have analysed path dependency in policy development. Process (or reactive) sequencing has recently been suggested as an alternative temporal approach to analyze public policy evolution. Process sequencing focuses on the way in which policy events are causally connected in a policy sequence in which a specific event is both a reaction to an antecedent event and a cause of a subsequent one. It does not assume that policy development is predetermined by path dependency but emphasizes fine-grained temporal (causal) analysis of reactions and counter-reactions in a process of reiterated problem solving. Establishing the causal connection between policy events is a methodological challenge. We argue that Process-tracing methodology has the potential to contribute to establishing such empirical causal relations in policy sequences and to contribute to the development of theoretical explanations of policy evolution. By combining recent methodological advances in case studies research with recent developments in temporal policy studies this paper suggests a new framework for temporal policy studies.

1. Introduction
In the last two decades policy scholars have increasingly applied a temporal perspective to explain first policy stability and then increasingly also to explain policy change. Howlett and Rayner (2006) suggest that there has been an ‘historical turn’ in the policy science. They identify narratives (both in positivist and postmodernist variants), path dependency and process sequencing as the three distinct approaches to temporal policy studies. What constitutes the historical turn is a strong focus on the timing and sequencing of events to understand the dynamics of policy making. Policy stability, it is argued, can only be explained and understood within the context of a historical sequence of policy events unfolding to reinforcing an already established policy trajectory embarked on in a past formative phase or critical juncture. Policy change must also be understood from a historical perspective. As the sequence of policy event develops over time, driven by internal dynamics, the policy may increasingly be out of line with broader socio-economic, technological, political or institutional contexts within which it is developed and at some point this may trigger abrupt policy change or a gradual change of direction of the policy sequence (Steinmo and Thelen 1992, Thelen 1999).

From a social science perspective in which the ambition is to develop more general theoretical insights on the drivers of policy sequences reaching beyond the individual cases, the path dependency and process sequencing models are the more appealing of the three approaches to temporal policy making suggested by Howlett and Rayner (2006). Path dependency and process sequencing have proved more capable of providing more general insight into the process of policy evolution than narratives. The latter tends to produce ‘idiosyncratic, non-cumulative “thick description”’ … and applied to the policy sciences … has many methodological difficulties related to its ex-post facto character, difficulties involved in replication of the analysis, and problems with generalizing results across policy “stories”’ (Howlett and Rayner 2006, 8). The literature on path dependency within historical institutionalism is now substantial and has made important
contribution to our understanding of the policy dynamics producing policy stability and to a lesser extent the way in which policy change can be understood. Process sequencing is less applied in the policy sciences but has significant potential to generate insight into policy evolution.

The debate on the path dependency model of policy evolution has its roots within the historical institutionalist literature. Public policies can be considered institutions since they consist of a set of rules which facilitate or dictate certain actions and constrain or preclude others and influence ‘the allocation of economic and political resources, modifying the costs and benefits associated with alternative political strategies, and consequently altering ensuing political development’ (Pierson 1993: 596, Kay 2003). The path dependency model is based on the notion of punctuated equilibrium which describes policy development as relatively short moments of innovative change followed by extended periods of stability (Krasner 1984: 240-4). The policy path is maintained by a set of self-reinforcing reproduction mechanisms, or positive feedback processes, which lock policy into a particular path by constantly increasing the costs of changing direction as policy moves down the path. Path breaking policy change is caused by exogenous shocks, creating a critical juncture which is generally understood as a ‘contingent event … that was not expected to take place, given certain theoretical understandings of how causal processes work’ (Mahoney 2000: 513). The concept of path dependency has been applied to explain the periods of stasis. It was not until a decade ago more analytical emphasis was put on identifying the self-reinforcing reproduction mechanisms maintaining a particular path (see Thelen 1999, Pierson 2000a, Mahoney 2000). This theoretical focus on path dependency and policy stability has left the question of what explains policy change mainly unexplored and has demonstrated limited capability of the approach to explain policy changes. Further, the notion of path dependency has limitations in explaining gradual policy evolution accumulating to substantial change over time. Thus policy adjustments appearing insignificant at the time of their adoption may turn out to be important catalysts for more comprehensive changes at a later stage (Coleman, Skogstad and Atkinson 1997, Cashore and Howlett 2007, Daugbjerg and Swinbank 2009).

