

Policy Dynamics

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Abstract

This paper presents the theoretical introduction for a forthcoming edited book with the same title. We review the importance of a punctuated equilibrium view of the political system. We note the importance of negative feedback systems in inducing long periods of stability in policy outcomes. We note the fundamental linkage between these periods of stability and the periodic punctuations that arise from positive feedback systems when these come into operation. We discuss the importance of institutional design and institutional change in these processes. Finally, we note the importance of a complete view of politics. Both negative and positive feedback systems are fundamental to the nature of politics; they should be fundamental to our theories of politics as well.

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Introduction: Positive and Negative Feedback in Politics

The American policy process is characterized by the dual and contrasting characteristics of stability and dramatic change. At times, government policies seem remarkably resistant to change, following standard operating procedures, working within norms of consensus among those involved, attracting little public attention, and deviating little from year to year. At other times, or in other areas of public policy, dramatic changes occur: New problems appear on the political agenda; crises require quick government response; new programs are created and old ones are terminated. The Medicare Program was not created in 1965 in a wave of incrementalism, after all. Welfare reform was not just a marginal adjustment to past policies. The tobacco settlement, costing the tobacco industry hundreds of billions of dollars and putting an end to tobacco advertisements on billboards, does not reflect policymaking by standard operating procedures.

Moreover, neither welfare reform nor the tobacco settlement would have occurred as they did without the operation of multiple venues for political action. In the case of welfare reform, the states took the lead. In the case of tobacco, most of the action resulted from the innovative legal theories promoted by Mississippi's attorney general. In each case, innovations and new ways of thinking of the issue were then copied by others so that large-scale national changes resulted from isolated local decisions.

Dramatic policy changes regularly occur in American politics, even if most issues most of the time are characterized by more routine developments. In this paper, we explore these dual characteristics of public policy, developing further evidence for the theory of punctuated equilibrium developed in our earlier work on policy change (Baumgartner and Jones 1993). This approach forces students of the policy process to integrate what have often been seen as unrelated, if not mutually antagonistic, phenomena: peaceful incrementalism and jarring change.

We focus here on the issue of explaining both periods of dramatic change and those of relative stability within the same framework. These are the signature characteristics of punctuated equilibrium, and the joint explanation of both contrasts sharply with the more common treatment of one to the exclusion of the other. Political scientists have traditionally focused either on the periods of rapid change (as in most studies of agenda-setting and program creation) or on those of relative stability (as in most studies of policy subsystems, budgeting, implementation, or public policy more generally). One research tradition focuses on building models based on what we will call positive feedback processes; the other bases its studies on negative feedback models. In this paper, we lay out these contrasting views and explain the importance of integrating them.

Our project is designed with an important theoretical ambition in mind. The study of public policy (and American politics more generally) has too often been divided into groups of scholars studying different parts of the same process. Many scholars focus their attention on explaining the smooth functioning of policy systems working within powerful and relatively stable institutional constraints. Such studies often show remarkable predictive powers and allow their authors to use sophisticated techniques of prediction and analysis. Other scholars often ask much broader questions and analyze issues over much longer periods of time or across many different institutional venues. Their work tends to have a more qualitative character, partly because the issues that they study are not clearly contained within the activities of any one

institution. Students of institutions have been much more successful in modeling and in showing statistically significant predictions than have students of policy.

We want to show the importance of a combined view. Institutions, we will argue, are fundamentally endogenous to the policy process. That means that the policy process itself can alter the manner in which institutions function. The tradition in political science, however, is to think of institutions as exogenous. When we treat institutions as exogenous, we think of them as fixed and unchanging. They are causes, but not effects, of the policies that they are involved with. They structure, but are not structured by, public policy. Since the major institutions of government generally may remain in place for decades or longer, and since their organization, structure, and rules of participation tend to induce a certain type of outcome, scholars are often well served by treating them as relatively fixed, exogenous. (In other words, institutions generally have purposes, and political scientists are well served by an emphasis on noting what those purposes are. This is an assertion that readers should find utterly uncontroversial.) The view of institutions as exogenous factors, causes but not consequences of public policy is not so much wrong as it is incomplete.

It is deceptively easy to model the stable functioning of an institution, treating it as fixed and exogenous, but doing so ignores some important questions. Where did the institution come from? What political forces conspired to make the institution be designed in one way rather than another? How capable is the institution of exerting its authority over rival institutions? How are policies made when several institutions share jurisdiction? Do institutions evolve over time in response to new issues and the actions of competing institutions? If we want to understand the ways in which government responds to important social problems, then we must look not only at the periods during which institutions produce policies in a smooth and consistent manner, but also at those periods in history when the institutions themselves are reorganized, at how institutions compete with each other for control over important public policies, and at how institutional practices evolve over time. In previous work (Baumgartner and Jones 1993), we argued that American public policy is an ever-changing mosaic, with some policies quietly being handled within policy subsystems and with little public attention, but with other policies being the subject of considerable public debate and institutional struggle. A complete understanding of the process requires attention to both types of process.

If we succeed in our first goal, then readers will develop a strong understanding that a complete view of American government and public policy must include a theory of institutional development as well as an understanding of institutionally induced equilibrium. Positive and negative feedback processes lead alternately to the creation, the destruction, and the evolution of the institutions of public policy. As new issues rise to and recede from the political agenda, as old issues come to be understood in new ways, and as the institutions of government compete with each other for control over important areas of policy, institutional structures are continuously revamped, modified, and altered. While a given institution may operate according to the logic of negative feedback for long periods of time, the entire government cannot be understood in these terms alone. Looking at the operations of government over the long term, as we do here, and considering both positive and negative feedback processes, leads quickly to the conclusion that institutional design should be endogenous to our theories of government. Taking it as fixed can be useful for some limited purposes, but a larger view requires attention to the creation, modification, and evolution of the structures of government themselves.

A second goal is to introduce scholars, students and others to some straightforward techniques of studying policy change. One of the truly great failings of the policy sciences has

been the inability to produce longitudinal studies that are reliable. Many times, data sets used for policy analysis are simply not equivalent across time. We have collected a series of reliable policy indicators across time, and believe that the broadest possible availability of this and similar information will help us develop a more comprehensive understanding of how public policies are formulated and changed. We want to encourage the systematic and longitudinal study of public policy, and we have made available many of the resources necessary to do that for any number of issues. If we succeed in our second goal, then many readers will challenge and extend our analyses using these new data sources.

