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Punctuated Equilibrium Theory: Explaining Stability and Change in Public Policymaking

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Punctuated Equilibrium Theory (PET) seeks to explain a simple observation: although generally marked by stability and incrementalism, political processes occasionally produce large-scale departures from the past. Stasis, rather than crisis, typically characterizes most policy areas, but crises do occur. Large-scale changes in public policies are constantly occurring in one area or another of American politics and policymaking as public understandings of existing problems evolve. Important governmental programs are sometimes altered dramatically, even if most of the time they continue as they have in previous years. Although both stability and change are important elements of the policy process, most policy models have been designed to explain either the stability or the change. Punctuated Equilibrium Theory encompasses both.

In recent years, it has become clear that the general approach, developed in the early 1990s to explain US policymaking, applies to a broader set of governments than just the peculiar American system in which the theory was developed. Scholars around the world have confirmed aspects of the theory in a number of advanced democracies. In this chapter, we review Punctuated Equilibrium Theory, discuss new empirical studies in the United States and elsewhere, and interpret new theoretical developments. These developments have broadened PET to incorporate a general theory of information processing in the policy process, which fails to deal smoothly and seamlessly with new information but rather falls prey to sporadic punctuations. Over time, PET has changed not in the nature of its expectations but in the richness of its empirical

support, especially cross-nationally, and in the development of more powerful foundations for its cognitive and institutional drivers.

How are we to explain punctuations and stasis in a single theory? Several loosely related approaches in political science had previously noted that, although policymaking often proceeds smoothly, with marginal or incremental accommodations, it also is regularly torn by lurches and significant departures from the incremental past (Kingdon 1984; Baumgartner and Jones 1991, 1993; Dodd 1994; Kelly 1994). A unifying theme of these approaches is that the same institutional system of government organizations and rules produces both a plethora of small accommodations and a significant number of radical departures from the past. Punctuated Equilibrium Theory extends these observations by placing the policy process on a dual foundation of political institutions and boundedly rational decision making. It emphasizes two related elements of the policy process: issue definition and agenda setting. As issues are defined in public discourse in different ways and rise and fall in the public agenda, existing policies can be either reinforced or questioned. Reinforcement creates great obstacles to anything but modest change, whereas questioning policies at the most fundamental levels creates opportunities for major reversals.

Bounded rationality, which stresses that decision makers are subject to cognitive limitations in making choices, was the major foundation of theories of incremental decision making in the budget process (Wildavsky 1964). Neither incrementalism nor globally rational theories of preference maximization fit well with the joint observations of stasis and dramatic change that are the dual foci of the PET approach. However, if we add the observation that attention spans are limited in governments, just as they are in people, then we have a theory of decision making that is consistent with Punctuated Equilibrium Theory and with what is actually observed. As agenda setting theory has always rested on such a decision making foundation, PET simply extends current agenda setting theories to deal with both policy stasis, or incrementalism, and policy punctuations.

In this chapter, we examine Punctuated Equilibrium Theory and its foundations in the longitudinal study of political institutions and in political decision making (for other reviews, see John 2006b; Robinson 2005, 2006; Jones and Baumgartner 2012; and McFarland 2004, which contextualizes the theory in terms of the development of pluralism).[1] The theory has links to evolutionary biology,[2] though its application in the governmental context differs in important ways from its use in biology. Indeed, its intellectual roots are much closer to the study of complex systems (Érdi 2008), which investigates complex interactions among component parts of a system, including political systems, that can generate considerable unpredictability. Complexity in political systems implies that destabilizing events, the accumulation of unaddressed grievances, or other political processes can change the "normal" process of equilibrium and

status quo on the basis of negative feedback (which dampens down activities) into those rare periods when positive feedback (which reinforces activities) leads to explosive change for a short while and the establishment of a new policy equilibrium.

We begin by discussing punctuated equilibrium in the context of the agenda setting literature, extend the theory to national budgeting, and provide some recent evidence of punctuations and equilibria in US national government spending since World War II. Then we turn to how the theory has been generalized, including extensions to policymaking in US state and local governments as well as European national governments. These generalizations have been geographical (testing the ideas in new political systems), methodological (developing new statistical and qualitative means of testing the ideas), and substantive (expanding from only agenda setting and budgeting to a theory of institutional change). Next, we discuss in more detail how research on PET has developed since the first edition of this book. The chapter concludes with an assessment of the strengths and weaknesses of the PET approach to understanding public policymaking and notes the close linkage between the creation of a data infrastructure and the theoretical approach of analyzing policy dynamics.

Punctuated Equilibria in Public Policymaking

Since the pathbreaking work of E. E. Schattschneider (1960), theories of conflict expansion and agenda setting have stressed the difficulty disfavored groups and new ideas face in breaking through the established system of policymaking (Cobb and Elder 1983; Cobb and Ross 1997; Bosso 1987). The conservative nature of national political systems favors the status quo; multiple veto points, separation of powers, and other equilibrium-supporting factors have long been recognized. The key insight of PET is that, as a corollary of any system with a status quo bias, policy change will rarely be moderate: inertial forces for change are eliminated or kept to the smallest scale until and unless they are overpowered. The system generates a pattern of change characterized by stability most of the time, with dramatic shifts when the inertial forces are overcome.

When Baumgartner and Jones (1993) analyzed a number of US policymaking cases over time and across a variety of issue areas, they found that (1) policymaking both makes leaps and undergoes periods of near stasis as issues emerge on and recede from the public agenda, (2) American political institutions exacerbate this tendency toward punctuated equilibria, and (3) policy images play a critical role in expanding issues beyond the control of the specialists and special interests that occupy what they termed "policy monopolies."

Baumgartner and Jones (1991, 1993) saw that the separated institutions, overlapping jurisdictions, and relatively open access to mobilizations in the United States combine to create a dynamic between the politics of subsystems

and the macro politics of Congress and the presidency—a dynamic that usually works against any impetus for change but occasionally reinforces it. For example, mobilizations are often required to overcome entrenched interests, but once under way they sometimes engender large-scale changes in policy. The reason is that once a mobilization is under way, the diffuse jurisdictional boundaries that separate the various overlapping institutions of government can allow many governmental actors to become involved in a new policy area. Typically, the newcomers are proponents of changes in the status quo, and they often overwhelm the previously controlling powers. Institutional separation often works to reinforce conservatism, but it sometimes works to wash away existing policy subsystems.

In short, American political institutions were conservatively designed to resist many efforts at change and thus to make mobilizations necessary to overcoming established interests. The result has been institutionally reinforced stability interrupted by bursts of change. These bursts have kept the US government from becoming a gridlocked Leviathan despite its growth in size and complexity since World War II. Instead, it has become a complex, interactive system. Redford (1969) differentiated between subsystem politics and macro politics. Baumgartner and Jones extended Redford's insight and combined it with the issue expansion and contraction insights of Schattschneider (1960) and Downs (1972) to form this theory of long-term agenda change and policymaking. Thus, at the core, the literature on agenda setting has always been concerned with the power of specialized communities of experts and the degree to which they operate with relative autonomy from the larger political system or are subject to more intense scrutiny. Because the members of any professional community of experts (say, farmers, nuclear engineers, or members of the military) may prefer more spending on "their" policy, political scientists have long been concerned with tracing the relative power of these shared interest communities; Redford (1969) gives a good summary of these dilemmas.

No political system features continuous discussion on all issues that confront it. Rather, discussions of political issues are usually disaggregated into a number of issue-oriented policy subsystems. These subsystems can be dominated by a single interest, can undergo competition among several interests, can disintegrate over time, or can build up their independence from others (Meier 1985; Sabatier 1987; Browne 1995; Worsham 1998). They may be called "iron triangles," "issue niches," "policy subsystems," or "issue networks," but any such characterization can be considered only a snapshot of a dynamic process (Baumgartner and Jones 1993, 6). Whatever name one gives to these communities of specialists operating out of the political spotlight, most issues, most of the time, are treated within such a community. Nonetheless, within the spotlight of macro politics, some issues catch fire, dominate the agenda, and result in changes in one or more subsystems. The explanation for the same political

institutions producing both stasis and punctuations can be found in the processes of agenda setting—especially the dynamics produced by bounded rationality and serial information processing. These affect the interactions between communities of experts and the larger political system.

SERIAL AND PARALLEL PROCESSING

Herbert Simon (1957, 1977, 1983, 1985) developed the notion of bounded rationality to explain how human organizations, including those in business and government, operate. He distinguished between parallel and serial processing. Individuals devote conscious attention to one thing at a time, so decision making must be done in serial fashion, one thing after the other. Organizations are somewhat more flexible. Some decision structures are capable of handling many issues simultaneously, in parallel. Political systems, like humans, cannot simultaneously consider all the issues that face them at the highest level, so policy subsystems can be viewed as mechanisms that allow the political system to engage in parallel processing (Jones 1994). Thousands of issues may be considered simultaneously in parallel within their respective communities of experts.

Sometimes parallel processing within distinct policy communities breaks down, and issues must be handled serially. In the United States, the macropolitical institutions of Congress and the public presidency engage in governmental serial processing, whereby high-profile issues are considered, contested, and decided one—or at most a few—at a time. An issue moves higher on the political agenda usually because new participants have become interested in the debate: "When a policy shifts to the macro-political institutions for serial processing, it generally does so in an environment of changing issue definitions and heightened attentiveness by the media and broader publics" (Jones 1994, 185). Issues cannot forever be considered within the confines of a policy subsystem; occasionally macropolitical forces intervene. The intersection of the parallel-processing capabilities of the policy subsystems and the serial-processing needs of the macropolitical system creates the nonincremental dynamics of lurching that we often observe in many policy areas. Agenda access does not guarantee major change, however, because reform is often blunted in the decision making stage. But this access is a precondition for major policy punctuations. An interesting but largely untested area is the likelihood of substantial policy change in the absence of salience or agenda access. This could come, for example, by shifting norms within a professional community, but without broad social discussion, or by the accumulation of many small changes each moving in the same direction. Although these are of course possible and many have been documented (see, e.g., Jacob 1988 on the issue of US divorce law), we are aware of no systematic test on a large scale that would determine the proportion of big changes due to sudden punctuations as compared to the slow accretion of small changes.

