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A Change of Mind or a Change of Focus? A Theory of Choice Reversals in Politics*

Bryan D. Jones
Texas A&M University

ABSTRACT

Most models of choice treat decisions as if they occur but once. But people are continually making choices, and often they are asked to make similar choices at different times. It is not unusual to find choice reversals, in which a choice made at one time is reversed at another. Even if choice reversals do not occur, because exactly similar choices seldom recur, great inconsistencies in choice across time are readily observable. To explain such inconsistencies, it seems that we must postulate either a rapid change in preferences or irrationality (not making a choice based on one's preferences). This article explores a third alternative: that preferences are multidimensional, and that attentiveness to preferences can shift abruptly as the decisional context changes. Shifts in attentiveness, rather than instability in preferences or irrationality, often account for choice inconsistencies.

Great inconsistencies in choice may result from fluctuating attention.
—Herbert Simon

In early 1993, senate leaders in New Jersey scheduled an override vote on a bill vetoed by Democratic governor James Florio to make the sale of semiautomatic weapons legal once again. The original bill had passed by a "veto-proof" Republican supermajority, and no Republican opposition to the override had emerged. But after a vigorous campaign by Florio, a tremendously unpopular governor because of his tax policies, *not a single legislator voted to override*. Why?

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In 1992, seventy-nine members of the U.S. House of Representatives, who voted in favor of the superconducting supercollider in 1991, voted on virtually the same appropriations bill amendment to kill the big science project. How could this happen?

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These are but two of a limitless supply of examples of political intertemporal choices that seem egregiously inconsistent. Choices that look quite straightforward when examined at one time can look inconsistent or even irrational when studied across time. The problem is not limited to exactly similar choices, since the political world seldom offers exactly similar choice situations. Many choices look inconsistent when gauged against the past behavior of the policy maker.

This article develops a theory of intertemporal choice in politics that is capable of accounting for such *choice reversals*. At first it seems simple: Any change in choice implies a change in preference. But inferring preferences from choices is not an acceptable approach—first, because it begs the important theoretical question (why do people choose?) and second, because preferences are always multidimensional so that *which* preferences are used in making a decision is always at issue. Political scientists know this implicitly; we always complain when politicians claim a mandate for a particular policy direction based on the vote totals. We object because we know that it is not possible to infer the reasons for the vote decision from the choice, or outcome, posted in the vote totals.

In a world of multidimensional preferences, how individuals become attentive to one preference rather than another is primary. I will develop a conception of human decision making in politics that stresses *both* the limits in human cognition stemming from the necessity to shift attentiveness *and* the abilities of homo politicus to make solidly rational decisions. So this study of decision making first develops a model, an abstraction of the reality of making decisions, that is based on attentiveness to the context of decisions. The model implies that decision makers value or weight preferences differently depending on the context in which they are evoked. It treats preferences as relatively fixed, changing only gradually, but views attention to underlying preferences as capable of radical shifts in brief periods of time. Then I will show how actual choices can be affected by this shift. This model is more commensurate with current empirical studies of political decision making, and it has the added advantage of incorporating the decision-making capabilities of both elites and mass publics into one framework. In politics, as in other areas of life, preferences are activated by individual interpretation of context, and it is this combination of preferences and context that yields choice.

The first part of this article discusses the role of shifting attention to preferences, a shift that is driven by changes in con-

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text. It discusses the implications of such shifts for rational analysis of choice. The second part of the article elaborates the model, showing how rational choice analysis as it has developed in political science can be used to understand shifts in attentiveness to preferences. I use the 1992 superconducting supercollider vote in the House of Representatives as an example of how the model developed here can be used to understand choice reversals.

DECISION MAKING AND ATTENTION

While there are many different uses of the concept of rationality (March 1978), the model of decision making that is commonly known by that term is well specified and well understood. It assumes that the best decisions are made when decision makers factor and optimize. Rational decision makers break decisions into component parts (factoring or analysis) then examine alternatives for each part of the problem, in each case choosing the best, or optimum, alternative (maximization). The analytical/maximization approach works, at least in theory, because the problem facing the decision maker allows this breaking down and putting together process to work.

While most of decision science is directed at making better decisions under the analytical/optimization approach, economics and those parts of political science and sociology that use the rational decision-making analysis focus on the implications for economic, political, and social systems if decision makers factor and optimize. Social systems operate optimally only if individual decision makers optimize. Hence rational decision makers must maximize *overall* satisfaction, or what is called *utility*, or preferences. People then may be seen as maximizing a comprehensive *utility or preference function*, which is a relationship between satisfaction on the one hand and objects of choices or decisions on the other. So they get the most satisfaction possible from their choices in all aspects of life taken together.

Given that decision makers must operate on one problem at a time, the underlying assumption is that the goals of decision makers in each decision-making situation may be translated easily into the individual's overall utility function. Decisions are not compartmentalized because the social world is well behaved; that is, it is fundamentally linear and decomposable. It can be taken apart, worked on by the decision maker, then put back together. Operating on one part has easily understandable effects on other parts. That is, decision makers easily can understand the myriad trade-offs that they face in making decisions, and they can allocate effort accordingly. So by working on one problem at a time, decision makers are in effect maximizing overall utility.

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Critiques abound of the rational choice approach in social science. Attacked as an unrealistic model of actual decision making, as a misleading norm for making better decisions, as a poor vehicle for theory building (by hiding all sorts of prior factual assumptions about human cognition and institutions), the rational choice approach nevertheless survives and thrives in all of the major social science disciplines (Lane 1991, chap. 2; Cook and Levy 1990). There are circumstances that evoke the capacity of humans to make calculating decisions. People can learn to make better decisions—for example, how to evaluate risk and integrate risk (rather than fear or dread) in their decisional calculations. Nevertheless, the rational choice perspective seems particularly limited where incentive structures are vague or where situations are changing quickly. If one cannot specify stable or equilibrium conditions that provide strong, well-understood incentives to individuals, then the maximization techniques of rational choice are not so useful in predicting their behaviors (Jones 1989). In such situations, shifts of frames of reference may be common. Reversals of preference in actual choices can occur when frames shift (Tversky and Kahneman 1981 and 1986; Quattrone and Tversky 1988). In political science, agenda studies have suggested the importance of such shifts in ambiguous circumstances (see Baumgartner and Jones 1993, chap. 3, for a review).

Attention and Intertemporal Choice

Such indeterminacy has sometimes been read as the inability of humans to make decisions rationally. Students of politics have studied the irrelevance of campaigns and political advertising to the issues facing the polity; the roles of attachment and identifications, as opposed to information in determining political choice; and the sweep of fads within the political system. A better approach is to view decision makers as "boundedly rational" (Simon 1985); that is, as working to achieve a degree of decision-making rationality through various heuristic devices. One critical component of decision making is the "bottleneck of attention"—that is, the biological necessity of decision makers to process cognitive information serially (Simon 1985).

Within the cognitive limits of serial processing, humans may be capable of a closer approximation to rational decision making than is sometimes appreciated. But a complex and ambiguous world may conspire to magnify the decision maker's shortcomings. In this article, I will investigate the possibility of relaxing certain assumptions of the rational approach to decision making in politics by incorporating the decision to attend to

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political issues in the decision-making model. The "attention to attention" leads directly to a focus on intertemporal choice—the issue of how people make choices over time (Lowenstein and Elster 1990). When we view choice over time, we observe incredible inconsistencies.