In this paper, we introduce the most important themes of our book. We begin with a discussion of negative feedback processes. These are the mechanisms that induce stability and incrementalism in public policy, and they are fundamental to most models of bureaucratic behavior, the functioning of policy subsystems, concepts of interest-group pluralism, models of democratic gridlock, and to other prominent views of the policy process. Though rarely described in the terms that we use here, all these models have in common an adherence to a negative feedback model of the political process, one where shocks to the system are dampened, where pressures from one side lead to counter-pressures from another side, and in general where self-corrective mechanisms keep the system on an even keel. We then turn our attention of positive feedback models of politics—models in which ideas of momentum, band-wagon effects, thresholds, and cascades play critical roles. In these processes, dramatic and unpredictable changes to public policy are more common, as in the literatures on issue-definition, agenda-setting, and policy entrepreneurship. Rather than self-correction, these models are characterized by self-reinforcing processes in which change in one case makes change in the next case more likely. Like a market in which consumers prefer to own a stock that is going up in value, initial increases can become self-perpetuating, at least for a time. Many political phenomenon share characteristics of positive feedback mechanisms, as for example when political leaders sense that the public, or an important segment of it, is increasingly concerned with an issue such as prescription drug coverage. The more the leaders talk about the issue, the more the public may be concerned with it, and the cycle can last for quite some time. In sum, the political system shows important characteristics of both negative and positive feedback processes, though the two do not operate at the same time for the same issue.

A complete view of the political system must include both positive and negative feedback processes because the processes that make one of them possible also make the other one inevitable. Therefore any theory that focuses on one must also make room for the other. Fundamental to the differences between positive and negative feedback systems in public policy are the roles and structures of institutions. We review the important role of institutional design in promoting negative feedback processes, but also in making inevitable certain periods of institutional redesign, and therefore positive feedback processes as well. Institutions react to the changing nature of the issues that they are called upon to deal with. Sometimes institutional change is rapid and dramatic, as when new institutions are created or redesigned; at other times issues and institutions co-evolve in a more gradual manner. That is, institutional structures can react and evolve slowly over time in reaction to the changing nature of the issues that they face.

Many theories of politics leave no room for institutional design or change. Others have no room for the steady functioning of relatively stable systems of negative feedback. Rarely do theories of politics allow for both; we think that any complete theoretical perspective must necessarily allow for both the routine functioning of issues as they are processed by the specialized institutions of government that have been built up around them as well as for the

exceptional periods when institutions themselves are created, ripped apart, or dramatically altered in the face of political mobilizations, altered understandings of underlying issues, or for other reasons. So we first want to encourage a broader view of the functioning of the political system and its institutional design.

American politics changed greatly in the second half of the twentieth century. During the early period covered by our data sets, that is, just after demobilizing from the Second World War, our government had a limited role in the economy, virtually no role in the health care system, very little emphasis on public health or the environment, and had instituted no interstate highways or serious national transportation policies, no national energy policies, no space program or National Institutes of Health, and little in the way of anti-discrimination legislation. At the end of the century, just 40 years later, we had evolved to a new situation where government was not only bigger in absolute terms, but perhaps more importantly where it was involved simultaneously in a great many more activities. Though many have noted the growth in government, few have explored the ways in which this growth has affected the nature and functioning of the government itself. Many seem to expect governmental leaders now to behave in ways reminiscent of how they worked when government was much simpler. We believe that this would be inappropriate if it were not impossible. We hope that this project will provide some initial glimpses into these wide-ranging changes, that it will prompt others to study these issues as we continue to do so ourselves, and that the combined impact of all these further studies will be an enhanced and more complete understanding of the nature of our democracy.

In the rest of this paper, we explore in detail what we mean by negative feedback processes, positive feedback mechanisms, and institutional evolution.

Negative Feedback

A negative feedback system includes a homeostatic process or a self-correcting mechanism. Just as a thermostat adjusts to falling temperatures by putting out more heat, homeostatic devices work to maintain stability. Whatever the direction of the outside force, the homeostatic device operates in the opposite way; the result is to maintain steady outputs in the face of changing external pressures. The key element of any negative feedback system is simply that the system react to counter-balance, rather than reinforce, any changes coming in from the environment.

Negative feedback systems are extremely common in political science and in public policy. Many public policies, such as counter-inflationary actions of the Federal Reserve, are explicitly designed to be homeostatic: Where inflationary pressures are seen to rise, the Fed tightens credit policies, working to counter-balance the incipient inflation and to keep the economy on an even track. Unemployment compensation, anti-poverty programs, price supports for farmers, and many other entitlement programs are explicitly homeostatic in that they are designed to activate automatically in response to changes in the condition they are supposed to regulate (see Boynton 1989).

Many models of congressional and bureaucratic behavior include explicit homeostatic processes. Members interested in reelection provide benefits to constituency groups that mobilize to support them, pulling back from further support when rival groups make clear their own power. The result is that the political system never leads to ever-increasing power to any single group, but rather to distributions of support that remain within certain bounds. Wlezien (1995) argues that public policy and public opinion act in such a fashion: when policymakers enact policies that are too liberal from the perspective of the general public, the public becomes more

conservative. When policy is too conservative, public opinion reacts by becoming more liberal (for a similar argument see also MacKuen, Erikson, and Stimson 2001). Similarly, Peltzman's (1976) model of regulatory capture models a government decision-maker choosing to allocate resources to one of two groups: Consumers or business. Members of these competing constituencies then support or oppose the political decision-maker depending on the actions he has taken. Where the decisions veer too far in one direction, the disfavored group mobilizes to show its own power, supporting a challenging candidate, for example. With political support distributed between the two competing constituency groups, the decision-maker is constrained to operate only within a certain band of action. The result is an equilibrium outcome that illustrates the negative feedback processes common to many theories of politics and policy.

Bendor and Moe (1985) present a more realistic model than Peltzman; their model includes agency leaders hoping to receive budget increases, legislators hoping for reelection, and competing interest-group coalitions hoping for certain government policies. Here, too, the key elements are essentially homeostatic: The competing interest groups provide or withdraw support from elected officials depending on the policies being produced. The elected officials then adjust their views on future policy changes in order to maintain adequate public support to be reelected. They provide support or cutbacks to agency leaders who are producing these outcomes, basing each year's budget on the performance and outcomes generated by previous experience. The result is a closed and mutually adjusting system that ensures that policies reflect the competing interests and the relative strengths of those concerned. Bendor and Moe refer to this "pluralist equilibrium" as a "very stable balance-of-power system" (1985, 769).

Some form of negative feedback, or diminishing returns to scale, is required in any equilibrium model and is therefore a part of any neo-institutional analysis. Without counter-mobilization, political interests would gather ever-increasing powers until they overwhelmed the entire political system. We can see diminishing returns in any number of institutional models. Models of distributional politics in Congress focus on how committees may become stacked with "high demanders" working through their institutional positions to pull congressional policies to support their own constituents at the expense of the chamber preference (Fiorina 1977; Shepsle and Weingast 1987). Increasing costs accrue as the committee pulls the policy further and further from the chamber preference: As pressures grow in one direction, counter-pressures from the other side are predicted to pull the system back to its stable equilibrium. In this model of congressional behavior, outcomes are expected always to remain within some range of policies acceptable to the chamber; if they were beyond the range of acceptable, then the chamber would act to reign in the committee. Similarly in Krehbiel's (1991) informational model, specialists invest in expertise because they gain policy control. The floor grants them this control as long as their policies do not go too far from the chamber preference. The two models may predict different equilibrium outcomes, but each includes a mechanism of diminishing returns making it impossible for the committee to veer further and further from the chamber. Models of bureaucratic oversight (McCubbins and Schwartz 1984) posit an increasing likelihood that Congress will act to reign in an agency as that agency's behavior veers further from congressional preferences. Virtually all models of institutional behavior involve a strong element of diminishing returns, since this is necessary for an equilibrium analysis. (And, we might add, because it conforms to how things work in most cases most of the time.)