Some of the critiques of path dependency originated from within the historical institutionalist literature itself. It has been questioned whether the notion punctuated equilibrium is a valid metaphor for institutional and policy development, suggesting that ‘there often seems to be too much continuity through putative breakpoints in history, but also often too much change beneath the surface of apparently stable formal institutional [and policy] arrangements’ (Thelen 2003: 211). This has triggered a theoretical discussion on gradual institutional change which amounts to more than just minor adjustments. Thelen (2003) and her associates (Streeck and Thelen 2005, Mahoney and Thelen 2009) have engaged in efforts to develop analytical concepts which can help identify various types of gradual institutional transformation and understand their causes and how the transformation process unfolds. Recent theoretical developments suggest that much gradual institutional transformation is driven from within the institution rather than by forces exogenous to the institution (Streeck and Thelen 2005: 19, Mahoney and Thelen 2010: 6-7). This perspective on institutional and policy evolution questions the notion of path dependency as a valid model of policy evolution. It also challenges our understanding of how policies evolve over time. What are
the driving forces behind a gradual policy reform sequence, and how does a policy sequence unfold?

This notion of gradual policy change through a sequence of policy events redirects the analyst’s attention away from identifying the reproduction mechanisms sustaining path dependency towards establishing the causal relations between the individual events in a sequence of policy evolution. An alternative, but related, approach to explaining policy evolution over time is process sequencing. It focuses on the temporal and causal connections between policy events and attempts to establish how previous events enable and shape subsequent events in a policy sequence. It is an analytical approach to policy evolution in which fine-grained temporal analysis of the causal relations between policy events is the key to explaining policy evolution. The basic assumption in process sequencing is that an event in a policy sequence is both a reaction to an antecedent event and a cause of a subsequent one. Thus, policy outcomes feedback and become inputs in the policy process. Even though Process Sequencing in recent years has emerged as an alternative temporal approach to analyse public policy evolution (Howlett and Rayner 2006) it is still rather under-specified and under-theorized in respect to factors that is assumed to connect empirical events in a causal mechanism and how the causal connection between events is established in empirical analysis.

A particular challenge in this approach to temporal analysis is therefore to develop research methods which enable scholars to establish the causal connection between policy events by identifying the mechanisms linking them. How do we demonstrate that a gradual policy change can be explained by the previous event in the policy sequence? To substantiate the sequencing argument the scholar must show that properties of previous policy events shape and legitimate proposals for further policy changes. It must be demonstrated that it is the ability of policy actors to connect past and future events which drives the policy sequence.

In the remainder of this paper we argue that process sequencing can benefit from recent developments in Process tracing methodology (PT). PT can be defined as a method that shares with single cases or small N studies the focus on tracing causal mechanisms based on the collection of process observations (Bennett, 2008a, 2008b; Checkel, 2008; Beach and Pedersen, 2012; Blatter and Haverland 2012; Rohlfing, 2012). In particular we argue that process sequencing can benefit from adopting the conceptualization logic in PT where causal mechanisms are understood as mechanisms linking X:Y relationships (or different empirical events) in which antecedent events in a policy sequence causes subsequent events. In this endeavour it is important to avoid substituting causal analysis for accounts of a series of events which are temporally ordered but not explained.

The paper is structured as follows: In section 2 we present the state of the art in reactive sequencing and Path dependency. In section 3 we discuss the use of process sequencing in public policy studies where we in particular address the role of policy problems and policy actors and further discuss the role of learning and precedent as policy feedbacks. In section 4 we discuss the potential of PT methodology in order to establish causal relationship between different events. In the conclusion we
summarize the main arguments pursued in this paper and discuss the contribution of process sequencing to apply forward reasoning in the policy sciences.

