

Punctuated-Equilibrium Theory

Explaining Stability and Change in Public Policymaking

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Punctuated-equilibrium theory seeks to explain a simple observation: Political processes are generally characterized by stability and incrementalism, but occasionally they 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 change. Important governmental programs are sometimes altered dramatically, even if most of the time they continue as they did in the previous year. While both stability and change are important elements of the policy process, most policy models have been designed to explain, or at least have been most successful at explaining, 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 punctuated equilibrium was developed. Scholars around the world have confirmed aspects of the theory in a number of advanced democracies. In this

chapter, we review the basic aspects of punctuated equilibrium, review new empirical studies in the US and elsewhere, and discuss new theoretical developments. These developments have broadened PET to incorporate a general theory of information processing in the policy process, a process that fails to deal smoothly and seamlessly with new information but rather falls prey to sporadic punctuations.

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 proceed smoothly with marginal, or incremental, accommodations, it also is regularly torn by lurches and significant departures from the incremental past (Kingdon, 1984, 1985/1995; Baumgartner and Jones, 1991, 1993; Dodd, 1994; Kelly, 1994). A unifying theme of these approaches is that we observe the same institutional system of government organizations and rules producing 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 decisionmaking. 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 as issues rise and fall in the public agenda, existing policies can be either reinforced or questioned. Reinforcement creates great obstacles to anything but modest change, but the questioning of policies at the most fundamental levels creates opportunities for major reversals in policy outcomes.

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 punctuated-equilibrium approach. However, if we add the simple 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. Since agenda-setting theory always rested on such a decision-making foundation, punctuated equilibrium theory simply extends current agenda-setting theories to deal with both policy stasis, or incrementalism, and policy punctuations.

For the authors of this chapter, the clearest explanation for both marginal and large-scale policy changes comes from the interaction of multilevel political institutions and behavioral decisionmaking, a combination that creates patterns of stability and mobilization or punctuated equilibria.¹ In this chapter, we examine punctuated equilibrium theory and its foundations in the longitudinal study of political institutions and in political decisionmaking (for other reviews, see John 2006a; Robinson 2005, 2006; McFarland, 2004, puts the theory in the context of the development of pluralism as a theory of policy processes). Next, we extend the punctuated-equilibrium 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. We conclude with an assessment of the strengths and weaknesses of this approach to understanding public policymaking.

Punctuated Equilibria in Public Policymaking

Since the path-breaking work of E. E. Schattschneider (1960), theories of conflict expansion and agenda setting have stressed the difficulty that disfavored groups and new ideas have in breaking through the established system of policymaking (Cobb and Elder, 1983; Cobb and Ross 1997; Bosso, 1987). As opposed to smooth, moderate adjustments to changing circumstances, the conservative nature of national political systems often favor the status quo, thereby making conflict or an extraordinary effort necessary for a major change.

When Baumgartner and Jones (1993) analyzed a number of US policymaking cases over time and over a variety of issue areas, they found (1) that policymaking both makes leaps and undergoes periods of near stasis as issues emerge on and recede from the public agenda; (2) that this tendency toward punctuated equilibria is exacerbated by American political institutions; and (3) that 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 combined to create a dynamic between the politics of subsystems and the macropolitics of Congress and the presidency—a dynamic that usually worked against any impetus for change but occasionally reinforces it. For example, mobilizations were often required to overcome entrenched interests, but once under way, they sometimes engendered 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 if established interests are to be overcome. The result over time 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 macropolitics. 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.

Punctuated equilibrium theory began with a long-term analysis of American national policymaking, but its features have been useful in understanding public policymaking more generally. The theory focuses on the interaction of political institutions, interest mobilizations, and boundedly rational decisionmaking. And the dynamics of the interplay among institutions, interests, and attentiveness have been usefully applied to other advanced democracies as well as a variety of other policymaking venues. Many governments in the 21st century shoulder a wide variety of responsibilities and face an array of problems and policies seeking space on their institutional agendas. They have coped by evolving into interactive complex systems of several levels.

No political system features continuous discussion over 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 be disintegrating over time, or may be building 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, p. 6). Whatever the 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 of experts. Nonetheless, within the spotlight of macropolitics, 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.