When dominated by a single interest, a subsystem is best thought of as a policy monopoly. A policy monopoly has a definable institutional structure responsible for policymaking in an issue area, and its responsibility is supported by some powerful idea or image. This image is generally connected to core political values and can be communicated simply and directly to the public (Baumgartner and Jones 1993, 5–7). Because a successful policy monopoly systematically dampens pressures for change, we say that it contains a negative feedback process. Yet policy monopolies are not invulnerable forever.

A long-term view of US policymaking reveals that policy monopolies can be constructed and can collapse. Their condition has an important effect on policymaking within their issue areas. If the citizens excluded from a monopoly remain apathetic, the institutional arrangement usually remains constant, and policy is likely to change only slowly (the negative feedback process). As pressure for change builds up, it may be resisted successfully for a time. But if pressures are sufficient, they may lead to a massive intervention by previously uninvolved political actors and governmental institutions. Generally, this requires a substantial change in the supporting policy image. As the issue is redefined or new dimensions of the debate become salient, new actors that had previously stayed away feel qualified to exert their authority. These new actors may insist on rewriting the rules and changing the balance of power, which will be reinforced by new institutional structures as previously dominant agencies and institutions are forced to share their power with groups or agencies that gain new legitimacy.

Thus, the changes that occur as a policy monopoly is broken up may be locked in for the future as institutional reforms are put in place. These new institutions remain in place after public and political involvements recede, often establishing a new equilibrium in the policy area that lasts well after the issue backs off the agenda and into the parallel processing of a (newly altered) policy community. Important elements of this process are the power, prestige, and legitimacy of the previously established policy monopoly. Such "incumbents" seek to maintain their control. Whether they are or are not discredited enough by policy failures to lose their influence depends on both their levels of policy success and prestige and the strength of those who seek to replace them (see Baumgartner 2013).

POSITIVE AND NEGATIVE FEEDBACK

Punctuated Equilibrium Theory includes periods of equilibrium or near stasis, when an issue is captured by a subsystem, and periods of disequilibrium, when an issue is forced onto the macropolitical agenda. When an issue area is on the macropolitical agenda, small changes in objective circumstances can cause large changes in policy, and we say that the system is undergoing a positive

feedback process (Baumgartner and Jones 2002). Positive feedback occurs when a change, sometimes a fairly modest one, causes future changes to be amplified. Observers often use terms like "feeding frenzy," "cascade," "tipping point," "momentum," or "bandwagon effect" to characterize such processes. Negative feedback, on the other hand, maintains stability in a system, somewhat like a thermostat maintains constant temperature in a room.

Physical scientists have studied large interactive systems that are characterized by positive feedback. Physical phenomena like earthquakes can result from fairly modest changes. Pressure inside the earth builds up over time and eventually causes the tectonic plates on the planet's surface to shift violently during an earthquake. Similarly, if we drop grains of sand slowly and constantly onto a small pile of sand in a laboratory, most of the time the pile remains in stasis, with occasional landslides, some of which are minor, and others of which are huge (Bak and Chen 1991; Bak 1997). A landslide may not be caused by a large-scale event; it may be caused by the slow and steady buildup of tiny changes. Like earthquakes and landslides, policy punctuations can be precipitated by a mighty blow, an event that simply cannot be ignored, or by relatively minor events that accumulate over longer periods. What determines whether an issue catches fire with positive feedback? The interaction of changing images and venues of public policies.

As an example of positive feedback in policymaking, let us take the case of the involvement of the US national government in criminal justice. Before the late 1960s, federal involvement in crime policy was relatively modest. At the end of that decade, however, the Lyndon B. Johnson administration initiated several new federal grant-in-aid programs to assist state and local governments in crime prevention and control. Congress passed the Omnibus Crime Control and Safe Streets Act in 1968; between 1969 and 1972 federal spending on crime and justice doubled in real dollar terms.

What happened? Crime was rising during this period, but more importantly other trends highlighted the increasing insecurity citizens were feeling, causing people and government officials to direct their attention to the crime problem. Three important measures of attention and agenda access came into focus all at once: press coverage of crime stories, the proportion of Americans saying that crime was the most important problem (MIP) facing the nation, and congressional hearings on crime and justice. All of this happened as major urban disorders swept many American cities. In the words of John Kingdon, a window of opportunity had opened, and federal crime policy changed in a major way. After 1968, the three trends fell out of focus, going their own ways, and crime policy moved back into the subsystem arena. It is not possible to say which of the three variables was primary; all three were intertwined in a complex positive feedback process. In a classic pattern, public attention to crime jumped, press coverage focused on the problem, and Congress scheduled hearings. The

issue left its normal subsystem home, with incremental adjustments, and entered the realm of macropolitics. Congress passed a major law, and spending increased in a major punctuation. US crime policy at the federal level is still powerfully affected by decisions that were made during this surge of attention on the "war on crime" and those that later reinforced them.

Recently, Jones, Thomas, and Wolfe (2014) showed how *policy bubbles* can develop from the processes that lead to policy subsystems. They define a policy bubble as sustained overinvestment in a policy solution (or instrument) or set of solutions relative to the efficiency of the policy solution in achieving goals. To illustrate they study three potential policy bubbles: crime control, privatization and contracting, and charter schools and vouchers. They conclude that the first two policies clearly generated overinvestment bubbles, but the third did not, primarily because countermobilization by affected interests limited the positive feedback effects. The formation of most policy subsystems does not result in bubbles because of countermobilization, but some clearly do. One possible reason is an extremely favorable policy image underlying these policy solutions.

POLICY IMAGES

Policy images are a mixture of empirical information and emotive appeals. Such images are, in effect, information—grist for the policymaking process. The factual content of any policy or program can have many different aspects and can affect different people in different ways. When a single image is widely accepted and generally supportive of the policy, it is usually associated with a successful policy monopoly. When there is disagreement over the proper way to describe or understand a policy, proponents may focus on one set of images while their opponents refer to a different set. For example, when the image of civilian nuclear power was associated with economic progress and technical expertise, its policymaking typified a policy monopoly. When opponents raised images of danger and environmental degradation, the nuclear policy monopoly began to collapse (Baumgartner and Jones 1991; 1993, 25–28, 59–82). As the next section shows, Jones (1994) has further emphasized the importance of policy images not only to issue definition and redefinition in policymaking but also to the serial and parallel processes of individual and collective decision making in a democracy.

A new image may attract new participants, and the multiple venues in the American political system constitute multiple opportunities for policy entrepreneurs to advance their cases. Federalism, separation of powers, and jurisdictional overlaps not only inhibit major changes during periods of negative feedback but also mean that a mobilization stymied in one venue may succeed in another. The states can sometimes act on a problem that has not advanced

onto the national agenda, and vice versa. The US system of multiple policy venues is an important part of the process of disrupting policy monopolies during periods of positive feedback.

Each institutional venue has its own language, set of participants, and limitations, leading to evolving sets of strategies among those who would try to affect the agenda setting process. In her pathbreaking study of courts, Vanessa Baird (2006) studied the interaction of justices' priorities, litigant strategies, and agenda setting. Baird wanted to know which dynamics underlie the movement of the Supreme Court into areas of policy it had ignored or avoided in the past. The work is exciting because it unifies the strategic concerns of game theory with the dynamics of agenda setting, hence pointing to new possibilities for integration across approaches.

In summary, subsystem politics is the politics of equilibrium—the politics of the policy monopoly, incrementalism, a widely accepted supportive image, and negative feedback. Subsystem decision making is decentralized to the iron triangles and issue networks of specialists in the bureaucracy, legislative subgroups, and interested parties. Established interests tend to dampen departures from inertia until political mobilization, advancement on the governmental agenda, and positive feedback occur. At that point, issues spill over into the macropolitical system, making possible major change.

Macropolitics is the politics of punctuation—the politics of large-scale change, competing policy images, political manipulation, and positive feedback. Positive feedback exacerbates impulses for change; it overcomes inertia and produces explosions or implosions from former states (Baumgartner and Jones 1991, 1993; Jones, Baumgartner, and Talbert 1993; Jones 1994; Talbert, Jones, and Baumgartner 1995).

Punctuated equilibrium seems to be a general characteristic of policymaking in the United States. Rigorous qualitative and quantitative studies again and again find strong evidence of the process, including studies on regulatory drug review (Ceccoli 2003), environmental policy (Repetto 2006; Busenberg 2004; Wood 2006; Salka 2004), education (Manna 2006; McLendon 2003; Mulholland and Shakespeare 2005; Robinson 2004), firearms control (True and Utter 2002), and regulation of state hospital rates (McDonough 1998).

This sweeping depiction of issue dynamics may hide a great deal of variability in the operation of policy subsystems. For example, Worsham (1998) examines three different subsystem types and finds substantial variation in the actors' ability to control attempts to shift conflict from the subsystem level to the macropolitical level by appealing to Congress (see, in addition, McCool 1998). Research using the Advocacy Coalition Framework (see Chapter 4 in this volume: Jenkins-Smith et al. 2017) has shown that opposing groups can modify certain elements of their belief structures through policy learning born of continual interaction within policy subsystems. This interaction can lead to

substantial compromise and important changes in public policy. This belief-adjustment process can lead to a dampening of policy punctuations because appeals from the disaffected are involved in the policymaking subsystem. In his study of federal land management, Wood (2006) shows that even conflictual subsystems can sometimes avoid disruption through conflict-management strategies. More generally, this suggests that institutional arrangements can affect the magnitude of punctuations—a point to which we return later in this chapter.

BOUNDEDLY RATIONAL FOUNDATIONS AND THE CENTRALITY OF DECISION MAKING

Embedded in the Punctuated Equilibrium Theory of policy change is an implicit theory of individual and collective decision making. From a decision making perspective, large-scale punctuations in policy spring from a change in either preferences or attentiveness. If we regard preferences as relatively stable, how can we explain nonmarginal changes in government policy? Particularly, how can we explain apparent cases of choice reversal when later studies find no large changes in the external environment?

Baumgartner and Jones (1993) have explained "bursts" of change and policy punctuations as arising from the interactions of images and institutions. When an agreed-on image becomes contested, a policy monopoly is usually under attack, and the likelihood grows of a new mobilization (a wave of either criticism or enthusiasm) advancing the issue onto the macropolitical agenda. How can policy images play such a central role in government agenda setting? Part of the answer is found in Jones's (1994) analysis of serial attention and rational decision making, both individually and collectively, and part is found in Jones and Baumgartner's (2005) analysis of the disproportionate nature of human individual and collective information processing. They expand on these themes in *The Politics of Information* (Baumgartner and Jones 2015).