Major aspects of the rational model, in particular fixed, transitive preference orderings (so that individuals can rank alternatives consistently), are not affected by serial processing—at least with a proper understanding of preferences. Changes in choice are not caused so much by changes in preferences as they are by the "exquisite sensitivity to contextual cues" (Iyengar 1991, 11) exhibited by decision makers. Humans are sensitive to context because they are not just preference maximizers; they are also problem solvers, and problem solving is related directly to perceiving changes in the relevant task environment. It is this contextual sensitivity that is not appreciated appropriately in the "dispositional" models of political choice, whether those dispositions are seen as preferences, or attitudes, or basic values, or affective or emotional identifications with groups, parties, or candidates.

Our basic guiding thesis, then, is that preferences generally change only grudgingly but attentiveness to those preferences can shift rapidly. Preferences are multidimensional; we want many things out of life. In politics, for example, one may like some aspects of a political candidate but dislike others. Preferences are also sometimes in conflict with one another. Hence choice is affected fundamentally by attentiveness to the attributes that candidates offer citizens (or, for that matter, that car manufacturers offer consumers). In one situation (the Cold War is salient), citizens may attend to one set of preferences (he or she focuses on national security). In another situation (a deep recession is in process) he or she may attend to another dimension of evaluation (stimulating the economy). Note that the citizen well may want *both* economic stimulation *and* increased military security but may not be offered this particular package by candidates. Hence the candidates would be advantaged differently by a shift from a national security emphasis to an economic security focus by citizens. Moreover, the point is entirely general: The *choices* that people face are almost always underlain by multiple *attributes*.

Before we go any further, it is advisable to clarify some terms. The terms *preference*, *goal*, and *dimension of evaluation* signify almost the same thing in so far as an individual decision maker is concerned. They of course may not be the same when

we discuss the whole political system; what citizens want and what is advisable policy may differ. The attributes, or characteristics, of candidates, or other objects of choice, also are related to goals and preferences. When these attributes are evaluated (in the sense of attaching worth to), we speak of preferences. This may seem confusing at first, but we can clarify by looking again at our candidates offering combinations of economic security and national defense. These policy packages are two (among potentially many) attributes of the candidates. National security and economic well-being are preferences that our hypothetical voter has; they are also dimensions of evaluation along which candidates vary.

¹I have chosen the term *choice reversals* to contrast this concept with what Kahneman and Tversky term *preference reversals*. Their approach focuses on shifts in preference orderings that emerge when alternatives are presented in different contexts. My view is that preferences are more fixed than alternatives and that preferences and context interact to produce choices. Therefore preferences may remain constant, context may vary, but choices may reverse.

Context is mediated by attention—that is, a person cannot be affected by context unless he or she attends to it. Attention to context is generally lumped into preference structures, with potentially misleading results. Analysts may decry inconsistency in preferences when in fact context has changed so much that different preferences (and perhaps contradictory ones—we all harbor inconsistent preferences) are activated. When attentiveness to context changes, analysts can be misled into thinking that preferences have changed. An objective of this book is to urge analysts to divide preference structures into the actual preferences (what people want) and the preferences that they are attentive to at any point in time.

²It should be clear that direct choice reversals do not actually have to occur to be important in politics. It is the shifting focus of selective attention to preferences that is critical.

The introduction of shifts in attention in intertemporal choice opens up a much more important role for the *context* of decisions in determining outcomes. Attentiveness is affected by context, but preferences are not. Changes in attentiveness to underlying attributes in a situation can lead to *choice reversals*, in which a decision maker decides very differently among seemingly similar structured choices.¹ Faced with the same vote or other choice at two different times, the decision maker may reverse an earlier choice without really changing his or her underlying preferences or goals. Changes in attentiveness to the underlying preferences (which in the approach presented here are evaluated attributes of the alternatives that a decision maker faces) may lead to a reversal of choice. On the face, this may seem inconsistent and nonrational, but an understanding of how selective attention to the various underlying attributes of alternatives happens makes what is going on clear.²

This seemingly minor modification not only introduces a strikingly different view of human choice, but it also brings into question the prevailing view of democratic government as a mechanism for satisfying preferences. This is because in intertemporal choice situations it is unlikely that citizens change preferences rapidly, but they quickly can change the aspects of a situation that they pick out for attention. Hence changes in focus can change outcomes. Democratic governance has as much to do with responding to these changes of focus as it has to do with responding to changes in preferences.

Two Kinds of Preferences

Models of rational choice embody the assumption of *fixed preferences*. The assumption of fixed preferences has been used in two senses: fixed for the purposes of analysis (that is, the analyst has no business exploring preferences, only how people

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realize those preferences), and fixed in the sense of unchanging. Hence economics concentrates on understanding how consumer demands (tastes backed up by money) are satisfied, and political scientists focus on the satisfaction of citizen political demands (politically expressed tastes for policies).

Several political scientists have attacked the assumption of fixed preferences in either of its manifestations. James Q. Wilson (1980), and Clarence Stone (1993), among others, have argued that in politics preferences cannot be taken as fixed, because much of the political process concerns persuasion about preferred courses of action. Analysts must therefore examine the molding of political preferences, because this process is more important for politics than the issue of how these tastes are satisfied through government. A once-vigorous research program in political socialization concentrated on the acquisition of political values and dispositions across the life span. Inglehart (1990), among others, has examined broad changes in value structures that affect the conduct of politics. So there has been considerable interest among political scientists in understanding how tastes and values are formed and how they are altered.

But exactly what is it that is fixed in the rational decision making model? One might think of two kinds of preferences, one centering on the actual objects of choice, the other on the individual's goals that are to be realized as a result of the choice. In essence, a goals-based conception of preferences underlies the work of George Stigler and Gary Becker, two economists who have developed a framework that will allow economic analysis of all sorts of human behavior. They argue that we ought to interpret the rationality maxim of fixed preferences to mean *unvarying*: "tastes neither change capriciously nor differ importantly between people" (Stigler and Becker 1977, 76; see also Becker 1976). In their model of consumer choice, Stigler and Becker conceive of consumers as "maximizing a utility function of objects of choice, called commodities, that they produce with their own time, their skills, training, and other human capital, and other inputs" (p. 78) rather than as "a utility function of goods and services bought in the marketplace" (p. 78). In this approach, individuals can be viewed as maximizing self-esteem, style, or other intangibles as well as economic well-being. So it is easy to see that these economists have in mind the general goals that people harbor when they refer to fixed preferences. Stigler and Becker go on to argue that markets can be found anywhere (in the sense that things of value are exchanged) and will respond to "shadow prices" for the inputs that will produce those commodities. That is, the costs in time, effort, and resources that

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must be expended to obtain the "commodity" are balanced against the value of the "commodity" that the individual wishes to acquire.³

Hence we may distinguish between two kinds of preferences. The first, call them *direct* preferences, are desires for particular goods and services in the marketplace or for particular public policies in politics. The second, which we might term *Stigler-Becker* preferences, refers to the underlying attributes that structure the particular choice. People seem to harbor a mixture of both kinds of preferences; sometimes they seem capable of working through the various attributes underlying a choice (the trade-off between more square feet and cost when building a house, for example); at other times, they seem to reify the choice object ("I want that car"). If preferences are of the Stigler-Becker type, they are unquestionably multidimensional. In acquiring an automobile, people may want thrifty transportation and a comfortable ride and status.