2. Defining process sequencing

Different terms have been used to describe the process of sequencing. Mahoney (2000) refers to ‘reactive sequencing’, Haydu (1998) to ‘reiterated problem solving’ and Howlett and Rayner (2006) to ‘process sequencing’. Essentially, these concepts refer to the same phenomenon. Mahoney defines reactive sequencing as ‘chains of temporally ordered and causally connected events’ (Mahoney 2000: 509). ‘In a reactive sequence, each event in the sequence is both a reaction to antecedent events and a cause of subsequent events ... In a reactive sequence, early events trigger subsequent development ... by setting in motion a chain of tightly linked reactions and counterreactions’ (Mahoney 2000: 526, see also Pierson 2000b: 84). Earlier events cause the subsequent events, ‘because they trigger a powerful response’ (Pierson 2000b: 85), thus producing an inherent logic in the chain of events. In other words, ‘events in one period [are used] to explain outcomes in another’ (Haydu 1998, 353). While Haydu’s discussion of reiterated problem solving tends to be more general and focusing on macro-political developments and the big steps in a historical trajectory, Howlett and Rayner’s discussion is focused on its relevance for the policy sciences. Process sequencing focuses on the way in which policy events are causally connected in a policy sequence. Some of the events may seem insignificant at the time they happen but later they may turn out to be significant events that appeared to trigger a change in direction of policy. Therefore process sequencing requires fine-grained empirical analysis and a detailed understanding of the case under scrutiny. Since this paper is focused on policy sequences, we shall refer to process sequencing in the balance of the paper.

In process sequencing, the overall direction of the trajectory is not conceived off as uni-directional (Howlett and Rayner 2006, 7-8, see also Sewell 1996, 263). Events are causally linked through reiterated problem solving and this may involve a change of direction. A particular trajectory is strengthened where the feedbacks from previous choices are positive. Where feedbacks are negative, the trajectory may change direction but not necessarily in the dramatic manner envisaged for critical junctures. Thus, as Jervis (1997: 129) argues in relation to policy evolution: ‘although some … feedbacks are amplifying or dampening, in many other cases they force the policy in a different direction’.

3. Process sequencing in public policy evolution

Process sequencing is particularly useful in public policy studies (Howlett and Rayner 2006, 13-14). To understand policy development, the approach emphasizes fine-grained temporal analysis of reactions and counter-reactions in a process of reiterated problem solving. The downside of process sequencing is its limited potential to generate theoretical statements on the way in which events in sequences are connected (Pierson 2000b: 84).

Connecting events causally in a sequence is an important challenge facing process sequencing analysis. In sequential analysis ‘explanations should respect historical time by casting causal
analysis in the form of sequenced events, with earlier happenings leading to and accounting for later ones. Explanations of this kind should, moreover, carefully specify the mechanisms through which causal influence is conveyed through time’ (Haydu 1998, 354). The theoretical challenge is to consider what connects policy events without violating the ability of the analytical approach to identify case-specific empirical details which are important for understanding the specific sequence of events under scrutiny. In other words, we need to establish the conditions under which individual events in a policy sequence become both an outcome of previous policy decisions and developments and a cause of subsequent policy changes. Mahoney (2000, 511) refers to an ‘inherent logic’ and a ‘natural’ connection between events and thus puts forward a somewhat deterministic view on the driving forces behind a sequence. He tends to emphasize structure and devotes limited attention to the role of actors in connecting events. To establish the causal link between events in a policy sequence more attention must be paid to the way in which policy actors act within a policy structure and how they change it. Policy sequences ‘are continually shaped and reshaped by the creativity and stubbornness of their human creators’ (Sewell 1996, 272, see also Haydu 1998, 357, Haydu 2010, 32-33, 39-40). Therefore, on the one hand, process sequencing must leave room for agency when theorizing on the causal connection between individual events in a sequence. On the other hand, since public policies are institutions, they constrain and facilitate certain actions over others (Pierson 1993: 596).

We suggest that the feedbacks from previous policy decisions are the key to establish how antecedent and subsequent events in a policy sequence are linked. Public policies produce various types of outcomes which feed back into the policy process and thus become inputs into the policy process (Pierson 1993). Feedbacks affect the perceptions and actions of government officials and various types of stakeholders continuously and actively involved in policy formulation and implementation. These reflect over the feedback from policy implementation when attempting to understand whether the policy works as intended or produces undesired unintended consequences (Lindblom 1959, 86).