Jones (1994) has argued that individual and collective decision changes, including choice reversals, do not spring from rapid flip-flops of preferences or from basic irrationality (choosing to go against our own preferences); they spring from shifts in attention. He has called such rapid changes "serial shifts." In individuals, serial attentiveness means that the senses may process information in a parallel way, but attention is given serially to one thing, or at most a few things, at a time (Simon 1977, 1983). Although reality may be complex, changing, and multifaceted, individuals cannot smoothly integrate competing concerns and perspectives. We usually focus on one primary aspect of the choice situation at a time (Simon 1957, 1985; Jones 1994; see also Tversky 1972; Zaller 1992). Collectively, a shift in the object of attention can lead to a disjointed change in preferred alternatives, even when the alternatives are well defined (Jones 1994).

More generally, bounded rationality undergirds all policy change because the mechanisms associated with human cognitive architecture are also characteristic of organizations, including governments (Jones 2001). Bounded rationality is the decision making underpinning of both the punctuated equilibrium and the advocacy coalition approaches, but the theories emphasize different aspects of the process. Punctuated equilibrium is based in serial processing of information and the consequent attention shifts, whereas the advocacy coalition approach traces policy dynamics to the belief systems of coalition participants (Leach and Sabatier 2005).

Bounded rationality was wedded early to incrementalism (Lindblom 1959; Wildavsky 1964); yet incrementalism proved to be, at best, an incomplete explanation of government policymaking and, at worst, a misleading one. The basic problem with incrementalism surfaced when it was tested empirically. For example, when Davis, Dempster, and Wildavsky (1966) made a longitudinal study of bureau-level budget results, they found and reported empirical evidence of both incremental decision rules and two types of nonincremental shifts. The first shift apparently happened when a decision rule was temporarily set aside for a short period (called a deviant case), and the second occurred when a new decision rule was adopted (called a shift point) (Davis, Dempster, and Wildavsky 1966, 537–542). These punctuations aside, the authors found support for a relatively incremental view of the budgetary process. The punctuations themselves were excluded from the model, and the authors' conclusions pointed to the significance of finding equations for the budget process and to the central role that the prior-year "base" played in those equations.

Focusing solely on incremental changes caused early behavioral decision theorists to downplay empirical evidence of large-scale change, and it led boundedly rational decision making into a theoretical cul-de-sac. Incrementalism did seem to explain much of what happened in the budgetary process, but it had nothing to say about major policy changes. Indeed, boundedly rational decision making even had a difficult time determining when changes could no longer be considered incremental (Wanat 1974; Padgett 1980; Berry 1990; Hayes 1992).

With Jones's reconceptualization, however, boundedly rational decision making is a foundation for both major and minor changes—for both punctuations and equilibria. In the case of public policymaking, the twin foundations of conservative and overlapping political institutions and boundedly rational decision making (especially the role of images in dampening or exacerbating mobilizations against entrenched interests) combine to create a system that is both inherently conservative and liable to occasional radical change.

Although bounded rationality dominates the literature in policy processes, that is not true in the study of governing institutions, where rational choice perspectives hold considerable sway. Yet these models do not fare well in either psychological or economic studies of decision making (Kahneman 2011), and

in many cases they predict policy outcomes, particularly their distributions, worse than a boundedly rational approach (Jones 2003; Jones and Thomas 2012). As we show later in this chapter, applying the punctuated equilibrium framework to public budgeting demonstrated this clearly.

INFORMATION PROCESSING

With its foundations in both political institutions and boundedly rational decision making, Punctuated Equilibrium Theory is at base a theory of organizational information processing. Governments are complex organizations that act on the flow of information in producing public policies (Jones, Workman, and Jochim 2009). The manner in which public policy adjusts to these information flows determines the extent of bursts of activity in the system. The general punctuation hypothesis suggests that information processing is disproportionate. That is, policymaking alternates between periods of underreaction and overreaction to the flow of information coming into the system from the environment (Jones and Baumgartner 2005; Wood and Peake 1998). This reaction may stem from a vivid event that symbolizes everything that is wrong (Birkland 1997) or from the accumulation of problems over longer periods. In either case, how the policymaking system allocates attention to the problem is a critical component of problem recognition and subsequent policy action, but so are the institutional arrangements responsible for policymaking.

One would expect a policymaking system, then, to be more subject to punctuations when it is less able to adjust to the changing circumstances it faces. Indeed, Jones and Baumgartner (2005) show that a perfect pattern of adjustment to a complex, multifaceted environment in which multiple informational input flows are processed by a political system will yield a normal distribution of output changes. As a consequence, the extent of the adjustment of a policy system may be gauged by a comparison of its distribution of policy outputs with the normal curve. In an important sense, the more normally public policy changes are distributed, the better the policymaking system is performing (in the sense of producing efficient adjustment to environmental demands).

Using this framework, Robinson (2004) finds that more-bureaucratic school systems adjust their expenditures better to fiscal reality than do less-bureaucratic ones—presumably because bureaucracy enhances information acquisition and processing. Breunig and Koski (2006) find that states with stronger chief executives are subject to smaller and fewer budgetary punctuations, and Berkman and Reenock (2004) show that incremental adjustments in state administrative reorganizations can obviate the need for sweeping reorganizations in the future. Chan (2006), however, reports results on administrative changes in Hong Kong that are very much in keeping with punctuated dynamics.

Adler and Wilkerson (2012) have developed what amounts to a new theoretical approach to the study of congressional behavior by adopting an information and problem-solving approach. They note, for example, that much of the US congressional workload is organized around a small number of "must-pass" pieces of legislation and that lawmakers structure things to ensure that bills that "must" be passed will periodically arise. Theirs is based on a sister project to the Policy Agendas Project: the Congressional Bills Project (http://www.congressionalbills.org) makes available hundreds of thousands of bills—all those ever introduced, not just passed—from 1947 through recent times and is organized according to the same categories as the Policy Agendas Project and Comparative Agendas Project (http://www.comparativeagendas.net).

Complex interactions, however, cannot be confined to activity within fixed institutional frameworks. It must be the case that the entire policymaking system can evolve, that the pieces of the system, in effect, can feed back into the whole, actually changing the decision making structures that acted as policy venues in the first place. Richardson (2000) argues that this is happening in European policymaking at present, and Daviter (2013) recently reinforced this point in the EU context as well. The framework we've set forth in this chapter can serve as a starting point for the analyses of such complicated interactions because they allow the policy process to be viewed as a complex, evolving system.

THE POLITICS OF INFORMATION AND THE PATHOLOGY OF PUNCTUATIONS

The concept of punctuated equilibria in policy studies is based in the theory of policy subsystems, in particular in ideas originating with E. E. Schattschneider and Emmette Redford. In the early work on punctuated equilibria, major policy changes were seen as natural outcomes of normal democratic processes. Friction in policymaking systems was a natural outcome of parallel processing in policy subsystems, rules that limit policy action, and the cognitive capacities of human actors that limit information-processing abilities. As a consequence, changes in collective attention were necessary to overcome the bias of the status quo, leading to disjointed large-scale policy changes. As the *Politics of Attention* showed, such changes could happen even in the absence of crises in the policymaking environment.

It has become clear in recent years that this view is incomplete. Political systems may be designed with such a high level of friction that they so strongly resist change, and when major changes come (and they will) they can be highly destructive. The friction dynamic implies that the more centralized and authoritarian the regime, the larger policy punctuations will be because the system is less able to adjust to the flows of information from the environment. Lam and Chan (2014) show that policy changes were greater when Hong Kong was more

centralized but abated as the political system democratized. Chan and Zhao (2016) develop what they call the "information disadvantage of authoritarianism" and show first the large policy punctuations that occur in authoritarian China relative to democratic regimes, and second that punctuations are larger in regions of China with less social discontent. Given the lack of other input means, discontent is one of the few mechanisms for stressing problems that exist.

System-destabilizing policy punctuations are a serious danger in nondemocratic systems but can be problematic in democratic ones as well. For example, more centralized agency structures within government may lead to patterns of less stable outputs (May, Workman, and Jones 2008). Epp (2015) shows that firms in decentralized markets are less punctuated than firms in less competitive situations.

Punctuations are inevitable, but their size and distribution are not. How can policymaking systems be designed so that the size of punctuations can be minimized? It is well established in the policy process literature that the dynamics affecting the discovery and interpretation of policy problems are distinct from the search for solutions. In *Human Problem-Solving,* Newell and Simon (1972) found that people solving problems tended to return to prepackaged sets of policy solutions when encountering a superficially similar problem to one they had solved before (see Jones 2001 for a discussion). The garbage can theory of Cohen, March, and Olsen (1972), extended by Kingdon (1984) to what is now called the Multiple Streams Framework (Herweg, Zahariadis, and Zohlnhöfer 2017; see Chapter 1, this volume), treats problem dynamics and solution search as separate processes at the systems level.

Baumgartner and Jones's *Politics of Information* develops the thesis that problem discovery and definition requires a different organizational system than does solution search. They begin with an information-processing perspective from more recent developments in the punctuated equilibrium approach (Baumgartner and Jones 2015). They show that policymaking systems may reach suboptimal equilibria by suppressing attributes in a complex problem space. They develop the thesis that "entropic search," in which multiple potentially competing jurisdictions of government agencies and legislative committees, yields a superior (in the sense of more consistent input streams of information) depiction of the problem space. But often a collaboration among experts is better at designing solutions than a cacophony of competing voices is. One implication is that organizational design may need to differ for detecting and defining problems and designing solutions.

In general, the most recent developments in the study of policy punctuations lead to a conception that, although punctuations are unavoidable, better governance systems tend to minimize the disruption from such punctuations. Crises of course can be unexpected, what Taleb (2007) calls black swans when they are particularly extreme. But many and probably most crises are foreseeable

to some extent; open and even confusing policy systems are better equipped to detect such potential crises than are more centralized and less adaptive ones.

THE DUAL ROLE OF FRICTION IN POLICYMAKING

Punctuated equilibrium in policy studies applies to a particular situation: when political conflict is expanded beyond the confines of expert-dominated policy subsystems to other policymaking venues. It relies on the mechanism of policy image—the manner in which a policy is characterized or understood—and a system of partially independent institutional venues within which policy can be made. The general punctuation hypothesis generalizes this basic framework to situations in which information flows into a policymaking system, and the system, acting on these signals from its environment, attends to the problem and acts to alleviate it if necessary (Jones, Sulkin, and Larsen 2003; Jones and Baumgartner 2005).