So long as we treat preferences as referring solely to the object of choice (direct preferences), comprehensive utility functions referring to those objects seem plausible. Surely people can rank the cars they like, or the political candidates. Unfortunately the examination of only direct preferences can lead to considerable confusion when the examination is applied intertemporally. People seem to be not only incapable of rationality, but they do not seem even to be boundedly rational. When alternatives are described in different terms people have different preferences. They make different choices when considering the same objects at different times. They apply wildly varying discount rates to the future in different domains, sometimes strongly valuing present satisfaction over future satisfaction (they smoke), at other times only weakly valuing the present over the future (they fear low-level nuclear waste sites in their communities).

The realization that the underlying attributes of the objective choice are often what people are concerned about can help to make sense of an otherwise chaotic and unpredictable situation. When the underlying attributes of an object of choice becomes valued, it becomes a Stigler-Becker type preference. But when we introduce Stigler-Becker preferences into the equation, the existence of comprehensive utility functions becomes problematic. The reason is that *all objects of choice are multidimensional in their attributes, but people don't incorporate all those attributes into any particular choice*. Trying to evaluate multiple alternatives all structured by multiple attributes is overwhelming; oftentimes people just don't do it. Considerable research shows

³Sociologists have treated much of human interaction as involving some kind of exchange, and the area of study was termed "exchange theory" (see Blau 1964). So the conception of all sorts of human behavior being rooted in exchange is not new with Stigler and Becker. What they have done is to add the rational maximization decision-making axioms to this line of thought.

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that they tend to pick out the attributes they view as important, ignoring the rest. Unfortunately, what is not important now may be important tomorrow.

Rationality and the Behavioral Critique

As Herbert Simon (1985) notes, *homo politicus* is not irrational. He seems to behave purposefully, adopting strategies that are relevant to general goals, given the limits of cognitive capacity and the complexity of the political world. But these facets make it impossible to maximize and often inappropriate to try to maximize. *Homo politicus* seems to Simon to operate according to the model of *bounded rationality*, that is, adopting means that are relevant to goals within environmental and cognitive processing limits.

Compare this approach to that of Gary Becker. He first defines the economic approach as "the combined assumptions of maximizing behavior, market equilibrium, and stable preferences, used relentlessly and unflinchingly" (p. 110). Becker argues that "the economic approach is one that is applicable to all human behavior" (p. 112). Markets really operate everywhere, not just where they are regulated by prices. For Becker, and other economists, information is just another good that is subject to scarcity and declining marginal utility—implying "for example, greater investment in acquiring information when undertaking major rather than minor decisions" (p. 111).

Models of political decision making under rationality of choice are based on three fundamental assumptions. First, all possible states of the world facing a decision maker can be ranked with regard to desirability. Second, the decision maker knows the connection between the strategies he or she may choose and the desired goals, or evaluated states of the world, that will result from these strategies. Third, the decision maker optimizes. That is, he or she chooses the strategy that brings about the most satisfaction (which is the best state of the world discounted by the cost of the strategies that can be used to bring it about).

Naturally it will be argued that the means-ends relationship in the real world may not be so simple. Decision theorists have studied three situations: *certainty*, where every means is known to lead to specific outcomes; *risk*, where each strategy leads to one of a number of ends, each with known possibility; and *uncertainty*, where outcomes are known but probabilities associated with the outcomes are not (see Luce and Raiffa 1990, 19-40). In

Exhibit 1

Outline of the Rational Decision Model

In the rational decision model, the decision maker is faced with:

- 1) a set $\{S\}$ of strategies, s ;
- 2) a set $\{X\}$ of states of the environment, x ;
- 3) a set $\{R\}$ of outcomes or results of the interaction between actions and the environment;
- 4) a function, R , the outcome function, that associates each action-environment pairing (s,x) with an outcome $r = R(s,a)$.

The sets $\{S\}$ and $\{X\}$ are mutually exclusive and exhaustive. The problem for the decision maker is to choose a strategy, s , that is optimal in some respect.

Optimality is defined relative to the decision maker's *preference ordering*, which orders outcomes according to the principles of *completeness* (all elements in R are included in the ordering); and *transitivity* (if the decision maker prefers a to b or is indifferent between them, and he or she prefers b to c , or is indifferent between them, then he or she either prefers a to c or is indifferent between them).

It is not enough for the decision maker simply to rank outcomes. He or she actually must rank outcomes relative to the costs of the strategies. So what must actually be ranked is the set $\{R\} = r(s,a)$; that is, the results conceived as pairs of outcomes and the strategies that achieve them.

Because the world is fraught with uncertainty, the decision maker assesses the *expected utility* of each strategy-outcome pair. That is, he or she weights the desirability of the outcome by the probability that it will occur given the chosen strategy; so that

$E(u_s) = (u_x)p(x|s)$; where u_x is the utility derived from outcome x and $p(x|s)$ is the probability of outcome x *given that* strategy s was pursued. What is optimized is the expected utility from pursuing strategy s .

certainty models, there is a known function that relates means to ends, and hence to satisfaction (or utility). Accordingly, the problem is to maximize the utility function. In situations of risk and uncertainty, scenarios are developed which go under the general rubric of *game theory*. Exhibit 1 provides a brief overview of some of the salient facets of the rational approach to decision making.

One implication of the overview of the rational choice approach in exhibit 1 is that preferences refer to *outcomes*, or end states, and not to the strategies themselves. Now it may happen that strategies come to be valued in themselves, as when a voter becomes attached to a candidate independently of (or in conjunction with) the outcomes of the candidate's election. Such "brand loyalty" may be incorporated as an outcome of the choice

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of strategies. As we shall see, treating alternatives as strategies rather than as ends in themselves is important, because decision makers tend to evaluate alternatives attribute by attribute rather than globally, across attributes. Hence the salience of the attribute (or goal-state) is an important component of how people actually make decisions.

Bounded Rationality

The model of decision making discussed above imposes high demands on the calculational abilities of the decision maker. The legislator or voter must be able to conceive of the structure of conflict as consisting of multiple dimensions of basic attributes or goals that he or she wishes to see implemented. In effect, that means that the decision maker is able to rank order alternatives along separable dimensions. The voter or legislator also must be able to make comparisons among the dimensions that structure the situation. If the situation is previously structured by a choice dimension, then the voter or legislator must be able to understand the relationship between the choice structure and the basic dimensions of conflict underlying the choice structure. These requirements may be well beyond the normal calculating capacity of humans (Herstein 1981). Moreover, the decision-making environment may not be as well structured as the spatial approach suggests; ambiguity often leads to considerable rhetoric in politics.