A focus on equilibrium analysis and an institutional, rational-choice perspective is not a necessary requirement for a negative feedback process. The literature on bounded rationality, incrementalism, and administrative behavior more generally is also characterized by negative

feedback systems. Standard operating procedures, rules of thumb, and decision-making by incrementalism have in common a focus on the relative stability of expected policy outcomes. In the absence of dramatic revisions to the procedures themselves, decisions should be made according to a process that induces stable outcomes (see Lindblom 1960; Wildavsky 1964; Simon 1997). There are any number of non-rational or incomplete-information models of decision making that nonetheless conform to a negative feedback model. Kahneman and Tversky discuss people's aversion to risk and certain inconsistent patterns of how individuals react to the potential for gains and losses (Kahneman and Tversky 1984, 1985; see also Tversky and Kahneman 1986; Quattrone and Tversky 1988). As long as these behaviors are consistent, they can be modeled using a negative feedback and equilibrium analysis; nothing in this perspective requires or even implies a rational decision-making process. It only requires diminishing marginal returns and negative feedback to inputs; a great many patterns of behavior conform to these requirements.

Not only are the institutional approaches to congressional behavior, congressional oversight of the bureaucracy, and administrative behavior more generally dominated by models of negative feedback, but the vast literature on policy subsystems is as well. From Griffith's (1939) discussion of "policy whirlpools" through Cater's (1964) study of policy subsystems and Lowi's (1969) description of "interest-group liberalism," scholars through the decades have noted the tendency for communities of like-minded interests to dominate policy-making in their areas. Those with technical expertise often have a vested interest in increased spending in a given area, and those without the expertise often have other priorities. The result, which has been noted and documented by scholars in every decade of the 20th century, is the predominance of "iron triangles," "policy subsystems," "systems of limited participation," or "policy monopolies" in many areas of American public policy. These models of subsystem power all have in common a view that increased power stems from autonomy from the broader political system. These models also note inherent limits to this power, however. Diminishing returns are evident since a policy subsystem is not expected to grow to overtake the entire political system. Where demands grow to be too great, political leaders reign the system back in, or rival subsystems attack. The result is an equilibrium outcome that may differ from the general good, but an equilibrium nonetheless.

Probably the most important negative feedback theory of American politics in general has been David Truman's "disturbance theory" (1951), the foundation of pluralism. In this view, "disturbances" to the established order—be they economic shocks, natural disasters, wars, or the actions of rival interest groups—that have the large negative effects on a given social group will naturally and inevitably lead to the reaction and the mobilization of that constituency. The suffering group will organize, mobilize, and demand redress—it will "put things right." In this pluralist perspective, the self-correcting genius of American democracy was in effect a negative feedback system: Any strong push in one direction could be expected to be countered by an equal and opposite push, never allowing the political system to veer too far from an underlying equilibrium. Of course the general view of the entire political system as a huge self-correcting mechanism came under strong and justified attack (for a review, see Baumgartner and Leech 1998). However, there are many areas of public policy where negative feedback systems operate over long periods of time.

In our previous work (Baumgartner and Jones 1993), we noted the importance of policy monopolies in creating stable policy outcomes, often for extremely long periods of time. We described the dual roles of ideas and institutions (images and venues, we called them) in buttressing these policy monopolies. Institutional structures limit who can participate in the

policy debate, and powerful supporting ideas often limit the ways in which the given issue is discussed. Where the institutional venues of decision-making are stable, and where a positive policy image supports a given policy, powerful negative feedback processes can operate, creating a strongly homeostatic system that generates stable policy outcomes for decades. One important element of the stable operation of policy monopolies is the policy image, or the supporting set of ideas structuring how policy-makers think about and discuss the policy. Where poverty policy is considered from a perspective of helping children avoid the scourge of growing up without the best chances of success, more generous policies are supported than where the policy is considered from a perspective of cutting back on government hand-outs. As long as the policy image remains stable, it is difficult to justify a radical rethinking of the resulting policy. Policy images, therefore, play an important role in promoting negative feedback processes, as long as they are stable.

Institutional structures, or venues, constitute the second element of our previous explanation of the strength of policy monopolies. Where institutional rules are clear and restrictive, structuring who has legitimate standing to participate and who can be labeled an “outsider,” then a group of authorities can implement a relatively stable set of policies for as long as they retain their authority. Since the leaders of government agencies typically have a vision of what policies they seek to promote, the relative autonomy of a given institution to implement the policies it favors is an important element in understanding almost any area of public policy. Where institutional structures are clear, then those promoting radical revisions from the status quo can often be dismissed as uninformed, irresponsible, or dangerous. As a result, powerful government institutions operating with autonomy and according to standard operating procedures that limit participation only to those granted authority can be a further source of the politics of negative feedback. Powerful institutions acting with set relations to the broader political system tend to produce relatively stable outcomes.

Negative feedback systems are fundamental to understanding a great variety of areas of public policy, and they are central to most theories of politics. They help explain equilibrium behavior of many kinds, and they are central to understanding the roles of voters in elections, interest groups, bureaucrats, and Members of Congress. No theory of politics would be complete without an understanding of negative feedback processes. The same can be said of positive feedback processes.

Positive Feedback

A positive feedback mechanism includes a self-reinforcing process that accentuates rather than counterbalances a trend. If we observe such a process operating through time, we find considerable clustering of events, along with large and generally unexpected changes. Seemingly random initial events can lead to a cascade or a spiral of subsequent events that dramatically change the status quo. The world of positive feedback processes is changeable, fickle, and erratic when compared with stable and predictable outcomes associated with negative feedback processes. This is because self-reinforcing processes can be explosive, as compared to self-correcting processes, which, by their nature, inhibit dramatic change.

Positive feedback systems can operate in the social sphere as well as in the physical realm. Bendor and Moe (1985) note that in a negative feedback process, “success is self-limiting” because the gains of one side lead to the mobilization of the opposing side. On the other hand, a different logic applies where positive feedback systems are operating: “In such a world, the positive feedback of the Matthew effect—‘To him who hath shall be given’—creates

an unstable system of cumulative advantages” (1985, 771). (When scholars contemplate an unbalanced and hard-to-explain world, they seem compelled to turn to biblical metaphors. Mandelbrot [1983: 248–49] refers to the “Noah” and “Joseph” effects—referring to the biblical stories of floods and droughts—in explaining wild fluctuations in outcomes over time.) In any case, we note that many authors have paid attention to the different logics of positive and negative feedback systems. It is easy enough to say that positive feedback processes can be unpredictable, but what is there in the different processes at the heart of positive and negative feedback that make this occur?