This translation is not smooth, however, because decision making activities are subject to decision and transaction costs. These are costs that policymakers incur in the very process of making a decision. Participants in a policymaking system must overcome these costs to respond to the signals from the environment, which themselves are uncertain and ambiguous. There are two major sources of costs in translating inputs into policy outputs. The first consists of cognitive costs: political actors must recognize the signal, devote attention to it, frame the problem, and devise solutions for it. The second source consists of institutional costs: the rules for making policy generally act to maintain stability and incrementalism.

In the case of US national institutions, constitutional requirements of supermajorities to pass legislation mean that policy outputs will be more punctuated than the information coming into government. In stochastic process terms, outputs are more leptokurtic than inputs. Because it should be easier for an issue to gain access to the governmental agenda than to stimulate final policy action, agenda setting policy distributions should be less leptokurtic and more similar to a normal distribution than output distributions. Jones, Sulkin, and Larsen (2003; see also Jones and Baumgartner 2005) report that a variety of agenda setting measures, such as congressional hearings, newspaper coverage, and congressional bill introductions, are less leptokurtic than the distributions for any of several outputs, such as public laws and public budgets. Outputs are more punctuated, characterized by stability interspersed with bursts of activity, than agenda setting distributions. Baumgartner, Breunig, et al. (2009) generalized this finding, showing progressively greater friction in distributions drawn from policy inputs, decision making, and budgeting in the United States, Denmark, and Belgium.

Policymaking institutions seem to add friction to the process of translating inputs into policy outputs. This friction acts to delay action on issues until

enough pressure develops to overcome this institutional resistance. Then there is a lurch or punctuation in policymaking. Friction, which leads to punctuated dynamics, rather than gridlock characterizes American national political institutions. Furthermore, this framework may prove useful in understanding differences among political systems, which, after all, add friction to the policymaking process in different ways. Some social movement theorists have critiqued policy process approaches as too narrow, but they do stress issue dynamics (Kenny 2003). A more general formulation may lead to grappling with how one might integrate the voluminous work on social movements with punctuated change within institutional frameworks.

PUNCTUATIONS AND STABILITY IN GOVERNMENT SPENDING

Over the past twenty years, the Punctuated Equilibrium Theory has been extended to produce an agenda-based model of governmental budgeting (Jones, Baumgartner, and True 1998; True 2000; Jones, Sulkin, and Larsen 2003; Jones and Baumgartner 2005; Jones et al. 2009; see also Jensen, Mortensen, and Serritzlew 2016). Its foundation remains the boundedly rational process of human decision making interacting with disaggregated political institutions, specifically serial attentiveness and parallel subsystems. Collectively, government decision makers usually process information in a parallel way through subsystems, policy monopolies, iron triangles, and issue networks. When that happens, budgets change only incrementally. However, sometimes issues move from subsystem politics to macropolitics, and national attention in the Congress and in the presidency is, of necessity, given to one or a few high-profile items at a time. In the attention limelight of the macropolitical institutions, policies and programs can make radical departures from the past, and budgets can lurch toward large changes. The study of budgets grew from a desire to construct a comprehensive test of PET; Jones and Baumgartner (2005) presented data on thousands of budget changes at the federal level, demonstrating a pattern in the overall distribution that was consistent with the theory. Since then, an entire theory of budgeting has developed based on bounded rationality (Jones et al. 2009).

Choice situations are multifaceted; yet decision makers tend to understand choices in terms of a circumscribed set of attributes, and they tend to have considerable difficulty making trade-offs among these attributes. If a given policy promotes economic growth but simultaneously has some negative consequences in terms of human rights, one or the other of those competing values may be at the forefront of decision makers' attention. If attentiveness to these two dimensions was to shift—say, as a result of scandal or changes in the composition of the group of decision makers, as sometimes occurs—then the

chosen policy might shift dramatically as well. In general terms, Jones (2001) has noted that decision makers tend to stick with a particular decision design (a term that refers to the attributes used in structuring a choice) until forced to reevaluate it.

Budgets react to both endogenous and exogenous forces. The forces that might cause a change in the decision design may be external to the decision maker. Such influences may include changing levels of public attention, striking and compelling new information, or turnover in the composition of the decision making body (e.g., when an election changes control of Congress and committee leaderships are rotated from one party to the other). When changing external circumstances force us out of an old decision design, the result is often not a modest adjustment but a major change. Yet subsystem politics and the bureaucratic regularity of annual budget submissions constitute endogenous forces that favor continuing with the same decision design. As a consequence, budget decisions tend to be either static, arrived at by applying the current decision design and subsystem institutions to the new choice situation, or disjointed, arrived at by utilizing a different decision design and macropolitical institutions that may incorporate new attributes into the choice structure or shift attention from one dimension to another. Even these explanations do not exhaust the possible interactions among institutions, images, and the environment, for large changes can also arise from endogenous conflicts over the appropriate image and from shifts in attention when the external circumstances have changed little, if at all.

Because political institutions amplify the tendency toward decisional stasis interspersed with abrupt change (as opposed to smooth, moderate adjustments to changing circumstances), the agenda-based model of policymaking and the serial shift model of decision making together produce a pattern of punctuations and equilibria in the budget processes. As attentiveness shifts to the new aspect or attribute, so, too, do outcomes shift, and this process is often not smooth. Occasionally, in almost every issue area, the usual forces of negative feedback and subsystem maintenance will be replaced by deviation-enhancing positive feedback forces. Positive feedback leads to episodic and sporadic change (as institutionally induced stability reasserts itself after the punctuation).

Punctuated equilibrium's attention-driven, agenda-based budget model encompasses periods of both punctuation and stability. This view of the budget process leads us to expect that annual budget changes within a given spending category will not be distributed in the normal, bell-shaped curve. Rather, these changes should reflect the nonnormal distributions found in earthquakes and other large interactive systems (see Mandelbrot 1963; Padgett 1980; Midlarsky 1988; Bak and Chen 1991; Peters 1991). The "earthquake" budget model anticipates many minuscule real changes, few moderate changes, and many large changes (True 2000).

The model implies that punctuations ought to occur at all levels of policymaking and at all levels of the budget and should not be driven simply by external (exogenous) factors in a top-down manner. This is a consequence of two factors. First, budget decisions are hostage to the statics and dynamics of selective attention to the underlying attributes structuring a political situation. Second, the theory of punctuated policy equilibrium is based in part on a bottom-up process in which policy change may occur in isolated subsystems, may spill over into other, related subsystems, or may be affected by exogenous shocks (Jones, Baumgartner, and True 1998). If punctuations did not occur at all levels of scale in the budget, from the program level to the macropolitical level, and if they did not occur during all time periods, then we would have to question the application of this theory to budgeting.

Yet, because national budget decisions take place within political institutions, we expect that hierarchy will produce an inequality in the transmission of punctuations from one level to another. This inequality of transmission is connected to the notion of parallel versus serial processing of issues. Both the president and Congress are capable of transmitting top-down budget changes to many agencies at once, and they do so when an issue affecting many agencies or programs reaches the national agenda and is processed serially. Such top-down punctuations from fiscal stress will be more easily transmitted to departments, agencies, and bureaus than bottom-up punctuations can be transmitted upward. The reason is that the insular nature of parallel processing within subsystems damps out the spillover effects among subsystems. As a result, we expect fewer punctuations at the top than at the bottom levels of governmental organization.

PUNCTUATIONS IN PREVIOUS BUDGET THEORIES

Many different models of the policy process have predicted abrupt change, but they have generally postulated exogenous change. In particular, the empirical and theoretical literature on public budgeting provides ample precedent to expect budget punctuations, beginning as shown above with Davis, Dempster, and Wildavsky (1966). This study focused on the use by decision makers of budget decision rules. These rules, understood by participants and offering a stable organizational environment for decision making, were based on the concepts of base and fair share, which led to incrementalism in both process and output. But Davis, Dempster, and Wildavsky (1974, 427) later added that "although it is basically incremental, the budget process does respond to the needs of the economy and society, but only after sufficient pressure has built up to cause abrupt changes precipitated by these events." Exogenously caused punctuations in budget results are consistent with findings by Ostrom and Marra (1986), Kamlet and Mowery (1987), Kiewiet and McCubbins (1991), and Su, Kamlet, and Mowery (1993).

The earthquake budget model departs from all of the cybernetic, optimizing, and adaptive models in emphasizing stasis or large change, but not moderate change. The policymaking literature is replete with models of exogenously forced policy change. Such models are suggested not only in the research of the authors cited above but also in the work of comparativists (Krasner 1984) and scholars who study public representation. They see changes in public policy as exogenously driven by changes in public opinion (Stimson, MacKuen, and Erikson 1995) and caused through a thermostat-like process (Wlezien 1995; Soroka and Wlezien 2010). These models call for punctuations only if there is a change in macrolevel exogenous forces.

Other authors have allowed for complex interactions between endogenous and exogenous budget changes. Kiel and Elliott (1992, 143) approached budgeting from a perspective of nonlinear dynamics and noted the existence of likely nonlinearities in the budgeting process in which "exogenous and endogenous forces simply have varying impacts on budget outlays over time." Nonlinear, interactive processes imply occasional punctuations. Thurmaier (1995) reported the results of experiments in budget scenarios in which decision makers shift from economic to political rationales for their decisions after being given new information about political calculations. Such shifts in the bases of decisions can lead to punctuations. True (1995) found that domestic political factors had more influence on spending for national defense than did the dissolution of the Soviet Union. The case for both endogenous and exogenous influences on national budgets seems to be a strong one.

Any work in this area must reckon with the seminal work of John Padgett (1980, 1981) on budget decision making. Padgett's (1980, 366) serial judgment model of the budget process implies "the occasional occurrence of very radical changes." Both Padgett's serial judgment model and our agenda-based approach allow for endogenous mobilizations as well as exogenous shocks. Davis, Dempster, and Wildavsky (1966) suggested only exogenous shocks, but they have suggested punctuations in the budget process. The earthquake budget model alone, however, ties budget making to both an embedded cognitive decision theory and an explicit policymaking theory—the Punctuated Equilibrium Theory of governance.