Policy makers have to respond to policy problems emerging from an evolving broader policy context and to policy problems generated from within the policy itself. Though some policy problems can be ignored, at least for some time, others require action to maintain output legitimacy; that is, demonstrating to policy takers and a broader universe of policy participants that policy can effectively address the problems with which it is confronted. The response to the policy problems depends on the opportunities and constraints embodied in the policy structure and policy makers’ ability to utilise these to develop strategies to address the challenges.

Each event in a policy sequence embodies a number of constraints and opportunities, which policy actors can utilize to prevent or to facilitate further evolution of the policy. While previous events constrain certain policy responses, they provide opportunities for others. Prior events ‘foster and shape the crises that prepare the ground for new solutions, and they influence the choices made by actors in response to those crises’ (Haydu 2010, 36). Feedback process may reveal these constraints and opportunities to reform advocates who want to change policy in particular directions and to
those who desire the status quo and at the most willing to accept limited adjustments to address the most immediate policy problems. These perceived opportunities and constraints influence the power balance within the policy process by empowering some actors with particular interests and weakening others who hold differing views on the desired direction of policy evolution.

An important issue is how actors realise the opportunities and constraints for further policy evolution embodied in previous policy events. To identify relevant theoretical concepts which may aid the scholar searching for causal connections between policy events, it is important to leave room for agency. We suggest learning feedback as concepts that may serve a useful purpose in searching for the causal mechanisms. May’s (1992) distinction between policy learning and political learning is useful in establishing the causal link between events in a policy sequence. He sub-divides policy learning in instrumental learning and social learning. The latter ‘involves a rethinking … of the dominant view about the fundamental aspects of policy. It entails reaffirmation or revision of the dominant causal reasoning about policy problems, interventions, or objectives’ (May 1992, 337). This type of learning is of less relevance to process sequencing and gradual policy change since it is associated with the punctuated equilibrium model of policy change which views policy change as a sudden and fundamental change (Hall 1993). Therefore, we focus on instrumental and political learning in the remainder of this paper.

Instrumental learning is defined as ‘new understandings about the viability of policy interventions or implementation designs’ (May 1992, 335). In a larger policy complex, small-scale experiments with new policy solutions may be undertaken for more limited parts of the policy and produce learning feedbacks. Positive experiences with these can produce positive learning effects modifying entrenched perceptions on certain types of policy instruments amongst some policy makers and thus create opportunities for extended and more intensive use of these. The most likely policy responses to learning feedbacks are those which are seen as representing the logical continuation of the direction set by the previous event in the policy sequence. Negative policy experiences with new policy instruments may produce counter-reactions precluding the increased use of such instruments and perhaps even policy reversal. Learning feedbacks may reveal policy inconsistencies which are counterproductive in relation to the objectives to be achieved within the policy field. Specific measures may pull policy in different directions and in some instances even neutralize the effects of each other. However, such effects may be ignored, particularly in situations in which contradictory measures have been deliberately introduced to create or maintain a delicate balance between different groups of stakeholders with opposing interests. When these inconsistent measures start generating effects that threatens the core functions of the policy, and particularly when this amounts to a crisis, policy change becomes inevitable. In some, but more rare, situations the change of policy direction may be abrupt and substantial. This tends to happen when contextual changes require immediate response. But even in these situations the policy response may grow out from the previous events in the policy sequence (Howlett and Rayner 2006, 7).

Political learning can be defined as policy advocates’ ‘learning about strategies for advocating policy ideas or drawing attention to policy problems. The foci are judgements about the political
feasibility of policy proposals and understandings of the policy process within a given policy domain’ (May 1992, 339). Through their actions and the consequences of these, policy makers learn, ‘enhancing awareness of structures and the constraints/opportunities they impose, providing the basis from which subsequent strategy might be formulated and perhaps prove more successful’ (Hay 1995, 201). Though ‘[policy] actors are reflective, routinely monitoring the consequences of their action’ (Hay 2002, 210), they are unlikely to reach a state of complete knowledge. Policy contexts are complex and evolving and therefore political learning is based on selective knowledge about the context within which strategic action is conducted. Experiences from past policy processes will be used to form strategies for future policy evolution. For instance, successful introduction of a new policy measure in the past to address a limited or marginal, perhaps even temporary, problem may be utilized by policy makers to construct precedent by claiming that the new measure has already been applied within the policy and that extended application is a logical continuation of the direction of policy evolution previously set out. This can be utilized to build a coalition to support full-scale use of the new measures within the policy. Even though a new measure may be insignificant when introduced, or appear so, it may sow the seeds for a sequence of policy adjustment amounting to substantial change over time.