Economist Brian Arthur has described elements of positive feedback in the economy. Initial success in gaining market share can make additional gains come more easily, rather than reaching a diminishing return as in a negative feedback model. Computer operating systems and widely used software packages are familiar examples of markets where the increasing returns to scale seem to operate. Part of the value of a given operating system or word processing software is not so much that it is superior to another one on technical grounds, but rather that many others use it so that files can easily be shared with colleagues and co-workers. In any situation where a consumer’s choice is determined by the number of other consumers making the same choice, then positive returns to scale may operate. Whichever producer establishes an initial lead in the market may well go on to dominate the market completely, if consumers are purchasing partly on the basis of this logic. Studies of the spread of many products, such as the QWERTY keyboard, video standards (VHS or Betamax), computer operating systems, and other technologies have shown this, as have studies of fashion trends, fads, and cultural norms (see Schelling 1978; David 1985; Banerjee 1992; Arthur 1994; Axelrod 1997).

Positive returns and “lock-ins” in the economy have been challenged on both empirical and theoretical grounds (Liebowitz and Margolis 1999). On the other hand, most studies of economic booms and busts point to self-sustaining bursts of optimism or pessimism (Kindleberger 1996). Studies of industrial location have noted a similar self-reinforcing trend: As a given city becomes known for the production of a particular item, the reputation can be self-perpetuating even if its initial choice was purely random. Suppliers locate nearby; a skilled and experienced workforce develops that cannot be easily replicated; economies of scale are created as the local industry grows; and these trends all reinforce each other (see Krugman 1997). Silicon valley is silicon valley partly because skilled programmers already happen to live there. Why it occurred there in the first place is not necessarily all that clear. The garment district remains the garment district because anyone thinking of opening a new business in the field would find skilled workers, customers, brokers, and other colleagues nearby. Reputations take hold as particular locations (be they towns, cities, areas, or neighborhoods) become known as centers for one type of industry or another. These reputations are not just based on rumor; rather there are strong and concrete incentives for all to follow this pattern, once the pattern has been established. The fact that the initial cause of the pattern may have been random or haphazard does not diminish its importance once established. However, it does make it less predictable.

A great variety of industrial standards, including railway gauges, electrical plugs, and other familiar items exhibit this characteristic: More important than making the “correct” choice on technical grounds, one simply wants to make the same choice as everyone else, so that goods can be shared most easily. Many markets exhibit positive returns to scale; one key element that they have in common is that the decisions of one depend on the decisions of those around them. Once established, great efficiencies are gained by reinforcing rather than bucking the trend. Bucking a trend is negative feedback; going along with and reinforcing a trend is positive

feedback; both processes are common in different circumstances, and both play important roles in politics.

In politics, two processes are generally responsible for positive feedback; both have to do with how individuals make decisions. The first operates when people observe the behavior of others and act accordingly. Cue-taking or mimicking models help us understand this type of behavior. The second operates because people, in the words of Herbert Simon, are “serial information processors.” They attend to only limited parts of the world at any given time. Since one cannot possibly simultaneously be attuned to all elements of the world around one, people use various informational “short-cuts” in order to make reasonable decisions. In particular, in most complex decision-making settings, there are many more dimensions of choice than people can pay attention to at any given time. In other words, when faced with a complex decision that may have many underlying dimensions, people focus on one or just a few dimensions in making their choices. If, at some later point, new dimensions of the issue are shown to be important, then people may shift their attention toward that dimension of the issue. This is what Bryan Jones (1994) has called the “serial shift.” When people shift attention from one element of a decision to another, they may rapidly and unpredictably change their behavior. Models of incremental decision-making typically rely on an assumption of uni-dimensionality, but where underlying decisions involve a great number of unrelated dimensions, decisions can shift dramatically when the decision-maker shifts from one dimension of evaluation to another. Both mimicking and attention-shifting are important elements of decision-making in many contexts, especially in governmental policy decisions. We consider each in turn.

Mimicking

The political advice that it is best to “go with a winner” is an apt description of how positive feedback can affect political life. Candidates for office attempting to raise money find that their perceived chances of success limit or stimulate their ability to find other supporters. Where potential donors feel the candidate has little chance of success, they may prefer to support a rival. Without money, it is hard to promote one’s message, leading to a downward cycle. Conversely, where people feel that the candidate has the potential to be a legitimate contender, money may flow more easily, thus making it easier to hire the best staff, purchase media ads, travel, and develop further popular support. So the cycle can be either positive or negative, but in either case it is self-reinforcing rather than self-limiting. Donors prefer to “invest in a winner” rather than “put money down a hole.” Such self-reinforcing logic helps explain why party nominations in the United States can be locked up so early, especially in recent years as candidate-centered fund raising has become so important. Rather than a negative-feedback process where early successes make subsequent victories more difficult, early successes lead to a self-perpetuating cycle. Proposals for campaign finance reforms may have at their root a dissatisfaction with precisely this element of the nominations process.

Economist Thomas Schelling (1978) was among the first to see clearly how the value people put on a good, service, or behavior, often depends on how many other people around them value that same good, service, or behavior. Discussing a range of examples from crossing the street while the light is red (few will do it if they see all those around them waiting; many will if they see their neighbors all doing so); applauding in a public performance or at the end of a class (if enough begin to do it, it becomes general; if too few, it dies out); standing patiently in a line (if others are patient, so will all; if one or a few begin to surge forward, a stampede can ensue); he notes the importance of the concept of the critical mass or the threshold effect. He

writes: “What is common to all of these examples is the way people’s behavior depends on *how many* are behaving a particular way, or how much they are behaving that way—how many attend the seminar how frequently, how many play volleyball how frequently, how many smoke, or double-park; how many applaud and how loudly; how many leave the dying neighborhood and how many leave the school” (Schelling 1978, 94). He continues to note that “What all the critical-mass models involve is some activity that is self-sustaining once the measure of that activity passes some minimum level” (1978, 95). Schelling’s examples make clear that threshold models are common in many areas of life, not only in politics.

Larry Bartels has developed a model of primary voting where voters are concerned with two things: Their own views of the candidate, and their estimate of the candidate’s chances of winning. Where the chances of winning are extremely low, they will not support the candidate even if they agree with her views (e.g., they do not want to “waste their vote”). Where the voters see that there is a greater chance of success, on the other hand, they become more willing to provide support. The result is a simple explanation for the concept of “momentum” in presidential primaries, and an assessment of the importance of early primary victories. Early victories lead to more press coverage, greater name recognition, easier fund-raising, less attention to competitors, and other advantages. Perhaps most importantly, they increase the chances that likely voters will consider the candidate to be “viable.” This, in turn, increases voters’ willingness to vote for the candidate (see Bartels 1988, 27). Of course, winning a presidential race is not purely a question of early primary victories; the candidate must retain support over the long haul. But Bartels shows how positive feedback effects are central to the electoral process.