Following Padgett's lead, our agenda-based budget model assumes that budgeting is a stochastic process. It remains extremely difficult (and perhaps impossible) to specify precise causal linkages among all of the variables that interact nonlinearly or interdependently to produce changes in all of the line items of annual national budgets (especially if, like us, one hopes to do so for the entire postwar period). However, it is possible to develop hypotheses about the distribution of budget changes that can be derived from our agenda-based model and that can be distinguished from previous budgeting models. And that is the strategy we have followed (Jones, Baumgartner, and True 1998; Jones and Baumgartner 2005; Jones et al. 2009; Jones Zalyani, and Érdi 2014).

If budgets generally change very little, but occasionally change a great deal, annual budget changes will be distributed leptokurtically. That is, their univariate distribution should have a large, slender central peak (representing a stability logic), weak shoulders (representing difficulty in making moderate changes), and big tails (representing episodic punctuations). Note that a normal, or Gaussian, distribution would be found if continuous dynamic adjustment were the primary decision mechanism (Davis, Dempster, and Wildavsky 1966; Padgett 1980; for a careful examination of univariate distributions, see Johnson, Kotz, and Balakrishnan 1994).

Because we expect the dynamics of budget decision making to occur at all levels, we hypothesize scale invariance. That is, we expect the underlying, nonnormal distribution of annual changes to be evident at all levels of aggregation (program, function, subfunction, and agency). Yet, because we expect changes in budget decisions to be more easily transmitted down the organizational chain than up, we expect that punctuations will be more pronounced at the bottom of the hierarchy than at the top. That is, we expect subfunctions to be more leptokurtic than functions and functions to be more leptokurtic than higher aggregations.

These expectations diverge from the predictions of other budget and decision models. The boundedly rational models of Davis, Dempster, and Wildavsky (1966, 1974) explicitly describe the normality of their residual terms. That is, year-to-year changes are usually normally distributed, and after an exogenous factor has caused a shift in parameters, the series will again be modeled with a normal residual term. The "cybernetic" models of Ostrom and Marra (1986), Kamlet and Mowery (1987), and Blais, Blake, and Dion (1993) depend on the assumption of normality to justify their use of linear regressions and pooled-regression models.

Budget-maximizing models have made few particular predictions in this area (Niskanen 1971), but it is reasonable to expect a normal distribution of first differences from them as well; indeed, most regression analyses and analyses of variance depend on the central limit theorem for their justification. Maximizing models do not predict punctuations unless there is a shift in exogenous factors, but if such a shift occurs, most maximizing models assume that the accumulation of exogenous factors will asymptotically approach normality.

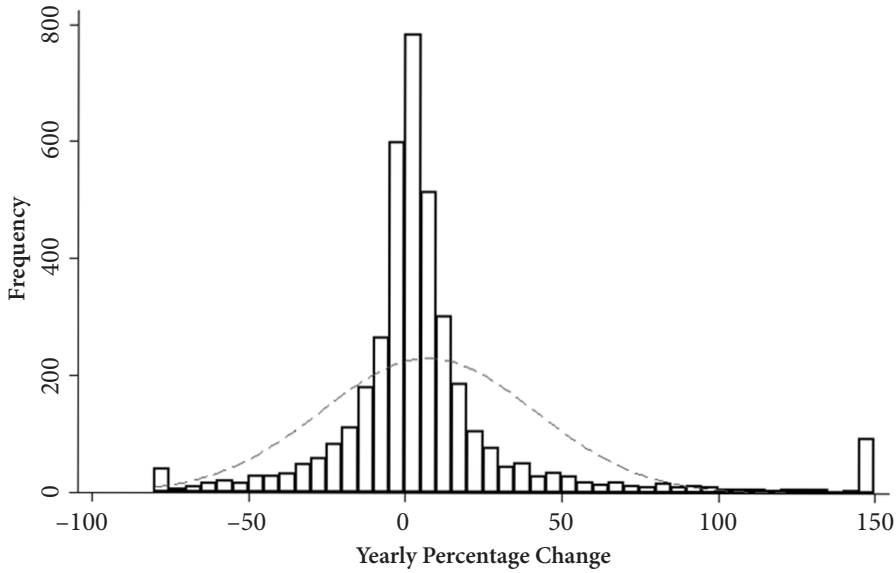
THE DISTRIBUTION OF BUDGET CHANGES

We first presented tests of this hypothesis in the first edition of this book; since then, policy process scholars have produced a virtual explosion of work on the distribution of budget changes. To study nonnormal budgetary changes, we developed a new dataset of US budget authority for Office of Management and Budget (OMB) subfunctions from fiscal year (FY) 1947 to the present. Budget data present special problems of comparability across time (Baumgartner,

Jones, and Wilkerson 2002; Soroka, Wlezien, and McLean 2006), and our dataset was adjusted for these comparability problems. Budget authority, corrected for inflation, is more accurate than appropriations, which can confuse the timing of contract spending and depend on estimates for trust fund spending. And budget authority is closer to the congressional decision making process than outlay data because outlays can be delayed for several years after the decision has been made. We constructed the relevant estimates from original contemporary budgets on the basis of our analysis of current budget categories. We focused primarily on OMB's subfunction level, which divides the twenty core governmental functions into seventy-six groupings based on the national purposes they are supposed to serve. We have focused on the sixty programmatic subfunctions, eliminating sixteen primarily financial subfunctions.

If we take the annual percentage change for each of the sixty programmatic budget subfunctions from FY 1947 through FY 2012, we get the distribution shown in the histogram in Figure 2.1. The distribution is clearly leptokurtic and positively skewed. Note the very strong central peak, indicating the great number of very small changes, the weak shoulders, indicating fewer than normal

FIGURE 2.1 Distribution of Percentage Changes in U.S. Budgeting, 1947–2012



NOTE: The figure is based on OMB subfunctions and pools all series from 1947 to 2012, showing the number of each size annual percentage change.

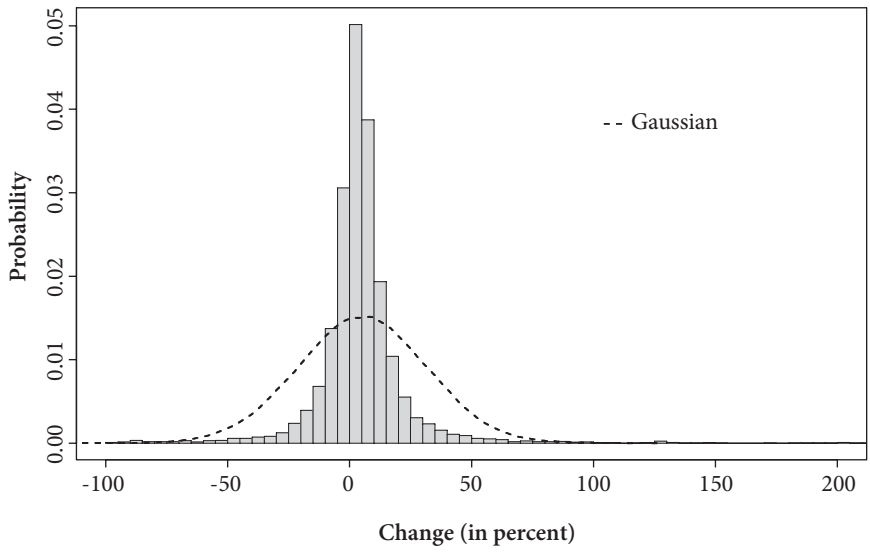
SOURCE: Data from http://www.policyagendas.org.

moderate changes, and the big tails, indicating more than normal radical departures from the previous year's budget. It diverges widely from a normal curve even if we drop the top 5 percent of the outliers when computing the normal curve.[3]

The distribution of annual changes in budget authority is consistent with the earthquake budget model (as called for by the Punctuated Equilibrium Theory), but not with incremental theories. Both rely on bounded rationality, and our approach may be viewed as adding agenda setting and attention allocation to the incrementalist models. That is, the incrementalist models were not far wrong; the central peak of budget change distributions indicates that they are virtually unchanging and hence may be viewed as incremental. But the incremental theories missed the manner in which attention allocation disrupts "normal" budgeting, which PET incorporates.

How general is the finding of punctuated, nonincremental budgeting? So far, every study examining public budgets has found this pattern. Jordan (2003) finds punctuated budget change distributions for US local expenditures; Robinson (2004), for Texas school districts; Breunig and Koski (2006), for state budgets; and Jones and Baumgartner (2005), for US national outlays since 1800. The pattern also emerges in other countries, including the United Kingdom

FIGURE 2.2 Annual Percentage Change in the U.S. Budget Authority for American States, Aggregated across Budget Categories, 1984–2002

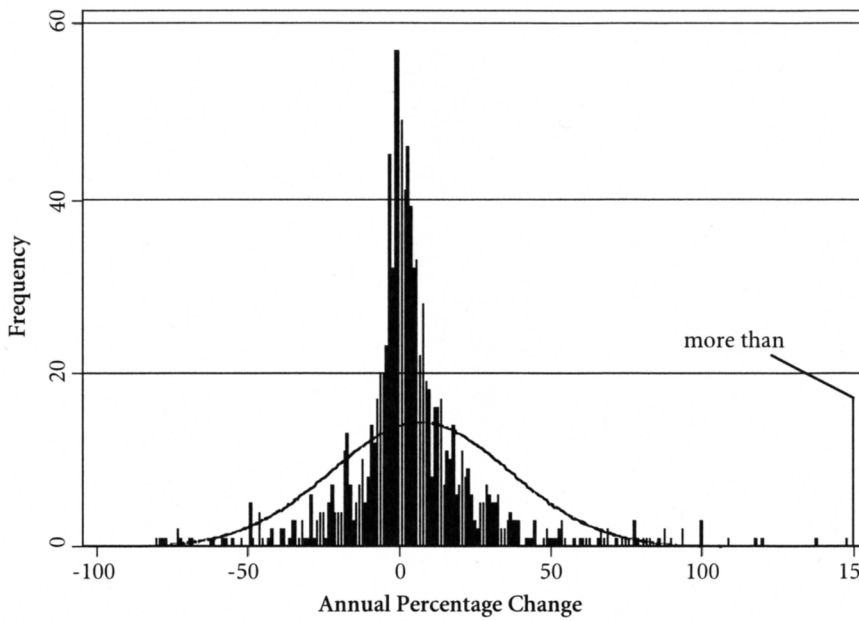


SOURCE: Christian Breunig and Chris Koski, "Punctuated Equilibria and Budgets in the American States," *Policy Studies Journal* 34, no. 3.