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 processing and serial processing in individual and organizational decisionmaking. Individuals devote conscious attention to but one thing at a time. Organizations are somewhat more flexible. Some decision structures are capable of handling many issues simultaneously, in parallel. Others handle issues seriatim, one or a few at a time. Political systems, like humans, cannot simultaneously consider all the issues that face them, so the existence of some form of policy subsystems can be viewed as a mechanism that allows 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.

This equilibrium of interests does not completely lock out change. Issue processing within subsystems allows for a politics of adjustment, with incremental change resulting from bargaining among interests and marginal moves in response to changing circumstances. But parallel processing does operate against larger policy changes, because it tends to be insulated from the glare of publicity associated with high-agenda politics.

Sometimes the parallel processing of issues breaks down, and they must be handled serially. In the US, the macropolitical institutions of Congress and the public presidency constitute governmental serial processing where high-profile issues are considered, contended over, and decided one at a time or, at most, a few at a time. When an issue moves higher on the political agenda, it is usually because new participants have become interested in the debate: “When a policy shifts to the macropolitical 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, p. 185). It is then that major changes tend to occur. Issues cannot forever be considered within the confines of a policy subsystem; occasionally macropolitical forces intervene. It is the intersection of the parallel processing capabilities of the policy subsystems and the serial processing needs of the macropolitical system that 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 decisionmaking stage. But this access is a precondition for major policy punctuations.

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, pp. 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 they 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 as new dimensions of the debate become more salient, new actors feel qualified to exert their authority where previously they stayed away. These new actors may insist on rewriting the rules, and on changing the balance of power that 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 recedes back off the agenda and into the parallel processing of a (newly altered) policy community.

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 the 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. We use terms like ‘feeding frenzy’ and ‘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 such positive feedbacks. Physical phenomena like earthquakes can result from fairly modest changes. Pressure from inside the earth can build up over time, causing the tectonic plates on the earth’s surface to shift violently, resulting in an earthquake. If we drop grains of sand slowly and constantly on a small pile of sand in a laboratory, the result is not small changes in the sandpile, but landslides. Many of these landslides are small, but some are huge (Bak and Chen 1991; Bak 1997). So a landslide need not be caused by a large scale event; it may be caused by the slow and steady build-up of very small changes. Like earthquakes or landslides, policy punctuations can be precipitated by a mighty blow, an event that simply cannot be ignored, or by relatively minor events that add up over longer periods of time. What determines whether an issue will catch fire with positive feedback or not? The interaction of changing images and venues of public policies does.

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, but during that period of time the Lyndon 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 focus their attention on the crime problem. As Figure 5.1 shows, three important measures of attention and agenda access came into phase all at once: press coverage of crime stories, the proportion of Americans saying that crime was the most important problem facing the nation (MIP), 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 phase, going their own ways, and crime policy moved back into the subsystem arena. It is not possible to say which of the three variables is the primary cause; all three are intertwined in a complex positive feedback process. During this period, Omnibus Crime Control and Safe Streets Act was passed, then budgetary commitment punctuated as a consequence.

In a classic pattern, public attention to crime jumped; press coverage focused on the problem; 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.

[Figure 5.1 about here]

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 it 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 of images. 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, pp. 25–28, 59–82). As we see in the next section, Jones (1994) further analyzed 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 decisionmaking 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 case. Not only do federalism, separation of powers, and jurisdictional overlaps inhibit major changes during periods of negative feedback, but they also mean that a mobilization stymied in one venue may be successful in another. A problem that has not advanced onto the national agenda can sometimes be acted on by the states, and vice versa. The U.S. 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) studies the interaction of justices' priorities, litigant strategies, and agenda-setting. Baird wants to know what dynamics underlie the movement of the Supreme Court into areas of policy they 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 decisionmaking 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 (except perhaps for the annual marginal increase in the budget) until a political mobilization, advancement on the governmental agenda, and positive feedback occurs. At that point, issues spill over into the macropolitical system, making possible major change.

Punctuated equilibrium seems to be a general characteristic of policymaking in the US. Rigorous qualitative and quantitative studies again and again find strong evidence of the process, including in 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 regulating 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, finding substantial variation in the ability of actors 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 approach (Sabatier and Jenkins-Smith, Chapter 6, this volume) has shown that opposing groups can modify certain elements of their belief structures through policy learning that is born of continual interactions within policy subsystems. This can lead to substantial compromise and important changes in public policy. It is possible that this belief-adjusting process can lead to dampening down of policy punctuations based in appeals of the disaffected from subsystems. 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 we return to later in this chapter.