Herbert Simon (1983) developed his bounded rationality approach to provide a model of choice that is in tune with empirical studies of decision making. Simon's dissatisfaction with the full-blown rationality assumptions is that they are highly unrealistic and seldom yield accurate predictions about human behavior. His bounded rationality approach is founded on two premises, each of which is contrasted with the "omniscient rationality" approach. First, Simon argues that limits on cognitive abilities of humans cause them to take a number of decisional "shortcuts" in contrast with what would be predicted in the rationality model. "Humans are information-processing systems operating largely in serial fashion, and possessing very modest computational powers" (Simon 1981, 173-74). In the second premise, Simon indicates that the environment is far more complex, ambiguous, and uncertain than proponents of rational choice are willing to grant. Because of this complexity, much of human problem-solving activity is with problems of design, or generating alternatives, rather than with decision, or choosing among these alternatives. In political science, major contributions were made by Charles Lindblom (1959) and Aaron Wildavsky (1984), who stressed the role of incremental adjustments in avoiding major mistakes in

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decision making in complex, multifaceted environments. Bounded, or limited, rationality models are more consonant with empirical analyses of human information processing and decision making than full rationality models. Students of human cognition continually stress the limited processing capacity of the human brain and its effects on decision making (Allport 1989; Schacter 1989). Social psychologists have found strong contextual and social effects that interact with the limited information processing capacities of humans (see Lane 1991 for a review and discussion).

Rationality and Preferences

James March (1978) notes that there are actually a variety of competing notions of rationality, but they all share assumptions about the limits of decision makers and about the world they face. He warns against trying to construct a model of choice based on observed choices and assumptions about preferences (that is, choices may or may not reflect preferences). The world within which the decision maker lives forces compromise; moreover, preferences are not fixed, rather, they shift according to circumstances. People "know that no matter how much they may be pressured both by their own prejudices for integration and by the demands of others, they will be left with contradictory and intermittent desires partially ordered but imperfectly reconciled" (March 1986, 156).

Nothing in the rational approach to decision making prohibits contradictory preferences. Indeed, much of the approach is directed at decisions under scarcity, hence it is based on contradictions. The comprehensive utility function is primarily a mechanism through which people resolve the trade-offs that they face. Becker (1986, 114) shows how rational analysis can be used to understand the contradictory preferences of the satisfaction gained from smoking versus the wish for a long and healthful life. To Becker, there is just a tradeoff: the joy of smoking versus the probability of living longer if one doesn't smoke. "The life-span forfeited is not worth the cost to him" (p. 114). The acquisition of information is a part of the model; the optimal decision maker treats information as a scarce good, which therefore is subject to the same trade-offs as any other good; the rational individual will acquire information until it is too costly given the decision.

Becker clearly is not wrong to note the contradictions, but he seems misguided in thinking these contradictions are ordinarily integrated. Most people do not integrate preferences

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that way; they tend instead to fix on one goal to the exclusion of the other. So preferences are often contradictory, and that offers no problem to rational analysis. The perspective this book adopts is that preferences are ill-integrated into an overarching utility function. In Becker's approach there is no room for *regret*; no room for the smoker who wishes he had quit as his health deteriorates, or for the workaholic who is pained that he did not choose to spend more time with his family. Becker thinks that the smoker had optimal information and therefore made an optimal choice. Is he now behaving irrationally by becoming depressed? Becker (1986, 114) says that "most deaths are . . . 'suicides.'" I would say that some deaths may be a result of focusing on one facet of preferences in a multifaceted world.

The Role of Information

Perhaps nowhere does the rational model of political choice diverge from boundedly rational understandings of politics than in the role of information. For most rational choice theorists, information is a "good" like other goods; hence it is subject to the rules of utility maximization. The more one values a decision, the more he or she will invest in acquiring information; but the more information that is acquired, the less valuable it is in illuminating a decision. At base, this is a marginalist conception of information: information, like other goods, is subject to declining marginal utility. A decision maker will stop acquiring information when the marginal cost of acquiring more offsets the marginal gain from the new information.

Political scientists, however, note that it is always irrational to acquire information about voting in elections, because the probability of influencing the outcome is infinitesimal. Hence considerable analysis has been directed at "the puzzle of informed citizens" (Fiorina 1990, 336). It seems rational to be ignorant; the marginal cost of acquiring information is always more than the marginal utility of information. At the very least, one must postulate that satisfaction that is received by informed citizens is quite independent of the probability of influencing the electoral outcome. Because this paradox is at the very heart of political participation, political scientists have been far more suspicious of treating information as a neutral good than have economists.

The problem goes even deeper. Information often provides a social definition; one often makes a statement about oneself by one's knowledge about politics, stance on the issues, and attitudes toward candidates and parties (Fiorina 1990, 340). Because information provides social definitions, political communities of inter-

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est are made and unmade during the exchange of information.⁴ Policy issues are not just illuminated by information, they are framed by it. When issues are reframed, often through the highlighting of a previously ignored dimension of evaluation, our basic understanding of an issue shifts. A marginalist approach to information can be misleading in politics.

Ill-Structured Problems

A very important class of problems, and indeed the typical problem in politics, involves "open constraints." These are the constraints that develop as problem solving proceeds (Reitman 1964, 292-93). Reitman asks us to consider such problems as "write a fugue," which is similar in form to "design a health-care system" or "produce an intergovernmental block-grant system" or "cut the federal deficit." The end is specified; other constraints are "generated from one transformation of the problem to the next" (Reitman 1964, 296).

The emergent solution is *path dependent*, in the sense that each step in the process of finding a solution is dependent on prior decisions. Most critically, the design problem, the whole range of choices that exist at any point in time, is constrained strongly by earlier decisions. If one has started on a path leading to a poor fugue (or deficit reduction plan or health care system), he or she is going to find a suboptimal solution that will be extremely difficult to change. In problem solving and decision making, history matters.

Finally, it may be noted that ill-structured problems with emergent constraints focus the attention of decision makers on a limited number of attributes of the problem. Indeed, one characteristic of the suboptimal solutions that can emerge in solving ill-structured problems is the ignoring of essential dimensions of evaluation that later appear to be important. This is a major reason that "no solution to an ill-defined problem can count on universal acceptance" (Reitman 1964, 302).

The Complexity Catastrophe

Critiques of rational decision making have tended to center on the empirical: People cannot make rational decisions in complex environments. The implication is that had the genetic makeup of homo sapiens been different, they perhaps could. But humans are great learners, and they clearly can learn to make better decisions. The question is whether they can learn to be fully rational, in the sense of maximizing overarching utility functions.

⁴I am rephrasing Alfred Marshall (1961, xiv) only slightly.

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Biologist Stuart Kauffman (1993) has developed a model that implies that optimizing in decision making is simply not possible in complex situations. While he developed his model to study evolution, it is quite general in its implication—applying to so-called combinatorial optimization problems. Kauffman (1993, 53) writes that "As systems with many parts increase both in the number of those parts and the richness of interactions among the parts, it is typical that the number of conflicting design constraints among the parts increases rapidly. Those conflicting constraints imply that optimization can attain only ever poorer compromises." Optimization can occur when systems are not complex (that is, when they are additive and not interactive; or when they contain few elements). Optimization cannot occur as a matter of the nature of the conflicting constraints when systems are complex—that is, when there are many elements and they interact.

The implications are powerful. Even if people could learn to overcome their cognitive limitations, they could maximize only in simple worlds. If the world is complex, they must make compromises, and the more complex the world, the worse their compromises are likely to be. It is the nature of the world that imposes the limits on optimization more than cognitive limits.