(John and Margetts 2003; Soroka, Wlezien, and McLean 2006), Denmark (Breunig 2006; Mortensen 2005), Germany (Breunig 2006), France (Baumgartner, François, and Foucault 2006), Belgium (Jones et al. 2009), Spain (Caamaño-Alegre and Lago-Peñas 2011; Chaqués-Bonafont, Palau, and Baumgartner 2015), and South Africa (Pauw 2007) (see also Jones et al. 2009; Baumgartner, Breunig, et al. 2009; Breunig and Koski 2012; Breunig, Koski, and Mortensen 2010; Breunig and Jones 2011; Soroka, Wlezien, and McLean 2006; Jensen, Mortensen, and Serritzlew 2016). Indeed, the results are so strong and invariant that punctuated equilibrium has been classified as "a general empirical law of public budgets" (see Jones et al. 2009).

Figure 2.2, reproduced from the work of Breunig and Koski (2006), shows the distribution of budgets across the fifty US states; in its basics, it closely resembles Figure 2.1. The pattern persists in centralized democracies as well as in more pluralistic ones such as the United States. Figure 2.3, showing the distribution of annual changes in ministerial funding in France, closely resembles Figure 2.1 as well. This suggests that we need a broader theory of how policy punctuations occur, one that is not so tightly tied to pluralistic forms of government. It is likely that different systems lead to different intensities in punctuations, yet don't escape the process—because it is rooted in the capacities of

FIGURE 2.3 Distribution of Annual Percentage Changes for Ten French Ministerial Budgets, 1868–2002



SOURCE: Baumgartner, Foucault, and Francois (2006).

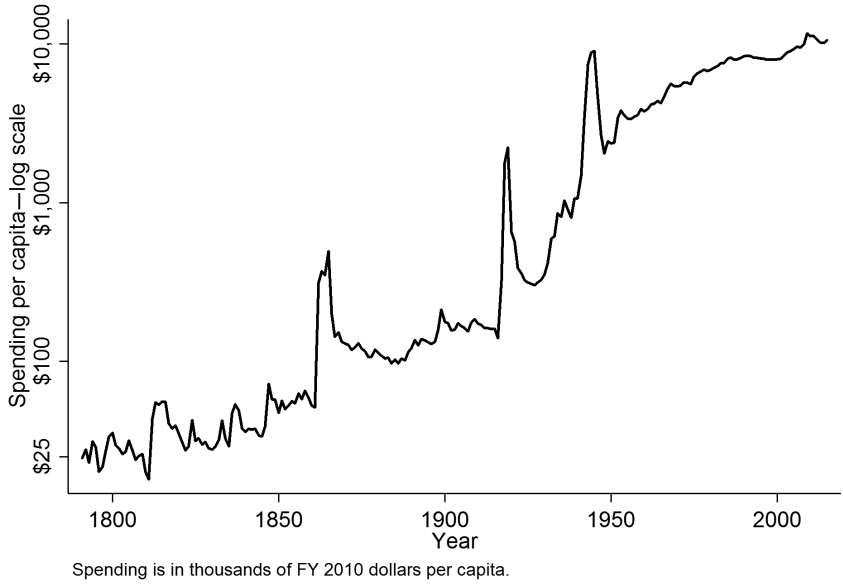
government to process information and allocate attention. We discuss this in more detail below.

Work done by a team of researchers analyzing budget data from seven Western democracies showed that all the national-level frequency distributions not only could be characterized as leptokurtic but also roughly described by a particular probability distribution: the Paretian, or power, function (Jones et al. 2009). Power functions are distinguished by a single parameter, the exponent, which indicates how punctuated the frequency distribution is, and this parameter can be recovered empirically in a straightforward manner. As a consequence, the investigators were able to compare the size of the exponents and relate them to a measure of institutional friction, or stickiness, among the democracies. The higher the levels of friction, the greater the extent of punctuations in the budget data. Although these results are consistent with the Punctuated Equilibrium Theory, it is worth noting that they challenge the standard view in the political economy literature of institutional friction inducing more policy stability (see, e.g., Tsebelis 2002). The stochastic process studies of public budgets indicate that friction does indeed lead to more stability but also to much more dramatic changes when priorities start to change.

Finally, Figure 2.4, showing annual spending in the US federal government adjusted for inflation and divided by population, addresses the issue of macro- and microlevel punctuations. We present the data on a log scale, so a consistent but straight upward slope represents a set percentage growth in the budget. The figure makes clear, however, that per capita spending goes through periods of relative stasis interrupted by major disruptions. At the outset of the series, spending was on the order of $25 per person; it moved temporarily to much higher levels during the War of 1812, was in the range of $30 to $50 until the Civil War, when it spiked dramatically again, then moved to a level of about $100 per person, where it stayed for several decades. This period of stability was interrupted by World War I, which inaugurated a period of steady growth in per capita spending, with huge spikes, of course, while the wars were engaged, but with spending remaining substantially higher after the wars than it was before. Spending in 1927 was just $300 per person, but it had increased by 1939 to $1,060. During World War II, spending reached $9,000 per capita, declined to $2,000 by 1948, and then increased relatively steadily to reach $12,000 in 2010. Of course, incomes rose dramatically during this time, especially during the post-1945 period. As a percentage of gross domestic product, federal spending was no higher in 2008 than it was in 1952 (about 20 percent).

Over the long haul, we can see that punctuations, along with long periods of relative stability, drive changes in the budget. At this level of aggregation, the disruptions associated with major wars seem to be the only catalysts that can shift our expectations of the role of government so completely. But more study is clearly needed to understand the complicated dynamics by which a war

FIGURE 2.4 U.S. Federal Government Outlays per Capita, 1791–2010



NOTES: Spending is in thousands of FY 2010 dollars per capita.
Level in 1791: $25 per person; 2010: $12,040 per person.

SOURCE: Historical Tables of the U.S. Budget, adjusted by the authors with census and CPI data.

creates new taxes and spending capacity; then, after the war is over, government settles into a pattern of spending perhaps twice as much as it did before the war.

PUNCTUATED EQUILIBRIUM THEORY IN COMPARATIVE PERSPECTIVE

The punctuated equilibrium model was originally developed to understand the dynamics of policy change in subsystems, but it has been extended to a more general formulation of punctuated change in policymaking. We have described the first tests of this more general formulation in the study of public budgeting. This testing has resulted in new insights into the process, including (1) an elaboration of an agenda-based, attention-driven budgeting model, (2) the generation of hypotheses concerning the distribution of annual budget changes and the reasons for its shape, and (3) empirical evidence that conforms to the new theory but is antithetical to the normal changes expected from incremental

theory or from most other budget theories. Punctuated equilibrium, rather than incrementalism alone, characterizes national budgeting in America and elsewhere, just as punctuated equilibrium, rather than gridlock or marginalism, characterizes overall policymaking in the American political system.

Founded on the bounded rationality of human decision making and on the nature of government institutions, punctuated equilibrium can make a strong claim that its propositions closely accord with what we have observed about US national policymaking. But how general are these dynamics? Do they hold across political systems? The ubiquity of serial attentiveness and organizational routines of operation leads us to expect that stability and punctuations are a feature of policymaking in many governments. At the same time, the institutional aspect of multiple venues interacts with boundedly rational decision making to make Punctuated Equilibrium Theory particularly apt for relatively open democracies. An important component of the initial formulation of the theory includes the multiple policymaking venues of American pluralism. The key questions are whether policy subsystems develop enough autonomy in other political systems to allow for independence from the central government and whether shifts in attention can act to change policymaking in those subsystems. It is likely that the processes of stability enforced by organizational routines interrupted by bursts of activity due to shifts in collective attention are general ones but that these processes are mediated by political institutions.

Where multiple venues occur as a consequence of institutional design, such as in federal systems, one would expect the dynamics of punctuated equilibrium to emerge. In the US Congress, committees are the linchpin of policy subsystems. There, overlapping committee jurisdictions offer opportunities for issue entrepreneurs to change jurisdictions by emphasizing particular issue characterizations (Baumgartner, Jones, and McLeod 2000). To what extent does this kind of dynamic extend beyond US policymaking organizations? Adam Sheingate (2000) has used the basic punctuated equilibrium concepts of policy image and venue shopping to study changes in agriculture policy in the European Union and the United States, and Sarah Pralle (2003) has studied environmental groups' exploitation of policy venues in forest policy in Canada and the United States. These systems have the requisite elements of openness and multiple venues. In the case of the European Union, the emergence of a strong central government from what previously were fully independent governments has offered students of public policy processes the opportunity to observe the effects of new venues in policy change. Princen and Rhinhard (2006, 1) write that "agenda setting in the EU takes place in two ways: 'from above,' through high-level political institutions urging EU action, and 'from below,' through policy experts formulating specific proposals in low-level groups and working parties." That is, the European Union has evolved into a set of policy subsystems that are important in making policy, but macrolevel

policymaking forces are also at play. Mark Schrad (2007, 2010) used the idea to explain the global wave of prohibition in Western countries in the early twentieth century. Graeme Boushey (2010, 2012) applies the theory to how policies diffuse across the US states.

These interacting venues operate in many ways similarly to the pluralistic policymaking system in the United States (Guiraudon 2000a, 2003; Wendon 1998; Mazey 1998; Mazey and Richardson 2001). Cichowski (2006) studied how women's groups and environmental groups use EU-level opportunity structures by bringing litigation before the European Court of Justice and engaging in transnational mobilization and organization in Brussels to participate in policymaking. But such venue shopping does not always aid disadvantaged groups. Guiraudon (2000a, 2000b) shows in a study of immigration policy in France, Germany and the Netherlands, and the European Union that simple expansion of the debate—for example, to the electoral arena—does not necessarily benefit the disadvantaged, as Schattschneider originally suggested. Losing in a narrow venue does not mean winning in a broader one; it could instead invite even bigger losses (see also Mortensen 2007, 2009). Moreover, when immigration rights organizations won victories in national courts, conservatives on the issue were able to appeal to the European Union and blunt their victories (see also Givens and Ludke 2004). The whole process of conflict expansion and venue shopping is more dynamic and uncertain than early conflict expansion literature suggested. Losers in one venue may also lose in the next.