As argued above, it is feedbacks from policy events and the way in which policy actors conceive of them through learning processes that connects the antecedent and subsequent events of the sequence. The methodological challenge in substantiating that argument is to develop research methods which reveal the actual mechanism connecting events in a policy sequence. Below we argue that Process Tracing has significant potential in that respect.

4. Using Process tracing to study causality in policy studies

Creating a theoretical foundation for the analysis

Process tracing (PT) has emerged as an important method of causal inference in research that employs case study design (Collier et al. 2010; George and Bennett 2005). It has been defined as a type of research design where ‘The cause-effect link that connects independent variable and outcome is unwrapped and divided into smaller steps; then the investigator looks for observable evidence of each step.’ (Van Evera 1997:64). The promise of process-tracing as a methodological tool is that it enables the scholar to study more or less directly the causal mechanism linking an X (or set of X’s) to Y, allowing us to open up the ‘black box’ of causality between a cause and outcome (George & Bennett 2005; Beach & Pedersen 2013). In relation to process sequencing the recent methodological advances suggests how to establish the causal connections between events in a policy sequence. Our conjecture that instrumental and political learning may be relevant causal mechanisms can help us search causal explanation. In the PT literature events are primarily understood as the observable empirical manifestations of an underlying theoretical causal mechanism.

A central problem in the emerging PT-literature is that many scholars contend they are studying causal mechanisms, but in reality they are only tracing an empirical process, understood as a series
of empirical events that are temporally and spatially located between the occurrence of X and the outcome Y (an empirical narrative). This often occurs in policy studies where the actual mechanism is often black boxed or vaguely understood or defined.\footnote{Within social science there are however many scholars who contend that they are studying causal mechanisms with many different research methods, ranging from scholars who believe they should be understood as systems that transmit causal forces from X to Y, to those that see them as series of empirical events between the occurrence of X and Y. Others have considered causal mechanisms in terms of intervening variables between X and Y.} In practical research it is difficult to identify the relevant causal events in a policy sequence because temporal analysis is characterized causal complexity. Often we have no idea whether and how these events are connected. While this type of scholarship is a valuable form of descriptive inference that provides valuable (historical) knowledge as to what actually happened, it can also be used inductively to build a theoretical explanation. However, such an approach tells us little about the how and why an outcome occurred in a specific case. The PT literature therefore suggests a solution to this major challenge in temporal policy analysis by providing a method with a more solid methodological foundation.

A central component in PT is to draw attention to the role of theory in relation to constructing a plausible causal pathway between X and Y. This means that causal mechanisms must first be deduced on the basis of theory and then tested empirically (George & Bennett 2005; Beach & Pedersen 2013). In theory centric process tracing the focus is on developing theoretical conjectures on the causal mechanism through which X contributes to producing an outcome Y and then search for empirical evidence (for instance in the form of certain events or other sorts of evidence) in order to test whether the expected observable implications can actually be observed, and whether the mechanism functioned as expected. Often the ambition in this type of research is to test whether the theoretical propositions reaches beyond the case under scrutiny. The theoretical mechanisms transmitting causal forces from X to Y identified in a case are often suggested to be present in a population of cases (George & Bennett 2005; Beach & Pedersen 2013). The starting point for theory centric process tracing is deductive. This means that we know both X and Y and we have either a) existing conjectures about a plausible mechanism or b) are able to use logical reasoning we formulate a causal mechanism from existing theorization.