Positive feedback processes have been seen to operate in a vast array of settings in which humans make decisions while paying attention to the decisions of those around them. Consider real estate values and how neighborhoods develop their reputations. Here again, the critical variable seems to be the degree to which a person’s decision to behave in a certain way is conditioned on their estimate of the likely behaviors of those around them. Matthew Crenson (1987) has shown the impact of context in why some urban neighborhoods have so many norms of cooperation and high property values, whereas others evolve into a complete lack of coordinated action, often leading to urban decline. He uses the concept of mimicking to explain why people in some neighborhoods keep their houses and yards clean and neat, pick up litter if they see it, paint their houses, keep them in good repair, and spend money to maintain the value of their property, whereas similar people living in other neighborhoods do not engage in any of these activities. When a neighborhood benefits from a strong sense of community, residents may easily be willing to work to make it remain so—as long as they see that those around them are doing the same. When a neighborhood begins to go downhill, on the other hand, residents may see that their individual efforts are a “lost cause”—only a “drop in the bucket,” unlikely to make a difference. Worse, they may feel that any investment in their home may be wasted since the neighbors are allowing their own homes to decline in value. The main point is that behaviors are strongly conditioned by the behaviors of neighbors or colleagues, and these positive reinforcements can act equally strongly either to create a virtuous cycle of cooperation or a vicious cycle of hopelessness. Neighborhoods can shift from stable to unstable very quickly if the residents sense a shift in the attitudes of those around them.

Similar patterns of virtuous and vicious cycles is apparent in Putnam’s study of civic life in Italy (1993), in Converse and Pierce’s (1986) study of participation in strikes, riots, and demonstrations during the May 1968 events in France, Lohmann’s (1994) study of the

demonstrations leading to the fall of the German Democratic Republic in 1991, and in Chong's (1991) work on social movements in the United States. People cannot riot or demonstrate alone, no matter how strongly they may feel compelled. Where one sees all one's neighbors ready to participate in a protest or social action, one becomes much more willing to participate oneself. Two people with the same attitudes, but living in different neighborhoods, might behave quite differently. Social movements of many kinds are characterized by sensitivity to context, and therefore by positive feedback. Dennis Chong (1991) shows the role of leadership and expected success in the civil rights movement: Where many saw their neighbors participating, they overcame their fears; where few saw their neighbors participating, they were less likely to participate themselves. The participation of neighbors and the expectation of success appear to be important predictors of participation in a great variety of social and protest movements. All these models have in common a positive feedback process at their core, and they help explain the explosive nature of many social and protest movements: Either they fail utterly or they can be the subject of explosive growth once they reach a certain threshold (see Granovetter 1978). Further and perhaps most importantly, virtuous cycles such as those described by Putnam or Crenson can quickly be transformed into vicious cycles as a social group crosses some threshold.

Scholars studying such disparate phenomena as revolution, rebellion, social protest, home ownership, the emergence of industrial standards, stock market pricing, the emergence of market leaders in the software industry, industrial geography, fashion, and the toy industry have all noted the exquisite sensitivity to context that humans can display. Where the behaviors of one are related to a desire or a need to conform to the behaviors of those around one, then positive feedback can occur. We can see this in everything from real estate to fashion. Who can predict what will be the next Pokémon? No one. But as long as kids want the same toys as their friends have, rather than choosing what to play with independently and in isolation from others, then we can predict that there will always be cascades and fads in the toy industry. Social cascades are an important source of positive feedback in politics as in other areas of life. Another important source is how humans process information while dealing with complex and multidimensional issues. Being unable simultaneously to pay attention to all elements of a complex decision, or not knowing all the relevant dimensions of a decision, people shift from focus to focus.

Attention-Shifting

Positive feedback processes are not limited to the mimicking actions of many individuals behaving in a group. Positive feedback also affects individual-level decision-making. Whenever people are called upon to make decisions in complex and multidimensional issues, invariably they may be forced to focus on a few elements more than others. Consider free trade. When Congress was asked to consider granting Permanent Normal Trading Relations to China in 2000, advocates on various sides of the issue argued that the issue was related to world labor standards, environmental protection, human rights, abortion, nuclear nonproliferation, America's potential democratizing influence in China, and the relative powers of the Congress v. the President, among other things. Different participants in the debate, of course, pushed different elements of the issue to the forefront as they attempted to sway others' opinions on the issue. Fundamentally, however, large decisions often involve so many different dimensions of potential relevance that it can be hard, if not impossible, simultaneously to pay attention to all of them. As a practical matter, most decision makers pay attention only to a few of the underlying dimensions. At times, however, they may be forced to pay greater attention to one of the elements they had been ignoring, as when these dimensions force themselves up on the agenda because of a crisis or

because of the actions of another decision-maker. When this occurs, people can change their views on the issue even without changing their minds on the underlying dimensions of choice: They simply give greater weight to a dimension they had previously been ignoring.

William Riker (1984, 1986) noted that strategically minded politicians could often have dramatic effects on public debates or parliamentary voting by shifting the elements of debate from one underlying dimension to another. Jones (1994) has developed an individual decision-making model involving attributes (John Zaller [1992] calls these “considerations”) that underlie a set of political alternatives (such as issues before a legislature or candidates before an electorate). A decision-maker can attend to only a very limited number of such attributes or considerations. If, during a debate, one’s attention is shifted from one attribute to another, as Jones shows formally, a decision may be reversed.

Such reversals are a critical component of the instability that characterizes occasional positive feedback in politics. So long as one’s understanding of a political issue is dominated by one attribute, there is likely to be little change (negative feedback dominates). But when new attributes come to be salient, then more substantial change is possible (positive feedback may emerge). The attention model of political debate shows the importance of the ability to focus attention on one dimension of the issue rather than on another. Where one side portrays an issue as relating to states’ rights, a rival might propose that the issue really concerns racial equality. The more people participating in the debate who support one of these views over the other, the more difficult it becomes to maintain the contrary view. Political debates therefore can exhibit the signature characteristics of positive feedback, since the behavior of an individual can be closely tied to the behaviors of those around them. Individuals making complex decisions do this; social groups do it even more because both attention-shifting and cue-taking may occur simultaneously.