Simon thinks that generally good decisions can be made by factorization—that is, by ignoring the irrelevant parts of the environment. He writes that we live in a "nearly empty world—one in which there are millions of variables that in principle could affect each other but that most of the time don't" (Simon 1983, 20).⁵ Simon is right in one sense—at any one time, probably not many variables affect a choice. But the world has a way of changing, bringing in previously ignored facets that act to undermine a choice that seemed perfectly respectable a little bit earlier. Evaluating choice means that we must attend to the temporal dimension, because over time more variables have the opportunity to undermine a compromise (path dependent) solution.

Limits on Optimality

⁵I am struck by how closely the thrust of the work on decision making by Herbert Simon parallels the thought of Marshall—as opposed to some of Marshall's more direct intellectual descendants, such as Gary Becker. Of particular interest is the similarity of their thoughts on factoring decisions.

Economist Gary Becker (1986, 119) claims that "all human behavior can be viewed as involving participants who maximize their utility from a stable set of preferences and accumulate an optimal amount of information and other inputs from a variety of markets." Empirical studies show that people do not—at least many times they do not. The reasons are twofold: They cannot because they are cognitively unable to, and they cannot because

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the world will not let them. I would view humans as great learners; potentially they could learn to behave according to Becker's model, even if they do not do so now.

We will turn shortly to a major heuristic for struggling with cognitive limitations, shifting attentiveness. But the major message I want to convey here is that people are boundedly rational because a multifaceted decision-making environment won't allow them to be omnisciently rational. Kauffman's complexity catastrophe places strong limits on rational decision making, because it denies optimization in complex systems. Infinite calculational power will not change that. James March (1986, 148) has termed this *contextual rationality*: "the extent to which choice behavior is embedded in a complex of other claims on the attention of actors and other structures of social and cognitive relations." At least in the early stages of the development of the quantitative approach to economics, the claim was *not* one of omniscient rationality by decision makers. Rather the claim of Alfred Marshall and the other marginalists had to do with the appropriateness of factoring as a decisional strategy—the world was basically linear and decomposable in the "normal" course of events. People could work on one thing at a time, then if anyone wanted to add all of these things up they would approximate a decisional equilibrium: effort and utility would exist in a nice balance. So things worked out all right in the end; the infamous "as if" assumptions (the world operates *as if* people maximize) does no damage.

What if the world is not so nicely decomposable? What if domains affect one another in complex patterns? Now cognitive limits intervene. Decision makers are going to have to compare across decisional domains, because they are not divisible. They could try to balance the facets in some sort of average. But they often do not. Rather, they tend to pick out facets that are most relevant at the time, and they make decisions based on those facets. They continue to compartmentalize and factor, behaving as if the world is linear and decomposable. It is not misleading to suggest that they maximize within compartments. But when the context changes, bringing in new facets, they can be left with poor past choices. If they now make new choices based on the changed context, they will look inconsistent.

ELABORATION OF THE MODEL

Now we can turn to a more systematic explanation of changes in actual political choices that do not infer changes in preferences.⁶ To do this, we observe that a change of choice

⁶The case for this approach has been made by Enelow and Hinich (1990). They note that "critical features of the voting environment rarely remain the same" (p. 436). They offer the example of a common-site picketing bill that was passed in 1975 by both houses of Congress but vetoed by President Ford. Then, with a Democratic president in office in 1977, the House of Representatives defeated a nearly identical measure.

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from one time to another means either that preferences have changed or the context has changed, hence activating a different underlying preference. Context changes when decision makers shift their attention from one evaluative dimension to another. Let us see how this might work.

On June 17, 1992, members of the House of Representatives voted 232-181 in favor of an amendment by Congressman Dennis Eckart of Ohio to eliminate all funds except shutdown costs for the superconducting supercollider, which was being constructed in Texas for an estimated cost of \$8.3 billion. The year before, members had rejected a similar amendment to the energy and water projects appropriations bill by 90 votes (*Congressional Quarterly*, June 20, 1982, 1782). Six weeks later, the Senate voted 62 to 32 to restore funding, sending the revised appropriations bill to conference committee (*New York Times*, August 8, 1992). The conference committee chose a funding figure close to the Senate's (Clayton 1992).

Seventy nine Representatives voted "yes" on the supercollider in 1991 and "no" in 1992. The standard interpretation, offered by journalists, was that these members changed their minds on the large, expensive project under the pressures of "antideficit fever." Independent presidential candidate Ross Perot had made the deficit the centerpiece of his grass roots bid; only one week before, the House had narrowly defeated a constitutional amendment requiring a balanced budget. Texans, and in particular Congressman Joe Barton, in whose district the supercollider was, were vigorous supporters of the amendment. Many speculated that some members reacted negatively to such gross displays of hypocrisy. By the time of the Senate vote, Perot was out of the race (temporarily, at least) and emotions had cooled over the balanced budget amendment. The Senate, moreover, traditionally had been more supportive of the project, having rejected a move by Senator Dale Bumpers of Arkansas to cut the project the year before by a 62-37 vote. Senators had not changed their minds about the "big science" project.

It is possible that *none* of the representatives changed their minds on the supercollider vote, and that their changed behavior was caused by a shift in attentiveness to the underlying dimensions of conflict that structured the vote. Following the line of argument developed above, we may infer that legislators and other political decision makers attend to only certain facets from a complex environment, and the particulars that command attention can shift behavior even in the absence of any changes in preferences.

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The introduction of new dimensions of conflict (and thereby definitions of issues) has been recognized as fundamental to understanding political decision making. Riker (1982 and 1990) indicates that preference cycling can occur when new dimensions of conflict are interjected into a political debate. Riker, however, emphasizes the strategic manipulation that can occur through agenda control. Clearly such strategic manipulation can occur, as is the case when agenda controllers offer "packages" of bills that must be accepted or rejected on the floor of the legislature. But strategic manipulation can only go so far.⁷

The Serial Shift

The approach developed here rests on two assumptions. First, I assume that decision makers must select aspects of the decision-making environment which they then treat as relevant for the decision-making situation. Second, I assume that attentiveness evokes frames of reference that are evaluative in nature. This is another way of saying that decision makers have goals that they view as more or less relevant to the decision in question, and that the realization that those goals are relevant imposes different structures on a situation. Recall from our earlier discussion that selective attention is a critical facet of the model of bounded rationality (Simon 1977; 1981; 1983; 1985). Selectivity in attention means that decision makers can focus only on a limited number of items during a single time span. The limits of serial processing necessitate episodic shifts from one focus of attention to another.

The second assumption, *decision framing*, is a concept developed by psychologists Kahneman and Tversky to describe situations in which decision makers allow descriptions of outcomes of choice that are irrelevant to the choice to affect the decision (Kahneman and Tversky 1984; Tversky and Kahneman 1981 and 1986). For example, decision makers will choose different strategies for disease treatment depending on whether the outcomes are described in terms of saving lives or of preventing deaths (Kahneman and Tversky 1984, 343). This violates what they term the *invariance* criterion for rational choice: "that the preference order between prospects should not depend on how they are described" (Kahneman and Tversky 1984, 343). Framing seems to be pervasive and to affect both the sophisticated and the naive. "In their stubborn appeal, framing effects resemble perceptual illusions more than computational effects" (Kahneman and Tversky 1984, 343).