Given that most social outcomes are the product of multiple mechanisms, no claims of analytical sufficiency are made in this type of research. The logic is that the mechanism should be explicitly theorized along with the expected empirical manifestations of each part of the theoretical mechanism. Subsequently we investigate whether the predicted empirical manifestations were present or absent in our case.\footnote{For instance in the form of different types of events taking place at the right time and order. This is also often sometime referred to as trace-evidence (see Beach & Pedersen 2013; Beach & Pedersen forthcoming).} For example, a theorized rational instrumental learning process could have the following four phases: decision-makers would 1) gather all relevant information; 2) then identify all possible courses of action, 3) followed by an assessment of the alternatives based upon the decision-makers utility function, and finally 4) choose the alternative that maximizes the expected utility (based on Oneal, 1988). The empirical manifestations of these four phases would be very different, and different types of evidence would be used to assess whether phase 1 or phase 4 were present. Determining whether phase 1 took place before phase 2 could be a manifestation of...
the presence of part 1; measured by investigating the temporal sequence of events. Instead, for example, to establish whether phase 2 was characterized by instrumental learning we would test whether other predicted manifestations were also present, including evidence that showed whether or not all possible courses of action were assessed or not. Although we are testing the empirical manifestations of each stage of the mechanism, what we are in effect tracing is the underlying theoretical causal mechanism. This is illustrated in Figure 1. Our analysis is structured as focused empirical tests of each part of a mechanism instead of a narrative empirical presentation of the story of events of the case. Theory should therefore guide our analysis since by only identifying events we gain no knowledge of the underlying causal mechanism.

![Diagram](image)

**Figure 1** – Theory-centric process tracing methods

Complicating the picture slightly is the difference in how causal mechanisms are understood in the PT literature. In *case centric process tracing*, the ambition to explain the outcome of a particular case rather than to make general theoretical claims beyond the single case. In this variant the understanding of the underlying causal mechanism differs from the one found in theory centric variant. In case centric process tracing the purpose of the empirical analysis is to craft a *(minimal) sufficient explanation* of a particular (policy) outcome. This variant of PT shares many similarities with the methodology of process sequencing due to its more empirical focus, where the focus is more explicit on the unfolding of empirical events and its focus on explaining the case in question. This variant of PT do however also stress the role of theory and the inclusion of systematic elements in the causal explanation along with more case specific (non systematic) components. In such a situation we almost always need to combine different mechanisms into an eclectic conglomerate mechanism to account for the case specific outcome. As a result, the causal argument is a more complicated, case-specific combinations of mechanisms. Further, given that the ambition is to reach a minimally sufficient explanation of a particular outcome, it is usually necessary to
include non-systematic parts in the causal mechanism, defined as a mechanism that is highly unique and case-specific. Non-systematic mechanisms can be distinguished from systematic ones by asking whether we can expect the parts of the mechanism playing a role in other cases. The inclusion of non-systematic mechanisms can sometimes be depicted as events which have an important analytical advantage, in that it enables us to capture actor choice and the contingency that pervades policy events. Figure 2 illustrates the more complex nature of the causal mechanisms that are being ‘traced’. Note that the analysis still has as its focus the theoretical level of causal mechanisms, although these are understood in a broader and more pragmatic fashion.

![Diagram](image)

**Figure 2** – Mechanisms in explaining outcome process tracing

The use of causal mechanism in both the theory and the case centric versions can help us to direct attention to the theoretical foundation for process sequence analysis. By applying theory centric PT we can test the validity of theoretical arguments about causal mechanism linking events in a policy sequences. To sustain theoretical arguments on causal relations between events in a policy sequence it is essential to substantiate these by undertaking empirical analysis which demonstrates that they can be identified in the case under scrutiny. Further, case centric process tracing can lead our attention towards causal mechanisms which have not been considered initially in a research project or which are not well-understood theoretically. By pointing towards under-theorized causal mechanism, case centric PT may initiate innovative theoretical development on the way in which events in a policy sequence are causally linked. In the next section we turn to the question of how we analytically can identify the way in which different events are causally connected, suggesting
the conceptualization and operationalization logic in PT analysis holds a great potential in this respect.