Most issues of public policy are inherently complex. Poverty has many causes; regulation of the electrical industry has a great number of impacts; military spending is related to a great number of unrelated goals; regulation of the health care industry can affect scores of different social goals. Public debates on these complex issues almost never simultaneously contain full discussions of all the relevant dimensions of choice; we always limit our discussion to the few dimensions that for one reason or another are on the agenda. But the future always harbors the possibility that a given element of the debate previously unattended may become more prominent. So we can see that issues of public policy typically contain the seeds of positive feedback because of the potential for attention shifts to occur. Public debates are even more prone to attention-shifts and positive feedback than models of individual decision-making would lead one to think, however, because public debates are social debates. That is, many of the participants in a public debate are acutely aware of the behaviors of those around them, and they want nothing more than to be on the winning side. Public debates, then, are simultaneously subject to the processes of attention-shifting common to all multi-dimensional and complex decisions and also to the cascading and mimicking phenomena that we have noted where decisions are made in reaction to the decisions of those around oneself. The result of these twin characteristics of policy debates is that positive feedback is a fundamental feature of many policies when we observe them over time.

Positive Feedback in Policy Processes

In previous work, we have shown how changing public images of a given policy question can interact with changing institutional venues of activity to produce surprisingly rapid changes

in public policy. A dominant public policy image is often one-dimensional even while the underlying issue is multi-dimensional. Attention is often directed at only one aspect or dimension, while others are suppressed or ignored. For example, we noted that public attention toward nuclear power was once focused almost exclusively on the potential that it would produce electricity “too cheap to meter,” that it represented the latest scientific advance, and other positive elements; later, of course, the image degraded considerably. At no time, however, was the inherently multidimensional nature of the nuclear power industry, with its various positive elements and its various negatives, simultaneously a part of the public discussion. This process was common, not unusual, in our study of nine different public policies.

Where a given policy monopoly begins to lose its supporting policy image, rival institutions of government which may not have been involved in the issue previously may assert their authority to become involved. The more hostile agencies that become involved, the greater the change in image; the greater the degradation of the image, the more new political leaders and agencies will want to become involved, and the cycle continues. This positive feedback mechanism explained some of the rapid shifts we observed with public policies towards nuclear power, pesticides, smoking, and other areas (see Baumgartner and Jones 1993).

The same logic that applied to markets, elections, social movements, and policy change also applies to individual strategies of policy making, lobbying, and decision-making within a legislature. We can establish an extremely simple model of a policy maker’s willingness to spend effort on one issue rather than another. Consider the choices available to a policy maker operating under a condition of scarcity of attention. The person might be an elected official, a lobbyist, an appointed official, or a staff member giving advice to such a person; the key element is that they must choose the issues on which to spend their time, organizational resources, and energy (see Salisbury and Shepsle 1981; Browne 1995; Hall 1996). One thing they might prefer is to work on issues that have a chance of success rather than on those issues that are sure to go nowhere.

If the probability of any action on the issue is zero, then there is little reason to focus attention on the issue, since there is no expected benefit. What would cause the probability of success to rise? One important element is the expected behaviors of other relevant actors. This is why focusing events can be so important, and why policy making in Washington and elsewhere often exhibits a herd-like phenomenon characteristic of positive feedback processes. A given issue may be stalled for years, but suddenly attracts the attention of many policy makers. This can happen not because any preferences change, but only because expectations change concerning the probability of government action. With many actors simultaneously paying attention to the expected willingness of others to pay attention to the issue and to expend resources in bringing about change, they may all change in rapid response to each other, or to a commonly perceived event. So a prominent technical study, or a stochastic event such as a high-school shooting bringing attention to the issue of gun-control, can be important not so much because it changes anyone’s mind about how serious the issue is (though this may well happen), but because it may change policy makers’ calculations about the willingness of allies to become involved in the struggle. The expectation of success itself can create momentum. Of course the mobilization of one side can lead to the counter-mobilization of the other side, as in the negative feedback processes discussed in the previous section. In the case of gun control in the wake of the Littleton, Colorado high school shootings, as in many other cases with such prominent focusing events, the more remarkable phenomenon is how the event mobilizes one side tremendously while it demobilizes the other. Certainly, these mobilizations do not last forever

(positive feedback processes must come to an end at some point), but the important question is how much policy change may be enacted during or as a direct result of the period of heightened attention to the issue generated during this short burst of increased attention. Often, important policies are adapted remarkably quickly, even after the same issue had gone nowhere in previous years.

The willingness of a political actor to invest resources in a given lobbying struggle is likely to be related to two things: The probability of success (which is related to the expected behaviors of other actors involved), and the expected benefits. Expected benefits may change only slowly or not at all, but the expected behaviors of other relevant actors can often change dramatically and in rapid response to commonly perceived crises, focusing events, the release of studies, Presidential pronouncements, or other premeditated or stochastic events. Therefore positive feedback processes, or policy bandwagons, can occur very quickly and without any change in the expected policy benefits to the various actors involved. More likely than a change in policy benefits is a change in the expected actions of others.

But why would participants expect a change in the actions of others? There can be more than one reason, but the most likely is that somehow new information has become available, and participants are trying to anticipate how others will react to it. As we have repeatedly argued, however, most so-called “new information” is not new at all. Rather, some aspect of available information has become more salient in the course of political debate, or some old argument suddenly has some credible new evidence to support it, or some information long known to one group of policymakers has come to the awareness of another group. As John Kingdon (1984) has argued, conditions do not automatically translate into problems; that translation occurs when previously ignored aspects of a complex situation become salient, and this occurs through the efforts of policymakers attempting to redefine public debates. So the two mechanisms that account for positive feedback effects in policy processes are intimately related. Research on how previously ignored attributes of complex public policies become salient in a policy debate, setting off a cascade of interest through the calculations of expected action described above, is currently ill-understood, however, and it remains a key item on the agenda for students of the policy process.

Many processes relevant to policy change show elements of positive feedback, just as negative feedback is central to understanding policy change as well. Most important from our perspective, large-scale decisions about institutional design are often made during periods of heightened attention to an issue; these often have substantial long-term consequences. Central to our view of the links between positive feedback processes, which are relatively rare and by definition short-lived, and negative feedback, which are more common and more long-lasting, is the role of institutional design.

Institutional Evolution

When Aaron Wildavsky (1964) looked at federal budgetary processes and noted the importance of incrementalism, he was careful to limit his analysis of yearly budgets to units that could directly be compared. Therefore he eliminated from consideration those cases where new programs and agencies were created, radically modified, or terminated, looking instead only at the years of “steady-state” functioning of existing institutions. When Richard Fenno did his landmark study of the congressional budgetary process, he also deleted all cases that threatened “organizational integrity” (1966). As studies of “steady-state” budgeting, one could hardly do better than these two projects, and together they demonstrated the importance of inertial forces, a

finding has been one of the most influential in the literature not just on budgeting, but on public policy overall. Of course, one might question what happens when all the observations are used.

Several scholars, including Wildavsky, have looked at more inclusive data sets and they have consistently found a combination of the same levels of incrementalism with a significant amount of non-incremental, radical change (see Davis, Dempster, and Wildavsky 1966; Jones, Baumgartner, and True 1998). In sum, the federal budgetary process is characterized by considerable incrementalism and stability, to be sure, but also by a remarkable degree of radical change. Key to the differences in these two outcomes are questions of institutional design.