If policymaking devolves to experts in all systems, then a key question is, When does the subsystem dominate, and when does the issue spill over into the broader macropolitical arena? Timmermans and Scholten (2006) suggest that, even in the technical arena of science policy in a smaller European parliamentary system—the Netherlands—this does occur, and again the dynamics are roughly similar to those highlighted in the American version of the punctuated equilibrium model. In a study of immigration policy, Scholten and Timmermans (2004) show that immigration policy is punctuated but damped down through the implementation process at the local level.

Punctuated-type dynamics also occur in other European countries. Maesschalck (2002), in a study of a major police failure in Belgium in the Dutroux child abuse scandal, shows that policymaking generated by scandal follows a conflict expansion model consistent with the punctuated equilibrium approach. This finding is no fluke. In a comprehensive study of Belgian public policy processes during the 1990s, Walgrave, Varone, and Dumont (2006) directly compare the party model with the issue expansion model. They note the ability of the Dutroux and other scandals to destabilize the system, basically disrupting the party-dominated policymaking system with highly emotive information that political elites cannot afford to ignore. Similarly, Peter John (2006a) finds that the interaction of media coverage and events is more

important in explaining major changes in budget commitment for urban affairs in the United Kingdom than are changes in party control.[4]

Cross-country studies of issue expansion offer the opportunity to examine how different institutional arrangements—that is, variations in the nature of political venues—affect the course of public policy. Timmermans (2001) examined cases of biomedical policy in four countries (Canada, the Netherlands, the United Kingdom, and Switzerland), finding that variation in arenas both at the macropolitical and policy subsystem levels had major effects on the tempo of agenda dynamics. Even where policy dynamics are broadly similar, as they seem to be in European democracies, the specific paths of policy development can be highly varied because of the operation of policy venues, particularly their interconnectedness with each other and with macropolitical forces.

In this enterprise, we need the qualitative studies of Pralle (2003), Princen and Rhinhard (2006), and Timmermans and Scholten (2006), as well as quantitative studies capable of tracing policy changes across longer periods. Such systematic investigations of the dynamics behind change and stability within particular policy domains have continued in recent years (see, e.g., Cashore and Howlett 2007; Busenberg 2011; Daviter 2009). In particular, many of these studies focus on how institutional structures permit change to occur and how the institutional structure influences the speed and magnitude of policy dynamics (e.g., Cashore and Howlett 2007; Mortensen 2005, 2007, 2009; Chaqués and Palau 2009).

THE COMPARATIVE POLICY AGENDAS PROJECT

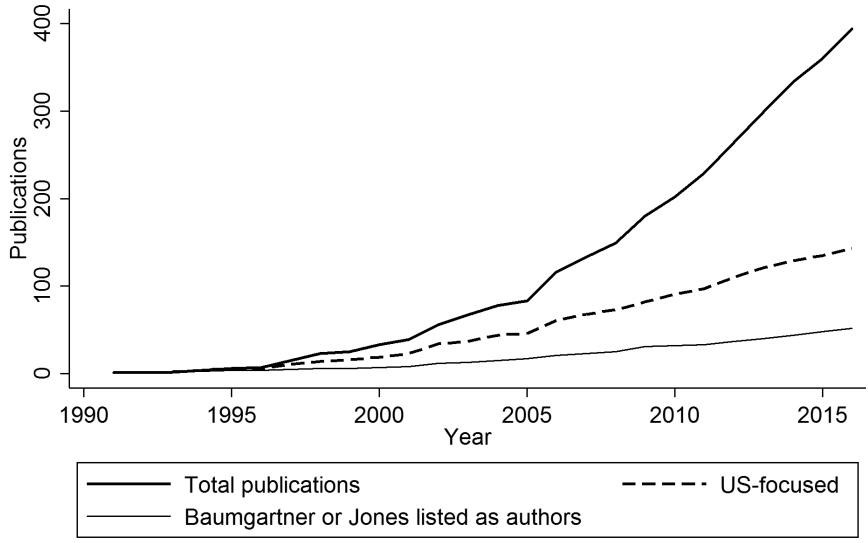
One of the major outcomes of the policy agenda setting research initiated by Baumgartner and Jones in the early 1990s is the development of an international community of scholars doing policy agendas research. Within this loosely structured Comparative Agendas Project (CAP), some scholars apply and extend PET to countries other than the United States, but many scholars also work with other theories and other research questions. What unites these scholars is the application of the measurement system originally developed to construct the databases of the US-based Policy Agendas Project, as later adjusted for comparative use (Jones 2016). Currently, the CAP project consists of fifteen country projects, with more in the pipeline. Every year in June the group of scholars organizes an annual meeting with around seventy participants on average. Whereas the range of theoretical approaches and research questions is broad, a main advantage from a comparative perspective is the strict enforcement across countries of a common measurement system. This is a necessary requisite for further development of comparative research. Another recent initiative to promote more comparative policy agenda setting research is the setup of a common webpage from which all country datasets can be downloaded and where students and researchers can easily conduct online analyses

of the data. CAP's website, www.comparativeagendas.net, is hosted by the University of Texas.

To give an impression of the scope and direction of research inspired by either PET or the methodological approach to agenda setting affiliated with the theory, we performed a set of systematic keyword searches in the major online bibliographic databases Scopus and ProQuest. The search strings were "punctuated equilibrium Jones Baumgartner," "disproportionate information processing Jones Baumgartner," and "agenda setting Jones Baumgartner." Publications just mentioning or briefly referring to the PET or the measurement system of CAP were then excluded. In the second round of searching, we supplemented this list of publications with more ad hoc online searches of relevant websites like the CAP and the European Union Policy Agendas Project (http://www.policyagendas.eu). In the third round, we circulated the list to Comparative Agendas Project scholars and asked them to identify whether some of their relevant publications were missing from the list. As of October 1, 2016, we ended up with a total of 393 relevant publications covering the period from 1991 to the present. For the full list of publications, see the online resources for this chapter at www.westviewpress.com/weible4e.

Figure 2.5 provides a sense of the growth in use of the theory and the measurement system over time. First, the figure inflects sharply upward after 2005,

FIGURE 2.5 Punctuated Equilibrium Articles over Time



Source: Authors' search of the literature.

clearly justifying this update in the assessment of the literature on Punctuated Equilibrium Theory. Second, perhaps the most noteworthy change since the first edition of this book is the marked increase in the number of publications using non-US data. The number of US studies has also increased over the years, but a total of 65 percent of all empirical studies before 2006 were based solely on US data, whereas the equivalent number is reduced to 36 percent for studies published after 2005. The bulk of the studies now focuses on political systems outside the United States. Third, the two most senior authors of this chapter were listed as coauthors for 21 percent of the publications in the early period, but for only 11 percent of those after 2005. Finally, although the figure does not represent this finding, the literature is highly empirical: our review showed just 18 review articles (such as this one), 39 purely theoretical treatments, and 336 empirical works; this last category represents 86 percent of the publications in the field. Table 2.1 shows the journals in which these articles have appeared. This list makes several things clear, particularly the importance of comparative work on the topic. The literature is well established in both US-based and comparative journals. Ninety different journals are represented in the list, including virtually all the major disciplinary journals as well as those focused on public policy, public administration, and US and comparative politics.

The dramatic increase in comparative use of the ideas and policy agenda setting approach associated with the PET is a remarkable development given the initial response to what some perceived as a peculiarly American focus in Baumgartner and Jones's *Agendas and Instability in American Politics,* with its notions of venue shopping in the complicated US system of separation of powers, federalism, and weak political parties. Surely, some surmised, things must be different in more centralized systems with more disciplined political parties. Although many things are indeed different in each political system, the basic limits of human cognition, organizational capacity, and attention at the core of PET give the theory a potential for universal application.

The increase in the number of publications around 2006 coincides with the development of the network of the comparative policy agendas project formed around independent country projects. An overview of the country projects and databases can be found at www.comparativeagendas.net. We've already noted the importance of these databases in the study of public budgeting, but they are critical in tracing changes in policy images and outputs over time.

In Denmark, Christoffer Green-Pedersen and his collaborators have traced the comparative policy dynamics of issues in more than one country, including tobacco policy in Denmark and the United States (Albaek, Green-Pedersen, and Nielsen 2007), euthanasia in Denmark, Belgium, and the Netherlands (Green-Pedersen 2004), and health care in Denmark and the United States (Green-Pedersen and Wilkerson 2006). Green-Pedersen and Mortensen (2010) provided a key insight into the roles of the parliamentary opposition in defining the political agenda in Denmark, discerning both the limits of strategic

TABLE 2.1 Journals in Which Punctuated Equilibrium Articles Have Been Published

Journal	Articles
Policy Studies Journal	59
Journal of European Public Policy	23
Journal of Public Policy	17
American Journal of Political Science	11
West European Politics	11
Policy Sciences	9
Review of Policy Research	9
European Journal of Political Research	8
Governance	8
Political Communication	8
Comparative Political Studies	7
Journal of Public Administration Research and Theory	7
Political Studies	7
Public Administration	7
British Journal of Political Science	6
Canadian Journal of Public Policy	6
Political Research Quarterly	6
Party Politics	5
Journal of Politics	5
Urban Affairs Review	4
American Political Science Review	3
Public Administration Review	3
Scandinavian Political Studies	3
Public Budgeting and Finance	3
Sixty-eight other journals, combined	82
Nonjournal publications	76
Total publications	393

agenda setting available to the government and the power of the opposition to focus attention in those areas the government might prefer to avoid (see also Green-Pedersen and Mortensen 2015).

Similar dynamics are key to Walgrave, Lefevere, and Nuytemans's (2009) discussion of Belgian media coverage of politics. In Canada, Stuart Soroka and

associated researchers have used parliamentary question periods as prime indicators of agenda setting and conflict expansion and have examined in detail the relative roles of public opinion and the media in the agenda setting process (Soroka 2002; Penner, Blidock, and Soroka 2006). The mechanisms of issue expansion and policy development are broadly similar in different democratic political systems, even though they may play out differently as they are channeled through different decision making institutions.

In an edited book (Engeli, Green-Pedersen, and Larsen 2012), scholars analyze morality politics through focused case comparisons of the treatment of such issues as euthanasia, abortion, and in vitro fertilization in the United States and several Western European countries. Most recently, Green-Pedersen and Walgrave (2014) have edited a book bringing together more quantitative findings from the Comparative Agendas Project in Europe to develop a theory not only of policy agendas and agenda setting but also of the dynamics of institutional evolution more generally. Peter John et al. (2013) have recently developed a similar argument about the development of UK politics from 1945 to present. John and Jennings's (2010) article had already discussed some of these findings with reference to punctuated changes in governmental attention, often unrelated to electoral turnover. Chaqués-Bonafont, Palau, and Baumgartner (2015) review recent Spanish political history through the lens of the Spanish agendas project and document a range of new findings.