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; Jones, Baumgartner, and True, 1996).

Boundedly Rational Foundations and the Centrality of Decisionmaking

Embedded in the punctuated-equilibrium theory of policy change is an implicit theory of individual and collective decisionmaking. From a decisionmaking perspective, large-scale punctuations in policy spring from either a change in preferences or a change in 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) explained “bursts” of change and policy punctuations as arising from the interactions of images and institutions. When an agreed-upon 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 decisionmaking, 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.

Jones (1994) 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 called such rapid changes “serial shifts.” Individually, our 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). This means that although reality may be

complex, changing, and multifaceted, we cannot smoothly integrate competing concerns and perspectives. We focus usually 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, 1996).

More generally, bounded rationality undergirds all policy change, because the mechanisms associated with human cognitive architecture is also a 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 they emphasize different aspects of the process. Punctuated equilibrium is based in serial processing of information and the consequent attention shifts, while 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) (1966, pp. 537–542). Except for these punctuations, these 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 decisionmaking 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 decisionmaking 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 decisionmaking 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 decisionmaking (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.

Punctuations and Stability in U.S. Government Spending

We have recently extended the punctuated-equilibrium theory to produce an agenda-based model of national budgeting (Jones, Baumgartner, and True, 1995, 1996, 1998; True 2000; Jones, Sulkin and Larsen 2003; Jones and Baumgartner 2005). Its foundation remains the boundedly rational process of human decisionmaking interacting with disaggregated political institutions, specifically serial attentiveness and parallel subsystems. Collectively, government

decisionmakers 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 into large changes.

National budget decisions are as boundedly rational as the policymaking decisions discussed above. Choice situations are multifaceted, yet decisionmakers tend to understand choices in terms of a circumscribed set of attributes, and they tend to have considerable difficulties in 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 in the forefront of decisionmakers' attention. If attentiveness to these two dimensions were to shift—say as a result of scandal or changes in the composition of the group of decisionmakers, as sometimes occurs—then the chosen policy might shift dramatically as well. In general terms, Jones (1996, 2001) noted that decisionmakers tend to stick with a particular decision design (a term that refers to the attributes used in structuring a choice) until forced to reevaluate the decision design.

Budgets react to both endogenous and exogenous forces. The forces that might cause a change in the decision design may be external to the decisionmaker. Such influences may include changing levels of public attention, striking and compelling new information, or turnover in the composition of the decisionmaking body (say, when an election changes control of Congress, and when 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 in choice. Yet subsystem politics and the bureaucratic regularity of annual budget submissions constitute endogenous forces that tend to favor continuing with the same decision design. As a consequence, budget decisions tend either to be 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 decisionmaking 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 tends to reassert itself after the punctuation).

Punctuated equilibrium's attention-driven, agenda-based budget model encompasses both periods of punctuation and periods of stability. This view of the budget process leads us to expect that annual budget changes within a given spending category should 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 (Jones et al., 1996; True 2000).

The model implies that punctuations ought to occur at all levels of policymaking and at all levels of the budget, not to 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 et al., 1996, 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 from within those institutions will 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, in the empirical and theoretical literature on public budgeting there is ample precedent to expect budget punctuations, beginning as shown above with Davis, Dempster, and Wildavsky (1966). Their studies focused on the use by decisionmakers of budget decision rules. These rules, understood by participants and offering a stable organizational environment for decisionmaking, were based on the concepts of base and fair share, which led to incrementalism in both process and output. But these authors 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” (Davis et al., 1974, p. 427). Exogenously caused punctuations in budget results are consistent with 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. In addition to the authors cited above, such models are also suggested 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) or, alternatively, both responding to opinion and causing changes in opinion through a thermostat-like device (Wlezien, 1995). 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) approached budgeting from a perspective of nonlinear dynamics, incorporating both linear and nonlinear processes. They 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” (Kiel and Elliott, 1992, p. 143). Nonlinear, interactive processes imply occasional punctuations. Thurmaier (1995) reported the results of experiments in budget scenarios in which decisionmakers 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 had the dissolution of the Soviet Union. The case for both endogenous and exogenous influences on national budgets seems to be a strong one.