⁷Considerable strategic agenda manipulation took place on the supercollider vote. The substantive committee report selected the amount for the supercollider to be included in the appropriations bill. This amount was lower than what the president had requested, to appeal to those legislators wary of continuing to fund the supercollider. The Eckart amendment selected an alternative amount (essentially zero) from among the possible alternative positions. The Rules Committee set a favorable rule for the committee report, one that was supported in a floor vote. Yet all of these activities were manipulations by House leaders, and they ultimately failed on the House floor vote.

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It is not hard to see how shifting attention to contextual cues often evokes new frames of reference. Indeed, framing only occurs because whole new evaluative frames are evoked by contextual cues (the descriptions of outcomes in the experiments of Kahneman and Tversky). Finally, because humans must process information serially, and because frames are raised by contextual cues, it is most difficult for decision makers to integrate utility functions across frames and be consistent across time. That is, a utility function can be quite coherent at one time, because it is structured by one frame of reference. Similarly, at another time, the decision maker's utility function might be quite coherent but structured by a second frame. However, the two functions may be quite different, shattered by a shift between the two frames.

Social Choice and Shifting Attention

The standard social choice approach has assumed unchanging preferences on the part of decision makers and has focused research attention on the manner in which these fixed preferences are translated into collective choices. Much progress has been made in understanding how political institutions can be manipulated to achieve leaders' ends, both where the preferences of followers are cyclical and no "equilibrium" social choice function exists and when an equilibrium condition exists (known as the Concordet alternative).

But how does the model deal with change? People don't change their minds very much in the models; otherwise any established equilibrium would be upset. Moreover, if people changed their minds, then the preference aggregation problem would be far less important in democratic theory. Preferences are fixed. But fixed preference decision makers may not be optimal performers, as Cohen and Axelrod (1984) have shown. Clarence Stone (1992) has argued that the world is so dynamic that fluidity in preferences is a necessity. These theorists, however, have a relatively restricted notion of preference, and a broader view such as that proposed by Stigler and Becker (1977) may avoid the problem of adjustment to changing reality.

In the fluid preference approach, it seems that decision makers are subject to a change of mind every time the decisional context changes. Since context is notoriously slippery as a concept, we are left with a very difficult situation—unless we can do a better job of specifying "context." Surely context has much to do with decision frames; just as surely, preferences and attention frames are distinct (or at least may be treated as distinct for the purposes of analysis).

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Important advantages accrue if we continue to assume fixed preferences but allow attention to those preferences to vary in time. Established models of political choice already allow for variation in salience of evaluative dimensions across decision makers (Ordeshook 1986, chap. 1). If we view preferences (or goals) as remaining relatively fixed, while attention to those preferences or goals varies considerably, we can take advantage of the models developed for the analysis of differences among decision makers in attentiveness to dimensions of choice.

In the standard rational choice model, conflicting preferences are allowed—and, indeed, assumed. Indifference curve analysis implies trade-offs among competing alternatives. Indifference can be thought of as reflecting two marketplace goods (apples versus oranges, in the classic Economics 101 example). In politics, the example can be applied to trade-offs between two candidates or two policy alternatives, what we have termed direct preferences. But the trade-offs also can refer to the underlying evaluative dimensions or goals that structure the actual or realized choice situation. These are the multidimensional Stigler-Becker preferences. Conflicts between two direct preferences often may be resolved by the type of comparisons implied by indifference analysis. But for Stigler-Becker preferences, contradictions often are reconciled through selective attention. In the supercollider example, a legislator might like both extensive growth spending and a smaller public budget. The choice situation can force the trade-off, and in such a situation the differential attentiveness of the legislator to the basic dimensions of choice could dictate his or her vote.

Riker's Heresthetics

William Riker has noted that "the formal theorems about equilibrium reveal nothing about moving parts" (Riker 1990, 46). That is, formal political theory lacks dynamics. In an attempt to add dynamics, Riker (1986 and 1990) distinguishes between situations where political leaders induce voters (in committees or in general elections) to change their ideal positions in issue-space, which he terms *rhetoric*, and in situations where the leader alters the issue-space or other constraints in the voting situation to get the voter to change his behavior. Riker terms the latter *heresthetics*. In such situations, leaders redefine issues by making salient dimensions of conflict that were previously latent.

Riker's approach derives directly from the indeterminacy of majority rule where more than one dimension of conflict is involved. He notes the possibility of manipulation of the final

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outcome where conflict proceeds in multidimensional space because of McKelvey's agenda theorem, which proves the possibility of cycling throughout the space. So if agenda setters can change one-dimensional conflict structures into two-dimensional structures, they could move proposals around in the multidimensional space until they achieve their goals. Therefore, Riker sees more possibilities of manipulation through the transformation of the issue-space from one-dimensional to multi-dimensional (Riker 1990, 53-54).⁸

This approach leads to a somewhat mechanistic view of the issue definition process, in which leaders have considerable leeway in the process of definition in order to achieve their (fixed) aims. In the literature on systemic agenda setting, issue definition tends to be viewed as part and parcel of the political dialogue, with no individual having exclusive privilege to define the dimensions along which conflict proceeds, and with considerable indeterminacy and contingent strategic behavior (Deborah Stone, 1988 and 1989; Baumgartner 1987 and 1989; Baumgartner and Jones 1993; see also Elder and Cobb 1983). Riker clearly moves in the right direction in distinguishing between rhetoric and heresthetics, but he retains a far too mechanistic view of the process of issue definition. Agenda setters cannot manipulate freely because of the phenomenon of "cognitive twoness," which implies a complete shift from one evaluative dimension to another. So while the introduction of a new dimension of evaluation is possible for the leader to accomplish, he or she may not be able to control the "flow" from one dimension to another.