Institutions are enduring rules for making decisions. At the broadest level, the Constitution establishes the rules for the American political system, and of course, these have changed only rarely—our Constitution has been stable for over 200 years. At another level, however, agencies and institutional procedures, or rules, structure the policy process in important ways. The budgetary rules observed by Wildavsky and Fenno were institutions in this sense. Institutions may be explicitly changed or they may slowly evolve. An analogy is the law—it changes explicitly when new laws are passed or old ones are amended, and it evolves more slowly through judicial interpretation and case law. Our Constitution has been amended only a few times, but its interpretation has changed dramatically over the centuries.

Invariably, institutions are created, terminated, or their procedures radically modified during periods of heightened attention to their purposes. Those involved in making these restructuring decisions typically have certain goals in mind. Therefore, institutions are typically designed to encourage participation by certain groups and discourage participation by others. Institutions are also designed to facilitate the use of some aspects of information rather than others. Institutions often promote certain issue-definitions by requiring that decision-makers consider to some types of information but not others. The Environmental Protection Agency looks at issues differently than the Small Business Administration; the Anti-Trust Division of the Justice Department has different staff expertise, different reporting requirements, and different priorities than does the Department of Commerce. If institutions are often created and reorganized during periods of heightened attention to a given problem, they do not disappear when public concern dies away; rather, they may be the most important legacies of agenda access. After an issue is no longer part of the public agenda, the institutions, procedures, and biases that these encourage, designed to achieve one set of goals rather than another, remain in place.

Most important social problems that government institutions may be designed to alleviate are extremely complex, but the institutions designed to attack these problems often are given the particular mandate to focus on one element of the problem. Of course, the institution may change its focus as it becomes clear that the problem has other causes that must be addressed. More typically, however, we design institutions with only a partial mandate to focus on one dimension of an inherently multidimensional problem. Welfare programs are designed to alleviate the problems of poverty, but of course their main focus is typically to distribute aid to poor people: It would be outside of their mandate to envision a radically different approach to the problem. So, if underlying social problems are largely multi-dimensional, but if institutions are designed to focus on one or a limited number of these dimensions but to ignore others, then it is inevitable that periodically there will be demands for institutional re-organization or for the creation of new institutions with different foci of attention. Rival institutions are created that approach the same problem from a different perspective, and in time these jurisdictional overlaps multiply. The inevitable consequence is that institutions promote simplified views of more complex social

issues. Because of the limited representation of complex issues within institutional frameworks, the smooth functioning of a given set of institutions can be interrupted by periodic recognition that it is not solving the entire underlying problem. Periods of negative feedback may alternate with periods of positive feedback during which attention focuses on new aspects of the problem, and new institutions are formed to address these newly salient aspects.

If the underlying social issue that they are designed to deal with is especially complex (e.g., poverty, parity in international trade flows, parity in income between agricultural workers and city-dwellers), it is unlikely that the procedures decided upon will push towards a global solution of the broader problem. One anti-poverty program may be quite effective at addressing certain parts of the problem (e.g., guaranteeing the poorest families some minimum level of subsistence, or providing a breakfast or a hot lunch to school children), but when attention shifts to greater concern with another element of the problem (e.g., reducing crime in poor neighborhoods), the program may not appear as successful. Calls for reform may occur, or new programs may be created in the wake of increased attention to a previously unattended dimension of the same broad social or economic problem.

So a multi-dimensional social issue may be subject to the same types of cycling and instability problems that formal theorists have discussed in relation to social choices in general. Even if a set of institutions successfully works towards achieving a certain goal, at some point in the future it could be destabilized as attention shifts to another dimension of the issue. This is more likely, of course, where the problems are complex and/or incompletely understood; it is less likely where the institution implements a straightforward technology managing a well-understood task (e.g., delivering the mail). But even in the relatively simple cases, disruptions occur. The Postal Service, after all, was dramatically reorganized when it was changed from a regular cabinet department (Department of the Post Office) to a quasi-independent agency (US Postal Service) in the early 1970s.

Many theories of public policy focus their attention, as Wildavsky did, on the periods of smooth functioning of a given set of institutional structures. Not surprisingly, these are the theories that focus on negative feedback mechanisms, as discussed in a previous section. Other theories ask where the institutional structures come from. Invariably, they note the policy goals that institutional designers are attempting to create (or frustrate) as they structure future participation. A complete understanding of public policy must show respect for the impact of institutions as they structure behavior, but at the same time it must note that these institutional structures themselves are subject to occasional change. To do this it is generally necessary to look at public policy processes over a long period of time. More importantly, it is paramount that the analyst avoid choosing as the scope of attention only the behaviors of a single institution.

Rather than look at a single institution, it is more fruitful to choose an issue and note how various institutions become involved in its resolution. By tracing public policy over the entire post-war period, we often note periods that show a smoothly functioning negative-feedback system carefully working to perpetuate a given policy goal as well as other periods when the institutional structures surrounding the issue are themselves thrown into doubt and dramatic restructurings occur. As we continue to look at a range of public policy issues and at diverse elements of the policy process, we find a consistent pattern of positive and negative feedback processes alternating irregularly in most areas of public policy. The result is a view of government comprised of a complex mosaic of ever-altering structures of limited participation and attention.

Our consideration of issues over time also allows us to observe how issues and institutions affect each other over the long-term. Many analysts have noticed the impact of institutional structures on how issues are handled and what policies are produced. However, the impact also works in the opposite direction: Institutions evolve and change over time as they are forced to adapt to new issues, share jurisdiction with competing institutions, and attend simultaneously to a greater number of the underlying elements of the issues with which they deal. The result of this longer time perspective is to show both the endogenous and the exogenous sources of institutional design and evolution.

In their book *Analytical Politics*, Melvin Hinich and Michael Munger (1997) note that choices are a function of preferences as these interact with institutions. Changes in either preferences or the institutions through which these are expressed, therefore, can result in different choices. Changes in both preferences and institutions at the same time can be simultaneous and explosive, they note, since there can be an interaction effect, or a multiplicative factor. Now, would one expect institutions to remain stable at the same time as preferences were changing dramatically? Sometimes. However, when the very forces that are leading to changes in preferences are simultaneously acting to promote changes in institutional structures of choice, then we may expect non-incremental, dramatic, and explosive change. Typically, scholars assume that one or the other of these two factors (preferences or institutions) is held constant so that they can model accurately the expected impact of change in the other factor. Usually, the institutions rather than the preferences are assumed to be stable; this is justified because institutional changes are often seen in the real world to be rare, slow, or both. In fact, the continued interactions of issues and institutions often lead to what we have previously referred to as the coevolution of issues and structures over time (Baumgartner, Jones, and MacLeod 2000). Positive feedback processes come about when issues are re-framed, when institutional designs are altered, and when policymakers come to realize that other policymakers may be looking at old issues in new ways. In any event, a complete view of politics must give proper weight both to the politics of negative feedback and to the related dynamics of positive feedback and dramatic change.