Most modern work in this area (including our own) must reckon with the seminal work of John Padgett (1980, 1981) on budget decisionmaking. Padgett’s serial judgment model of the budget process implies “the occasional occurrence of very radical changes” (1980, p. 366). 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 all three sets of authors have suggested punctuations in the budget process. The “earthquake” budget model alone, however, ties budget making both to an

embedded cognitive decision theory and to 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 et al., 1995, 1996).

Because we expect budgets generally to change very little, but occasionally to change a great deal, we hypothesize that 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 the 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 et al., 1966; Padgett, 1980; for a careful examination of univariate distributions, see Johnson, Kotz, and Balakrishnan, 1994).

Because we expect the dynamics of budget decisionmaking to occur at all levels, we hypothesize scale invariance. That is, we expected 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 et al. (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), or Blais, Blake, and Dion (1993) depend upon 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, and indeed most regression analyses and analyses of variance depend upon 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 earlier 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 data set of US budget authority for Office of Management and Budget (OMB) subfunctions from fiscal year 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 upon estimates for trust fund spending. And budget authority is closer to the congressional decisionmaking process than outlay data, which can be delayed for several years after the decision has been made. We constructed the relevant estimates from original contemporary budgets based upon 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 2003, we get the distribution shown in the histogram in Figure 5.2. 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 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 when we drop the top 5 percent of the outliers when computing the normal curve.²

[Figure 5.2 about here]

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 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 punctuated equilibrium incorporates.

How general is the finding of punctuated, non-incremental 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 Koske (2005) 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 (John and Margetts 2003; Soroka, Wlezien, and McLean 2006), Denmark (Breunig 2006; Mortensen 2005), Germany (Breunig 2006), France (Baumgartner, Francois, and Foucault 2006), and Belgium (Walgrave 2005). Figure 5.3, reproduced from the work of Breunig and Koske (2005), shows the distribution of budgets in states; in its basics, it closely resembles Figure 5.1.

[Figure 5.3 about here]

The pattern persists in centralized democracies as well as more pluralistic ones such as the United States. Figure 5.4 shows the distribution of annual changes in ministerial funding in France, and it closely resembles Figure 5.2 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, but don’t escape the process—because it is rooted in the capacities of government to process information and allocate attention. We discuss this in more detail below.

[Figure 5.4 about here]

How General is Punctuated Equilibrium?

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 above the first tests of this more general formulation in the study of public budgeting. This has resulted in new insights to 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 its underlying structure; and (3) empirical evidence that conforms to the new theory but that 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 decisionmaking 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 lead 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 decisionmaking to make punctuated equilibrium theory particularly apt for relatively open democracies. An

important component of the initial formulation of the theory is 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 to occur, and whether shifts in attention can act to change policymaking in those subsystems. It is likely that the general process 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 US, and Sarah Pralle (2003) studied the exploitation of policy venues in forest policy in Canada and the US by environmental groups. 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

EU has evolved into a set of policy subsystems that are important in making policy, but there are also macrolevel policymaking forces at play.

These interacting venues operate in a manner in many ways similar to the pluralistic policymaking system in the US (Guiraudon 2000a, 2003, Wendon 1998; Mazey 1998; Mazey and Richardson 2001). Cichowski (2006) studied how women's groups and environmental groups are utilizing EU level opportunity structures by bringing litigation before the European Court of Justice and engaging in transnational mobilization and organizing in Brussels to participate in policy making. 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 conflict 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 invite even bigger losses. Moreover, when immigration rights organizations won victories in national courts, conservatives on the issue were able to appeal to the EU 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.

If policymaking devolves to experts in all systems, then a key question is the extent to which the subsystem always dominates politics or whether at times the issue spills over into the broader macropolitical arena. Timmermans and Scholten (2006) suggests that even in the technical arena of science policy in a smaller European parliamentary system—the Netherlands—that 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 is 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 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 (2006) finds that the interaction of media coverage and events are more important in explaining major changes in budget commitment for urban affairs in the UK than changes in party control. 3

Cross-country studies of issue expansion offer the opportunity to examine how different institutional arrangements—that is, variation in the nature of political venues—affect the course of public policy. Timmermans examined cases of biomedical policy in four countries (Canada, Netherlands, Norway and Switzerland), finding that variation in arenas both at the macropolitical and policy subsystem level 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, in particular, their interconnectedness with each other and with macropolitical forces.