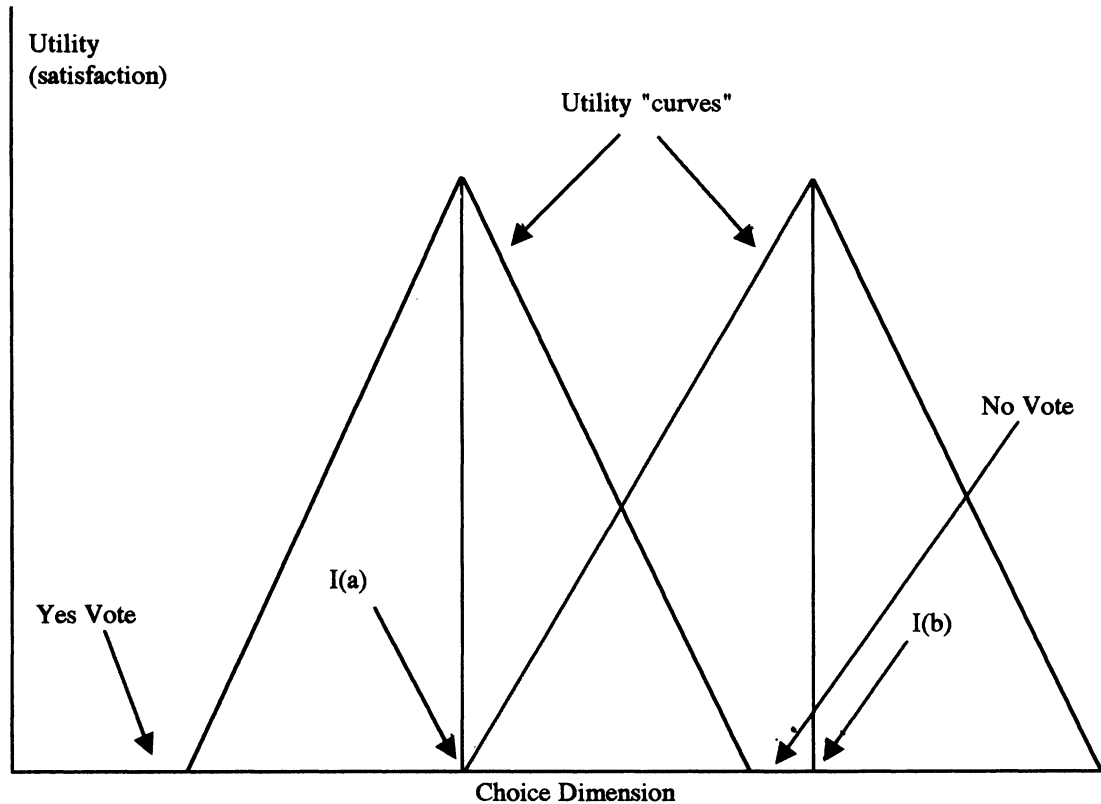
The Choice Dimension

⁸Riker's examples tend to focus on a single move, in which conflict is shifted from one dimension to another, at least for a swing group of committee members. He implies that the introduction of a new dimension of conflict is abrupt, causing rapid shifts in outcomes. This would seem to come closer to accepting the serial shift and cognitive "twoness" than his formal analyses imply. He offers the example of the heresthetics of Senator Warren Magnuson in 1969. The issue concerned the transportation of nerve gas from Japan across Washington to a detoxification center in Oregon. The senator interjected the prerogatives of the Senate in treaty negotiations to a debate about the dangers of transport (which most senators cared little about, since their states were not involved). The single move determined the outcome, with ten senators moving to Magnuson's position (Riker 1986).

Let us now return to the supercollider issue, assuming that an underlying dimension of choice structures the simple yes-no dichotomy that was offered legislators on the supercollider issue. The postulation of a continuous choice dimension underlying this vote suggests that other alternatives on the supercollider, ranging from more to less supportive of the project, could have been presented to the House. It was clear that this was how the issue was perceived, since the Eckart amendment was a vote to cut \$450 million of the \$484 million allocated in the Appropriations committee recommendation for the supercollider for fiscal year 1993. This was the same amount as that allocated in fiscal year 1992, even though President Bush had requested \$650 million. Hence the committee's recommendation was considerably less than the president's, and the Eckart amendment's was less than the committee's (but even the Eckart amendment left some funds for shutdown); many projects have returned from the grave when funeral costs are included in a budget bill).

Exhibit 2

The Supercollider Vote in One Dimension



Now we can depict the choice dimension using the tools of spatial analysis (see Davis, Hinich, and Ordeshook 1970; Ordeshook 1986). In exhibit 2, the "yes" and "no" votes are depicted on the underlying choice dimension, but for convenience in discussion, support for the supercollider has been labelled as the "yes" vote (even though it was actually a "no" vote on the Eckart amendment). We know that the seventy-nine legislators were "closer to" the pro vote in 1991, but they were "closer to" the anti vote in 1992. (Recall that the pro vote was exactly the same in monetary terms in the two years and the anti vote was essentially the same.) The locations of the ideal points for these legislators is arbitrary, because the vote would not suffice to reveal their exact preferences but the diagram gives an interpretation consistent with the facts of the case. Utilities are depicted on the Y-axis, making the traditional single-peaked assumption. So

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I(a) can be interpreted as the average ideal point for the seventy-nine legislators in 1991 (although of course they would range between the origin and $1/2$ the distance between the positions of the Y vote and the N vote). I(b) is the average ideal point on the choice dimension in 1992.

Exhibit 2 would seem to indicate that the legislators, for some reason, changed their preferences. They voted differently on the same vote at two different points in time. One might think that they received new "information" that caused them to shift their preferences. This new information, in journalistic accounts, was probably information about the deficit. The problem with this interpretation is that there was a deficit the year before. The objective "facts" had not changed much. It is more likely that changes in the political context had caused legislators to pay attention to this dimension of conflict.

An Embedded Choice Dimension

Spatial analyses of elections and other structured choice situations generally have assumed that the observed alternatives are drawn from more fundamental underlying choice dimensions (Enelow and Hinich 1984; Ordeshook 1986). Analyses of electoral choice situations from survey data have confirmed that electoral choice is structured by a limited number of dimensions of conflict (Weisberg and Rusk 1970). Dimensional analyses of legislative roll call voting have also been successful in isolating a limited number of dimensions along which political conflict proceeds (Clausen 1967 and 1973; Jones 1973; Poole and Rosenthal 1991).

The point is that the dimension of choice may not be identical to the dimensions of conflict that structure the legislative body. Indeed, any particular decision is almost certainly likely to be correlated imperfectly to the dimensions of conflict that structure a body. If these dimensions of conflict are thought of as underlying generalized evaluative dimensions or goals, then spatial models of political conflict become general models of decision making. This is consistent with a suggestion by Riker (1990, 57) to think of an alternative space as distinct from an outcome space. That is, decision makers are presented with a set of alternatives. Generally, decision makers are interested not so much in the set of alternatives as in the outcomes that these alternatives presumably bring about.

Rather than view the choice and outcome spaces as distinct and separate, we might assume that the alternative, or choice,

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space is embedded in the outcome, or policy, space. The choice space is smaller than the outcome space in dimensionality; thus the alternative space can be defined in terms of the outcome space. This is another way of saying that any choice has multiple dimensions along which it can be evaluated. Generally the axes of the choice space will be oblique to the axes of the policy or outcome space. This implies that the choice space is correlated with dimensions of the policy or outcome space. Should the choice space collapse onto the outcome space, the alternatives are perfectly correlated with outcomes, and any change in alternatives will bring about a direct and proportional change in outcomes. Generally, however, by acting on the choice space, decision makers know that they can affect the policy space, but each unit of change on the choice space will not yield a proportional change in outcomes.

Given the postulate of two spaces, we may distinguish two situations. In the first, decision makers know the relationship between the choice and policy spaces. In the second, they know that there is a relationship but are unsure about its exact nature. This latter condition introduces an element of uncertainty (the relationship between alternatives and outcomes). It allows for more rhetorical play than the former condition, which is more amenable to the politics of issue definition and heresthetics. For the present, we assume that all actors see the relationship as the same, but they can evaluate the worth of the outcomes differently.

In many cases, the alternative space will be unidimensional, because the choices can be ordered from more to less along a single dimension. This pertains to many budget decisions and amendments to the decisions. Alternatives would also fall along a single dimension in cases of *structure-induced equilibria*, which impose issue-by-issue voting in a legislative body via the committee structure (Shepsle 1979). Structure-induced equilibria stem from institutional factoring of decisions such as assigning issues to committees to prevent issue cycling. Transportation committees vote for transportation bills, even though mass transit would affect urban sprawl and environmental pollution as well as transit problems.

Predictive Mappings

Adopting the tactic of viewing the choice space as embedded in an outcome space allows us to take advantage of a theory of embedded dimensions developed in a somewhat different context—the *theory of predictive mappings* of Hinich and Pollard

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(1981) and Enelow and Hinich (1983 and 1990; see also Enelow 1984). Enelow and Hinich ask us to consider an election in which multiple issue dimensions are involved and candidates are placed in the minds of voters along a single ideological dimension. Then the major issue for analysis is how voters predict issue positions from their understanding of ideological differences among candidates.