References

- Arthur, W. Brian. 1994. *Increasing Returns and Path Dependence in the Economy*. Ann Arbor: University of Michigan Press.
- Axelrod, Robert. 1997. *The Complexity of Cooperation*. Princeton: Princeton University Press.
- Banerjee, Abhijit V. 1992. "A Simple Model of Herd Behavior." *Quarterly Journal of Economics* 107: 797–817.
- Bartels, Larry M. 1988. *Presidential Primaries and the Dynamics of Public Choice*. Princeton: Princeton University Press.
- Baumgartner, Frank R., and Beth L. Leech. 1998. *Basic Interests: The Importance of Groups in Politics and in Political Science*. Princeton, N.J.: Princeton University Press.
- Baumgartner, Frank R., and Bryan D. Jones. 1993. *Agendas and Instability in American Politics*. Chicago IL: University of Chicago Press.
- Bendor, Jonathan, and Terry M. Moe. 1985. An Adaptive Model of Bureaucratic Politics. *American Political Science Review* 79: 755–74.
- Boynton, G.R. 1989. The Senate Agriculture Committee Produces a Homeostat. *Policy Sciences* 22: 51–80.
- Browne, William P. 1995. *Cultivating Congress: Constituents, Issues, and Interests in Agricultural Policymaking*. Lawrence: University Press of Kansas.
- Cater, Douglass. 1964. *Power in Washington*. New York: Random House.
- Chong, Dennis. 1991. *Collective Action and the Civil Rights Movement*. Chicago: University of Chicago Press.
- Converse, Philip E., and Roy Perice. 1986. *Political Representation in France*. Cambridge: Harvard University Press.
- Crenson, Matthew A. 1987. The Private Stake in Public Goods: Overcoming the Illogic of Collective Action. *Policy Sciences* 20: 259–76.
- David, Paul A. 1985. Clio and the Economics of QWERTY. *American Economic Review* 75: 332–37.
- Davis, Otto A., M.A.H. Dempster, and Aaron Wildavsky. 1966. "A Theory of the Budget Process," *American Political Science Review* 60: 529–547.
- Fenno, Richard. 1966. *The Power of the Purse*. Boston: Little, Brown.
- Fiorina, Morris P. 1977. *Congress: Keystone of the Washington Establishment*. New Haven, CT: Yale University Press.
- Griffith, Ernest S. 1939. *The Impasse of Democracy*. New York: Harrison-Hilton.
- Granovetter, Mark. 1978. Threshold Models of Collective Behavior. *American Journal of Sociology* 83: 1420–43.
- Hall, Richard L. 1996. *Participation in Congress*. New Haven: Yale University Press.
- Hinich, Melvin J. and Munger, Michael C. 1997. *Analytical Politics*. New York: Cambridge University Press.
- Jones, Bryan D. 1994. *Reconceiving Decision-Making in Democratic Politics*. Chicago IL: University of Chicago Press.
- Jones, Bryan D., Frank R. Baumgartner, and James L. True. 1998. "Policy Punctuations: U.S. Budget Authority, 1947–1995," *The Journal of Politics* 60: 1–33.
- Kahneman, Daniel and Amos Tversky. 1984. "Choices, Values, and Frames. *American Psychologist* 39: 341–50.

- Kahneman, Daniel and Amos Tversky. 1985. "Prospect Theory: An Analysis of Decision-Making Under Risk." *Econometrica* 47: 263–91.
- Kindleberger, Charles P. 1996. *Manias, Panics, and Crashes*. Third Ed. New York: Wiley.
- Kingdon, John W. 1984. *Agendas, Alternatives, and Public Policies*. Boston: Little, Brown.
- Krehbiel, Keith. 1991. *Information and Legislative Organization*. Ann Arbor: University of Michigan Press.
- Krugman, Paul. 1997. How the Economy Organizes Itself in Space: A Survey of the New Economic Geography. In W. Brian Arthur, Steven N. Durlauf, and David A. Lane, eds. *The Economy as an Evolving Complex System II*. Reading, MA: Addison Wesley. Pp. 239–62.
- Liebowitz, Stanley, and Stephen E. Margolis. 1999. *Winners, Losers, and Microsoft: Competition and Anti-trust in High Technology*. Oakland, CA: Independent Institute.
- Lindblom, Charles E. 1960. The Science of "Muddling Through." *Public Administration Review* 19: 79–88.
- Lohmann, Susanne. 1994. The Dynamics of Informational Cascades: The Monday Demonstrations in Leipzig, East Germany, 1989–1991. *World Politics* 47: 42–101.
- Lowi, Theodore J. 1969. *The End of Liberalism*. New York: Norton.
- MacKuen, Michael, Robert S. Erikson, and James A. Stimson. 2001. *The Macro Polity*. New York: Cambridge University Press.
- McCubbins, Mathew, and Thomas Schwartz. 1984. Congressional Oversight Overlooked: Police Patrols versus Fire Alarms. *American Journal of Political Science* 28 (1): 165–79.
- Mandelbrot, Benoit B. 1982. *The Fractal Geometry of Nature*. San Francisco: Freeman.
- Peltzman, Sam. 1976. Toward a More General Theory of Regulation. *Journal of Law and Economics* 19: 211–40.
- Putnam, Robert D. 1993. *Making Democracy Work*. Princeton: Princeton University Press.
- Riker, William H. 1984. The Heresthetics of Constitution-Making: The Presidency in 1787, with Comments on Determinism and Rational Choice. *American Political Science Review* 78: 1–16.
- Riker, William H. 1986. *The Art of Political Manipulation*. New Haven: Yale University Press.
- Quattrone, George A. and Amos Tversky. 1988. "Contrasting Rational and Psychological Analyses of Political Choice." *American Political Science Review* 83: 719–36.
- Salisbury, Robert H., and Kenneth A. Shepsle. 1981. U.S. Congressman as Enterprise. *Legislative Studies Quarterly* 6 (November): 559–76.
- Schelling, Thomas C. 1978. *Micromotives and Macrobehavior*. New York: W.W. Norton.
- Shepsle, Kenneth A. and Barry Weingast. 1987. The Institutional Foundations of Committee Power. *American Political Science Review* 81 (1): 85–104.
- Simon, Herbert A. 1997. *Administrative Behavior* 4th ed. New York: Free Press.
- Truman, David. 1951. *The Governmental Process*. New York: Knopf.
- Tversky, Amos and Daniel Kahneman. 1986. "Rational Choice and the Framing of Decisions." *Journal of Business* 59: 251–78.
- Wildavsky, Aaron. 1964. *The Politics of the Budgetary Process*. Boston MA: Little, Brown.
- Wlezian, Christopher. 1995. The Public as Thermostat: Dynamics of Preferences for Spending. *American Journal of Political Science* 39 (4): 981–1000.
- Zaller, John R. 1992. *The Nature and Origins of Mass Opinion*. Cambridge, MA: Cambridge University Press.