This line of research implies that it will be critical in the future to pin down the particular dynamics that lead to roughly similar policymaking patterns. We can only understand the manner in which institutional differences channel policymaking activities by the kind of comparative studies that these papers represent.

Quantitative Comparative Studies of Policy Dynamics

In this enterprise, we need both the qualitative studies of Pralle, Princen and Rhinhard, and Timmermans and Scholten and quantitative studies capable of tracing policy changes across longer periods of time. For the United States, the Policy Agendas Project, housed at the University of Washington and Penn State University and funded by the National Science Foundation is providing this resource (see <http://www.policyagendas.org/>). Several important database development projects are becoming available to just this kind of analysis, including in Denmark under the direction of Christoffer Green-Pederson of the University of Aarhus (<http://www.ps.au.dk/greenp/Research/Agenda.htm>); Stuart Soroka and Chris Wlezien's work on Canada and the UK (<http://www.degreesofdemocracy.mcgill.ca/>) and Steffan Walgrave's work on Belgium (<http://www.ua.ac.be/main.aspx?c=m2p>). At the American state level, Joseph McLaughlin of Temple University is developing a policy dynamics-style database system for the state of Pennsylvania (http://www.temple.edu/ipa/Research/Policy_Agendas.asp). The Pennsylvania project also has a practical side: the system is being adopted by the state as an archiving tool.

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-Pederson and his collaborators have traced the comparative policy dynamics

of issues in more than one country, including following tobacco policy in Denmark and the US (Albaek, Green-Pederson, and Neilson 2005), euthanasia in Denmark, Belgium, and the Netherlands (Green-Pederson 2004), and health care in Denmark and the US (Green-Pederson and Wilkerson 2006). In Canada, Stuart Soroka and his research team have used parliamentary question periods as prime indicators of agenda-setting and conflict expansion, and has 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 if they play out differently as they are channeled through different decision-making institutions.

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, meaning that 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 US. 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.

Finally, the punctuated-equilibrium model is proving useful in understanding relations among nations, such as in protracted interstate rivalries (Cioffi-Revilla, 1997), 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, “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.”

The Goertz work is particularly important because its analysis is based in organizational analysis, which also is the general basis of 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 are due to more general dynamics based in human cognition and organizational behavior and which are due 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.

The General Punctuation Hypothesis

Punctuated equilibrium in policy studies applies to a particular situation—where political conflict is expanded beyond the confines of expert-dominated policy subsystems to other policymaking venues. It relies on the mechanisms 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 in

order 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 means that policy outputs will be more punctuated than the information coming into government. In stochastic process terms, outputs are more leptokurtic than inputs. Since 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 any of several output distributions, such as public laws and public budgets. Outputs are more punctuated, characterized by stability interspersed by bursts of activity, than agenda-setting distributions.

Policy making 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 institutional 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.

Information Processing

With its foundations in both political institutions and boundedly rational decisionmaking, Punctuated equilibrium theory is at base a theory of organizational information processing. Governments are complex organizations, and act on the flow of information in producing public policies. 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 to changes in the flow of information coming in to a policymaking system from the environment and overreaction to it (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 of time. 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 that are responsible for policymaking.

One would expect, then, for a policymaking system 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 adjustment

of a policy system may be gauged by a comparison of its distribution of policy outputs and 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 efficient adjustment to environmental demands).

Using this framework, Robinson (2004) finds that more bureaucratic school systems adjust their expenditures to fiscal reality than do less bureaucratic ones—presumably because bureaucracy enhances information acquisition and processing. Breunig and Koske (2005) find that states with stronger chief executives are subject to attenuated budgetary punctuations, and Berkman and Reenock (2004) show that incremental adjustments in state administrative reorganizations can act to 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.

Complex interactions, however, cannot be confined to activity within fixed institutional frameworks. It must be the case that the entire policymaking system can evolve; the pieces of the system, in effect, can feed back into the whole actually changing the decision-making structure that acted as policy venues in the first place. Richardson (2000) argues that this is happening in European policymaking at the present time. This sort of very difficult dynamics is only now being explored, but the framework we've set forth in this chapter can serve as a starting point for a problem only amenable when policymaking is viewed as a complex, evolving system.