But there is a further complication. Part of any differences in policies between countries may be attributed to differences in the mobilization of actors and the subsequent timing and sequencing of events. Consequently, even differences in policies between countries cannot necessarily be attributed to differences in institutions, as Pralle (2006) has shown in a case study of lawn pesticide policy in Canada and the United States. Jumping to the conclusion that Canada provides a more receptive venue for pesticide regulation might not be warranted without a study of the dynamics of political choice.

The punctuated equilibrium model is also proving useful in understanding relations among nations, such as in protracted interstate rivalries (Cioffi-Revilla 1998), the role of norms in international politics (Goertz 2003), and agenda setting in global disease control (Shiftman 2003; Shiftman, Beer, and Wu 2002). The latter study compared three models of policymaking—the incrementalist, the rationalist, and punctuated equilibrium—and found "a more complex pattern in which interventions are available only to select populations, punctuated with bursts of attention as these interventions spread across the globe in concentrated periods of time" (Shiftman, Beer, and Wu 2002, 225).

The Goertz work is particularly important because its analysis is based in organizational analysis, the general basis for punctuated equilibrium in US domestic policies. Goertz focuses on the development and change of organizational routines as critical in governing relations among nations. As in the case of comparative politics, it is critical in the future to begin to understand which

aspects of policymaking result from more general dynamics based in human cognition and organizational behavior and which relate to the particulars of the institutions under study. Such considerations move us beyond the confines of theories for institutions and toward a more general theory of the interaction of humans in organizations.

Examinations of the role of political parties with regard to stability and change in agendas and public policy represent another new research area—one that is probably a consequence of the expansion of the Punctuated Equilibrium Theory into non-US countries, where political parties traditionally have played a much more prominent role in the analysis of politics than they have in the United States. Two subthemes can be identified within this research agenda. One track offers a new approach to the classic question about the importance of elections and changes in the partisan composition of governments as drivers of policy and agenda changes. This perspective challenges the "politics matter" perspective, which has generally been restricted to looking for election and partisan effects along the left-right dimension. Approaching the question at the issue level, as is characteristic of PET studies, not only offers a fresh and more detailed look at the election-based explanations of change but also challenges conventional wisdom about the importance of elections and ideology as explanations of change. Thus, Mortensen et al. (2011), for instance, in a study of change and stability in government agendas across three different countries and several decades, conclude that there is no evidence that elections, changes in government colors, or changes of prime minister systematically affect the level of change and stability in government agendas. Furthermore, this finding corresponds with studies of agenda setting in France (Baumgartner, Grossman, et al. 2009), the United States (Jones and Baumgartner 2005, 84–85), and the United Kingdom (John and Jennings 2010). Agendas do change over time, but the timing of such changes is not closely related to elections or shifts of governments. To understand these changes requires more elaborate theoretical models about how governments respond to and process new information about changes in their environment (Jones and Baumgartner 2005; Baumgartner, Jones, and Wilkerson 2011; Mortensen et al. 2011).

The other subtheme within this new research agenda on political parties regards how political parties compete with each other when trying to set the political agenda. Though most scholars acknowledge that parties do respond to their competitors' attention to issues, the dominant theoretical accounts (e.g., Budge and Hofferbert 1990; Budge and Farlie 1983; Petrocik 1996; Simon 2002) have had much more to say about ignorance and selective issue emphases than about issue overlap and responsiveness. Inspired by agenda setting research and utilizing the systematic topics coding of political attention developed in the Comparative Agendas Project, recent agenda setting studies have started to challenge the conventional understanding of selective issue emphasis and show how political parties to a large extent do respond to each other instead

of simply talking past each other on different issues (Vliegenthart and Walgrave 2011). Furthermore, the literature has started to investigate the unequal agenda setting power of different political parties to improve the understanding of how and why political agendas change (Vliegenthart, Walgrave, and Meppelink 2011; Green-Pedersen and Mortensen 2010, 2015; Mortensen and Green-Pedersen 2015).

Finally, the European Union Policy Agendas Project represents an important development in which a number of researchers have utilized the topics coding system to systematically trace change and stability in attention to policy issues in the European Union and its institutions (see, e.g., Princen 2009, 2013; Alexandrova and Timmermans 2013; Alexandrova 2015, 2016). Central questions within this research agenda regard which issues feature on the EU agenda at specific points, how the definitions of issues change, and which factors drive the formation of EU priorities. In the next years, we have no doubt that many of the most important studies of policy agendas and the further elaborations of PET will come from the EU and related policy agenda projects worldwide. The vast data infrastructure that has been created and that continues to grow provides both the opportunity to test new theoretical questions and the scientific venue for the development of new ideas.

CONCLUSION

The initial theory of punctuated equilibrium in policy processes is applicable to the dynamics of the specialized politics of policy subsystems. It has proved useful enough that scholars have employed it to understand a variety of policymaking situations in the United States and abroad. It has proved robust enough to survive several rigorous quantitative and qualitative tests. It has spawned a new approach to the study of public budgeting based in stochastic processes, and it hence has satisfied the criterion that any theory be not only verifiable but also fruitful in suggesting new lines of inquiry.

It has also led to considerable discussion among policy practitioners. In his call to action on environmental change, *Red Sky at Morning,* Gustave Speth (2004) cites Punctuated Equilibrium Theory as a policy analysis that can lead to rapid, correcting change in the face of accumulating factual evidence. *Theories of the Policy Process* aims to supply better theory in the study of policy processes, and better applied work on policy change will occur with better theory; indeed, there is no substitute for this.

The formulation of the theory in stochastic process terms has made it possible to compare policy process theories with general formulations of human dynamic processes. Punctuated dynamics, in which any activity consists of long periods of stability interspersed with bursts of frenetic activity, may be the general case in human systems. For example, Barabasi (2005) shows that when humans prioritize incoming information for action, the distribution of

waiting times for action on the information is "heavy tailed"—that is, leptokurtic. When prioritization is not practiced and inputs are instead subject to random choice for processing, the distribution is not fat tailed.[5] The policy processes we study fundamentally involve prioritization, although they are much more complex than Barabasi's waiting-time studies. Perhaps the key to these distributional similarities is in setting priorities. If so, then punctuated dynamics may be a direct consequence of disproportionate information processing, in which people and the organizations they inhabit struggle to prioritize informational signals from the environment within a particular institutional frame or structure (Jones and Baumgartner 2005).

The utility of Punctuated Equilibrium Theory and its agreement with what is observed come at a price. The complexity and changing interactions of the American policy process mean that accurate policy predictions will be limited to the system level. Specific predictions about policy outcomes are possible only to the extent that we are able to avoid positive feedback and punctuations when we choose areas and periods for study or that we limit our "predictions" to what we can know, after the fact, were successful mobilizations. Nonlinearity, nonnormality, interdependencies, and high levels of aggregation for empirical data mean that clear causal chains and precise predictions work only in some cases and during some times. Because stasis characterizes most of the cases and most of the times, scholars may be convinced that they have a good working model of the process. But a complete model will not be locally predictable because we cannot foresee the timing or the outcomes of the punctuations.

What will cause the next big shift in attention, change in dimension, or new frame of reference? Immersion in a policy or issue area may lead to inferences about pressures for change, but when will the next attention shift occur in a particular policy area? At the systems level, punctuated equilibrium, as a theory, leads us to expect that some policy punctuation is under way almost all of the time. And the theory joins institutional settings and decision making processes to predict that the magnitude of local changes will be related to their systems-level frequency of occurrence. Punctuated Equilibrium Theory predicts a form of systems-level stability, but it will not help us make point-specific predictions for particular policy issues, unless we look only during periods of stability.

We can have a systems-level model of the policy process even without an individual-level model for each policy. Linear predictions about the details of future policies will fail each time they meet an unforeseen punctuation; they will succeed as long as the parameters of the test coincide with periods of equilibrium. This limitation means that it will be tempting to offer models applicable only to the more easily testable and confirmable periods of relative stability. Or investigators will focus on big changes and work backward from them to try to explain the case. This approach is subject to the fallacy of attributing causality to spurious factors. In our view, a clearer, more complete, and

more empirically accurate theoretical lens is that of punctuated equilibrium, especially in its more general form, which integrates large policy changes with periods of stability.

NOTES

1. Special issues of the following journals have also appeared: *Policy Studies Journal* 41, no. 1 (2012); *Comparative Political Studies* 44, no. 8 (2011); and *Journal of European Public Policy* 13, no. 7 (2006).

2. Punctuated equilibrium was first advanced as an explanation for the development of differences among species, or speciation (Eldridge and Gould 1972; Raup 1991). Rather than changing smoothly and slowly, as in the later Darwinian models, evolution and speciation were better characterized as a near stasis punctuated by large-scale extinctions and replacements. For example, there was a virtual explosion of diversity of life in the Precambrian period, an explosion that has never been repeated on such an immense scale (Gould 1989). The notion has been vigorously contested by evolutionary biologists, who claim that disconnects in evolution are not possible (although variations in the pace of evolution clearly are) (Dawkins 1996). Interestingly, some of these scholars have argued that consciousness makes possible punctuations in human cultural evolution; what cannot occur via genes can occur via memes (Dawkins's term for the transmitters of cultural adaptive advantage) (Dawkins 1989; see also Boyd and Richerson 1985).

3. Whether we plot percentage changes, first differences, or changes in logged data, the distributions are leptokurtic and not normal. When we compare annual changes in budget authority for functions and subfunctions, the characteristic leptokurtosis remains, although the subfunctions are more leptokurtic than the functions. When we plot the distribution of annual changes by agency, leptokurtosis remains. We examined plots of the following: subfunction budget outlay data, 1962–1994; subfunction budget authority data, 1976–1994; and agency-level budget authority data, 1976–1994. All exhibited leptokurtosis.

4. Punctuated equilibrium has also proved useful in understanding stability and change in British trunk roads policy (Dudley and Richardson 1996).

5. Prioritization results in a Pareto distribution of waiting times, whereas random processing results in an exponential distribution (Barabasi 2005).

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