**Creating causal connections between policy events**

As to establishing causal connections between different events, the PT literature has suggested that they must first be derived at the theoretical level through the formulation of a conjecture about causal mechanism explaining how an outcome is produced. Ideal explanations based on causal mechanisms should “…exhibit productive continuity without gaps from the set-up [X] to [the] termination conditions [Y]...” (Machamer, Darden and Craver, 2000: 3). Beach and Pedersen (2013) have argued that the relationship between the different theoretical parts and the whole mechanism should be conceptualized in the terminology of necessary and sufficient conditions (see also Ragin, 1988; Mahoney, 2000; Braumoeller and Goetz, 2000). Necessary conditions are conditions that have to be present for an outcome to occur, and where the absence of X results in an absence of the outcome. In contrast, sufficiency describes a situation where a condition (or set of conditions) is able to produce an outcome. If X then always Y. Each part of a theoretical causal mechanism can be illustrated as (n→), where the n refers to the entity (a political actor, organization, institution or structure) and the arrow refers to the activity transmitting causal energy through the mechanism to produce an outcome. * is used to refer to logical ‘and’. As a whole, a causal mechanism can therefore be portrayed as:

\[ X \rightarrow [(n1 \rightarrow) * (n2 \rightarrow)] Y. \]

This should be read as X transmits causal forces through the mechanism composed of part 1 (entity 1 and an activity) and part 2 (entity 2 and an activity) that together produce Y. X by itself is unable to produce Y. For instance, the policy design at time t1 does not automatically produce the policy design at time t2. There must be some policy actors who respond to policy feedback, form a view on what needs to be changed and succeeds in forming a coalition which supports that view. When adopting this mechanistic inspired understanding of causal mechanisms we argue that each part of the mechanism is by itself insufficient to produce an outcome Y, as it only functions together with the rest of the mechanism. Second, explicit in a mechanistic ontology is a view that the parts that we include in our conceptualization of a given causal mechanism are absolutely vital (necessary) for the causal mechanism to work; and in the absence of one part the mechanism itself cannot be said to exist. This is denoted by the logical ‘and’. If we have conceptualized a three part causal mechanism as:

\[ (n1 \rightarrow) * (n2 \rightarrow) * (n3 \rightarrow) = Y \]

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3 While the cross-case comparative literature usually describes causes (X’s) as conditions, there is no logical reason why we cannot adapt the logic of necessary and sufficient conditions to the present purposes of analyzing the mechanisms that produce an outcome. The difference is that while a comparativist thinks of a condition as (X), we argue that we can also adapt the language to the analysis of the parts of a mechanism and the whole.

4 This is a ‘context-free’ mechanism, and a proper study would also detail the contextual scope conditions that enable to trigger the mechanism (see Falletti and Lynch 2009).
And (n2→) is either empirically or theoretically superfluous, then the mechanism should be re-conceptualized as (n1→) * (n3→) = Y. This further introduces a disciplining effect when we attempt to model a given theory about process sequencing as a causal mechanism. Additionally, if our empirical analysis has found that a part is not necessary, then the mechanism should also be re-conceptualized to exclude it. As mentioned in section 3 we suggest that learning feedback either in form of a instrumental learning or political learning can be useful for process sequencing scholars in order to develop theoretical conjectures on causal relations between events in a policy sequence. This theoretical starting point for the case analysis draws attention to the role of agents, such government officials and interest groups representatives, and their perception of the reform constraints and opportunities produced by antecedent events in a policy sequence.

This implies that when tracing causal mechanisms in process sequencing, the analysis of the mechanism should include both the forward moving activities but also a ‘learning feedback activity’ in which feedbacks from previous policy decisions guide the forward moving activities (→). The relationship between the different parts in the causal mechanism therefore becomes more complex in process sequencing compared to the parsimonious mechanism suggested above because the mechanism (or causal path) is influenced by feedbacks from previous events. An event in a policy sequence is both a reaction to an antecedent event and a cause of a subsequent one. The application of the conceptual logic is illustrated in Figure 3. Here a hypothesized causal mechanism is conceptualized in order to specify how X and Y can theoretically be related. In this example a three part mechanism between X and Y is deduced, each part of which is composed of ‘entities’ engaging in ‘activities’ that transmit causal forces through the mechanism and thereby connects events at the empirically level in an ordered policy sequence. Entities are here seen as the factors (e.g. agency) engaging in activities where the activities are the producers of change or what transmits causal forces through a mechanism. The backward going arrow can be thought of as learning or policy feedbacks that arise from previous experience of implementing policy changes. Each of the entities can be thought of as a wheel, where the activities are the movement that transmits causal forces to the next part of the mechanism.