Concluding Comments

The initial theory of punctuated equilibrium in policy processes applied 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 US 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 hence has satisfied the criterion that any theory not only be verifiable, but that it also be 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 policy analysis that can lead to rapid, correcting change in the face of accumulating factual evidence. *Theories of the Policy Process* is directed at 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 dynamical processes. Punctuated dynamics, where 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 where humans prioritize incoming information for action, the distribution of waiting times for action on the information is ‘heavy tailed’—that is, leptokurtic. Where prioritization is not practiced, but rather inputs are subject to random choice for processing, the distribution is not fat-tailed. 4 The policy processes we study fundamentally involve prioritization, although a much more complex process 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 accord with what is observed come at a price. The complexity and changing interactions of the American policy process means that that accurate policy predictions will be limited to the system level. Individual-level predictions about policy outcomes will be possible only to the extent that either we can choose areas and periods for study that avoid the periods and areas of positive feedback and punctuations or we limit our “predictions” to periods when we can know after the fact what were the successful mobilizations. Nonlinearity, nonnormality, interdependencies, and high levels of aggregation for empirical data mean that clear causal chains and precise predictions will work only in some cases and for some times. To the extent that this is 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, since 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 areas 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 decisionmaking 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 to make point-specific predictions for particular policy issues.

We can have a systems-level model of the policy process even though not having 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. In our view, a clearer, more complete, and more empirically accurate theoretical lens is that of punctuated equilibrium.

Moreover the very fruitfulness of the approach and the seeming ubiquity of punctuated-type dynamics in human behavior mean that what was a reasonably tight policy process theory has become somewhat more vague in empirical referent as it has become more general. The information processing approach is less a theory and more a framework than the earlier punctuated equilibrium formulation. Since the ultimate aim of the scholarly enterprise is understanding and since Punctuated Equilibrium Theory has energized new policy research here and overseas, this is a small cost to pay indeed.

Notes

1. Punctuated equilibrium was first advanced as an explanation of 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 Pre-Cambrian 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; cf. Boyd and Richerson, 1985).

2 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.

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

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

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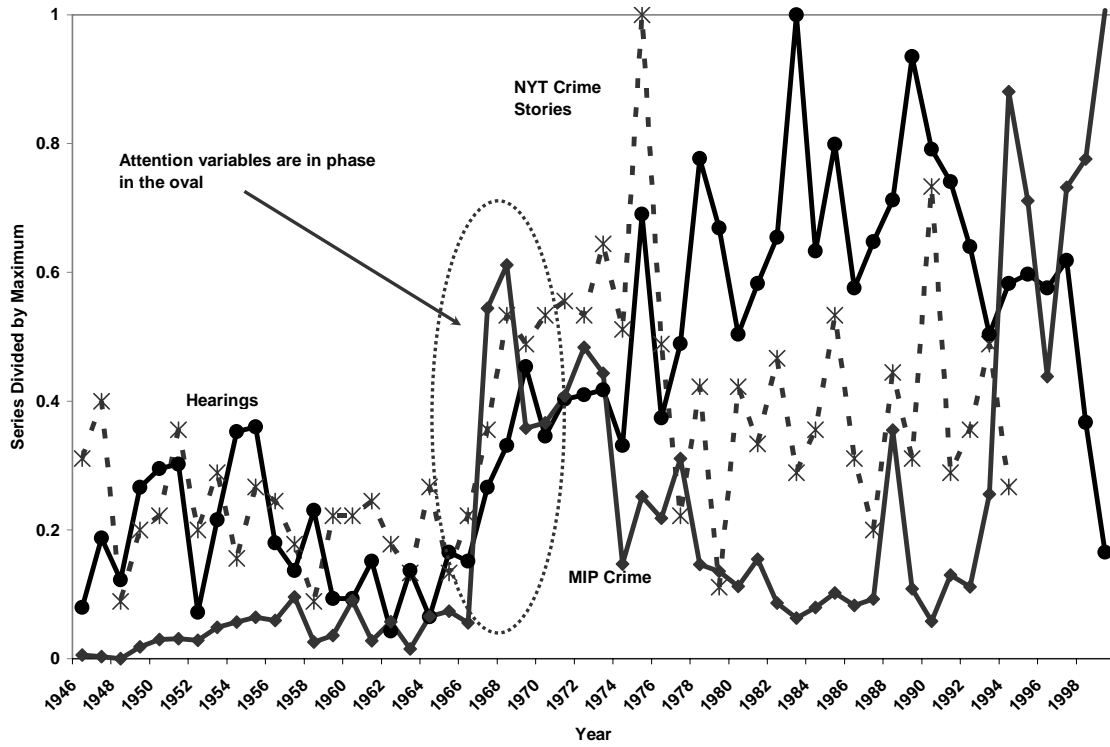
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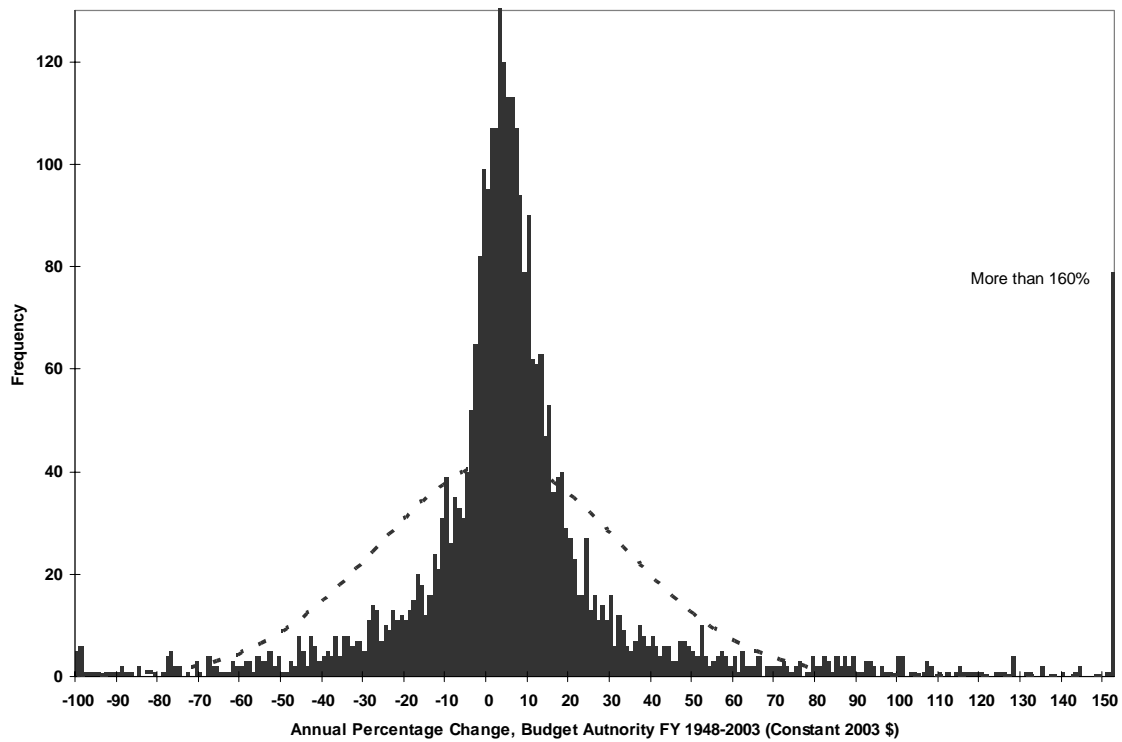
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Figure 5.1: Positive Feedback Effects in Federal Crime Policy