Figure 3 – A theoretical causal mechanism linking different parts with learning feedback

5 Basically, if a logical, theory-based argument cannot be formulated for why the particular part is a vital (necessary) part of a causal mechanism, and in particular describes how the specific entity or entities engage in activities that transmit causal forces from X to Y, then the part should be eliminated from the theoretical model as being redundant.

6 The understanding of the parts of a causal mechanism as individually necessary requires that a deterministic ontology of causality is adopted; making causal inferences about the existence of the individual parts of a causal mechanism possible.
By explicitly describing the activities that theoretically are assumed to produce change, this approach draws our attention to agency and the types of activities they undertake, ultimately transmitting causal forces from X to Y (see Glennan 1996; 2002). If we can confirm the existence of a hypothesized causal mechanism (all parts of the mechanism), we have produced strong evidence that shows how the theorized parts of the causal mechanism produce Y, and that X and Y are causally connected by the mechanism (Bunge 1997; 2004).

4. Conclusion
In this article process sequencing has been outlined and it has been argued that it is a distinct analytical approach to studying policy evolution. Though it shares a temporal approach to the study of policy making with the path dependency approach, it is not based on the assumption that public policy evolution is predetermined by a particular path sustained by a set of self-reinforcing reproduction mechanisms. Rather, event in a policy sequence are connected by the attempts of policy actors to solve policy problems. As Haydu (2010, 36) points out: ‘Thinking in terms reiterated problem solving thus corrects the tendency of path dependency to make historical trajectories over determined, with outcomes increasingly locked in over time’. Policy events in a temporal sequence are casually linked by the feedbacks from previous events. These feedbacks disclose the constraints and opportunities for further reform to policy makers. Though constrained by the policy structure, these actors utilise learning effects and precedent to generate support for policy changes. Thus, learning effects and precedent can provide causal link between antecedent and subsequent policy events in a sequence.

Process sequencing is theoretically underdeveloped in terms of specifying the factors linking antecedent and subsequent events in a policy sequence. In this article some initial theoretical considerations have been presented, focussing on the role of learning and precedent as casual links between individual events in a policy sequence. It has been argued that Process sequencing would benefit from recent advances in PT analysis by adopting a mechanistic ontology of causality when the causal relationship between events are created and theorized, viewing causal relations between explanatory factors that produce an outcome as a causal mechanism composed of a series of distinct parts. A causal mechanism should be understood as an interactive whole composed of a series of distinct parts, which can further be disaggregated into entities that undertake activities which are the transmitters of causal forces linking events leading up to an outcome Y. It has also been emphasized that policy sequences are the outcomes of human action and therefore analysis of sequencing must focus on the interaction between structure and agency as policy makers respond to policy problems.
Future research should concentrate on identifying other factors which potentially provide the causal connection between antecedent and subsequent policy event, specify how they privilege certain policy decisions and constrain others and explain how policy actors identify and conceive off the opportunities and constraints embodied in previous policy events. However, it is important not to over-theorize process sequencing. There is a risk that too much reliance on theory in identifying the causal mechanisms linking events in a sequence tempts analysts to downgrade fine-grained empirical analysis on the way in which events are actually connected. As Bearman (1999, 508) et al. caution: ‘Theory involves denying data. Thin narrative accounts are the product of specific theories that direct the .. [analyst] ... to identify some events as salient and to deny others as not salient’. Thus, the further development of process sequencing as an analytical framework to studying policy evolution must balance between theory as an analytical tool to guide the search for the causal mechanisms on the one hand and an open-minded empirical approach to how events are casually connected in the specific case study on the other hand.

References