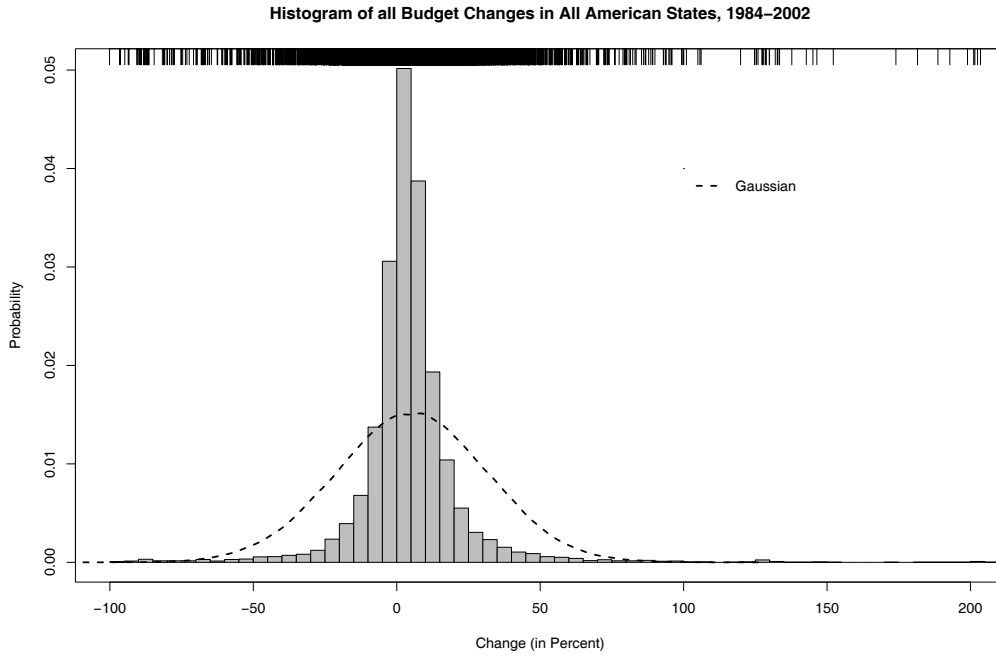
Source: Bryan D. Jones and Frank R. Baumgartner (2005), Figure 8.6. Calculated from data from the Policy Agendas Project (<http://www.policyagendas.org/>).

Figure 5.2: Annual Percentage Change in US Budget Authority for Office of Management and Budget Programmatic Subfunctions, FY1947-FY2003



Source: Calculated from data made available through the Policy Agendas Project, Center for American Politics and Public Policy, University of Washington. (<http://www.policyagendas.org/>).

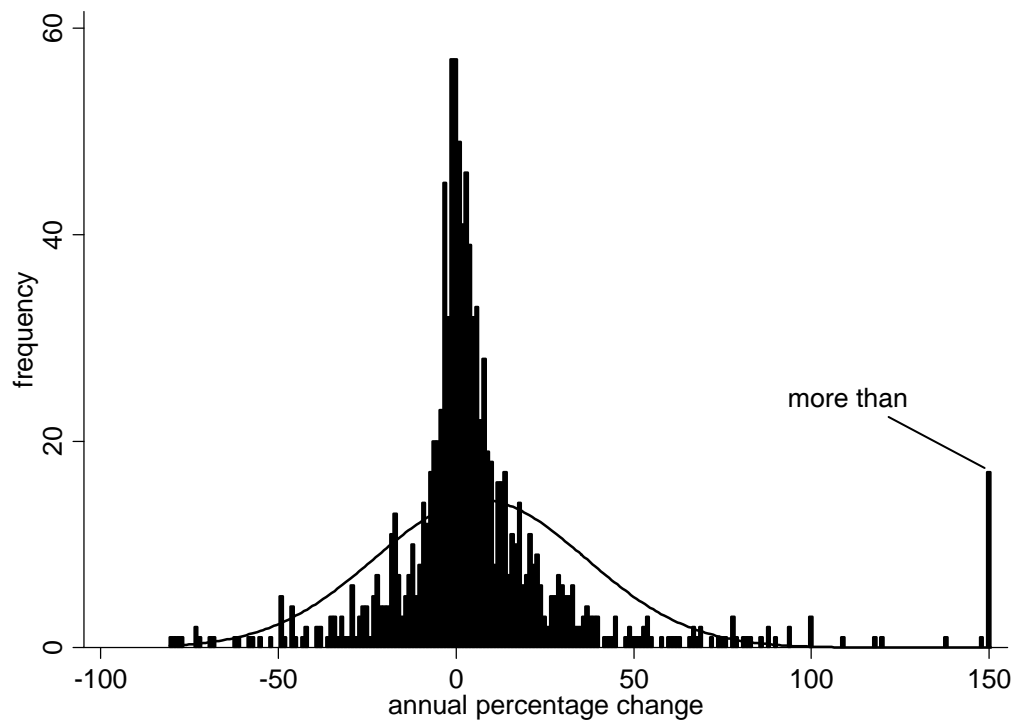
Figure 5.3: Annual Percentage Change in US Budget Authority for American States,
Aggregated across Budget Categories, 1983-2004.



Source: Christian Breunig and Chris Koske, Punctuated Equilibrium in the American States.

Figure 5.4: Distribution of Annual Percentage Changes for Ten French Ministerial

Budgets, 1868-2002.



Source: Baumgartner, Foucault, and François, 2006.