It may be seen that the embedded choice dimension is completely analogous to the ideological dimension in the Enelow-Hinich theory of predictive mappings. Legislators must make inferences from the choice dimension to the evaluative dimensions in a manner that is mathematically similar to the Enelow-Hinich approach.⁹ An important finding from this analysis is that when voters have single-peaked preference functions on the issues and there are linear mappings between the issue dimensions and the ideological dimensions, preferences on the ideological dimension are single peaked. For most goals or evaluative dimensions one adopts but a single position, and as one moves away from that goal state, he or she is less satisfied. But it is less evident that single-peakedness holds for any actual choice dimension, composed as it is of bits of numerous evaluative dimensions.

The vantage point also underpins the work of Poole and Rosenthal (1991) on the structure of congressional voting, in which roll-call votes are placed on a dimension that cuts through the ideological space. This ideological space structures conflict that is empirically observed on roll-call votes. If we think of the ideological dimensions as evaluative dimensions and the roll calls as forced choices, then we are back to the model discussed above. Poole and Rosenthal write that their finding of a stable low-dimensional conflict space that structures congressional voting patterns "says nothing about how specific issues get defined in terms of the structure" (p. 229) and nothing about "how specific issues get mapped on the dimensions may change over time" (p. 232). But attentiveness to the underlying structure also can shift over time.

⁹Enelow (1984) has developed a model in which legislative voting is conditioned on earlier votes such that there exists a linear mapping (forecast) from earlier to later votes, thus imposing consistency on legislative choice (also dealing seriously with cognitive limits in legislative choice). Enelow and Hinich (1990) show that this approach is mathematically equivalent to the ideological predictive mapping model of Hinich and Pollard.

So we can see that there has been considerable work in political science that has viewed the actual choice situation as distinct from the goals that participants in politics have. These include the ideological dimensions that separate the parties in elections (the realized choice) and the issues that voters are concerned about (the underlying Stigler-Becker preferences of voters). It also includes Riker's distinction between an "alternative" space (the actual choices) and an "outcome" space. Finally,

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roll calls can be viewed as the alternatives, or realized choices, with the ideological orientations of legislators being the underlying goals. These seemingly diverse examples all can be reduced to the general model of choice we have been developing.

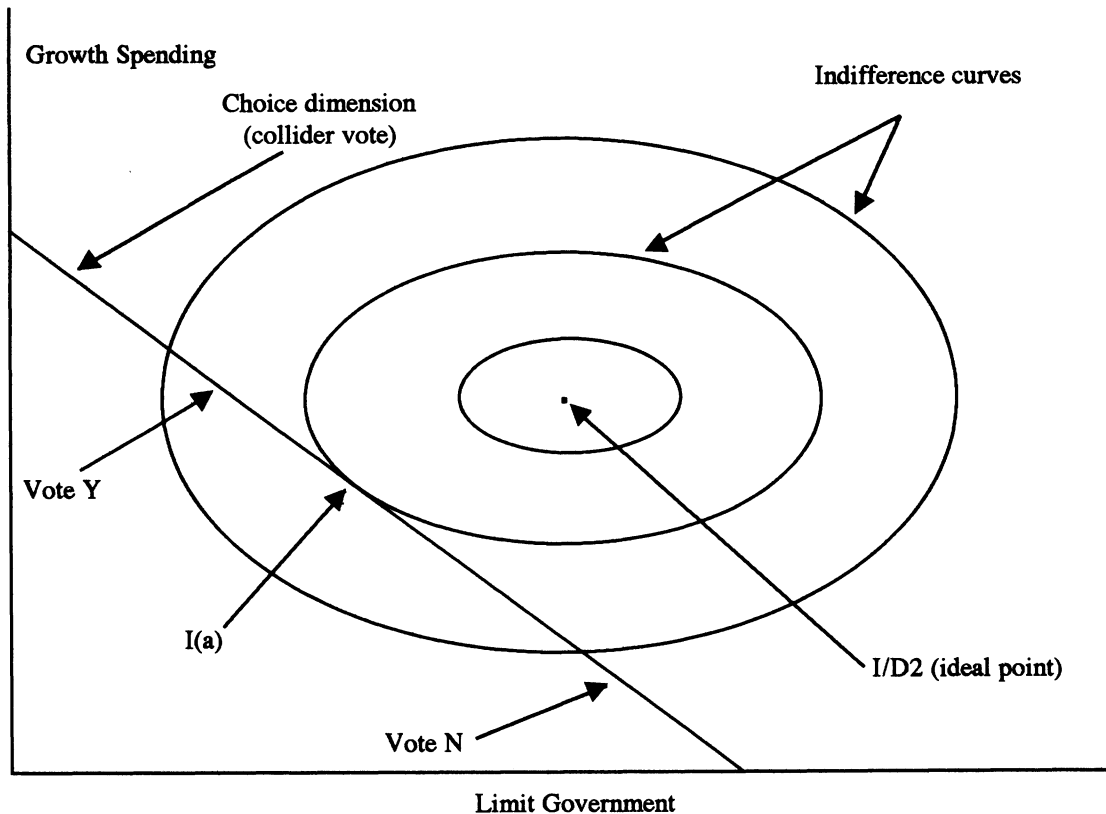
The Supercollider and the Serial Shift

Armed with these tools, let us return to the supercollider vote. There we might assume (with considerable justification from the journalistic accounts of the event) that the choice dimension was embedded in a two-dimensional policy or outcome structure, one of which concerned deficit reduction and the other of which concerned public spending to stimulate economic growth. Clearly other considerations intruded, including the benefits generated from supercollider contracts (proponents had carefully constructed a network of suppliers in forty-five states). But the dimensions of conflict postulated here are as old as the debate between Hamilton and Jefferson concerning the limits of government. Nevertheless, it is important to remember that the particular policy content of the dimensions, as important as they are in this example, are not critical for the general analysis.

The choice dimension (funding for the supercollider) embedded in the two-dimensional policy or outcome structure is presented in exhibit 3. The choice dimension is the same as in exhibit 2, but the exhibit presents only the situation in 1991. The ideal point in two dimensions, $I/D2$, is the hypothesized average ideal point for the seventy-nine legislators who shifted positions in the two-dimensional structure. Now it is clear that the ideal point for the legislators in 1991, $I(a)$, is the point at which the choice dimension is tangent to the smallest utility contour encircling $I/D2$. This is the least distance between the choice dimension and the average ideal point, $I/D2$. Because the point of tangency, $I(a)$, is closer to the Y vote than the N vote, the legislators voted to approve.

The choice dimension is depicted as a negative linear function in relation to the two goals. This indicates that the choice involves a structured trade-off between growth spending and the limiting of government spending. It is, therefore, similar to the standard budget constraint from microeconomic analyses of public policy (Stokey and Zeckhauser 1978). In the typical budget simplex situation, decision makers may choose any point within the triangle formed by the possibility frontier and the two axes. They will choose a point on the frontier because to do otherwise would be a suboptimal choice. There are other reasons that the choice dimension may force a trade-off other than strict

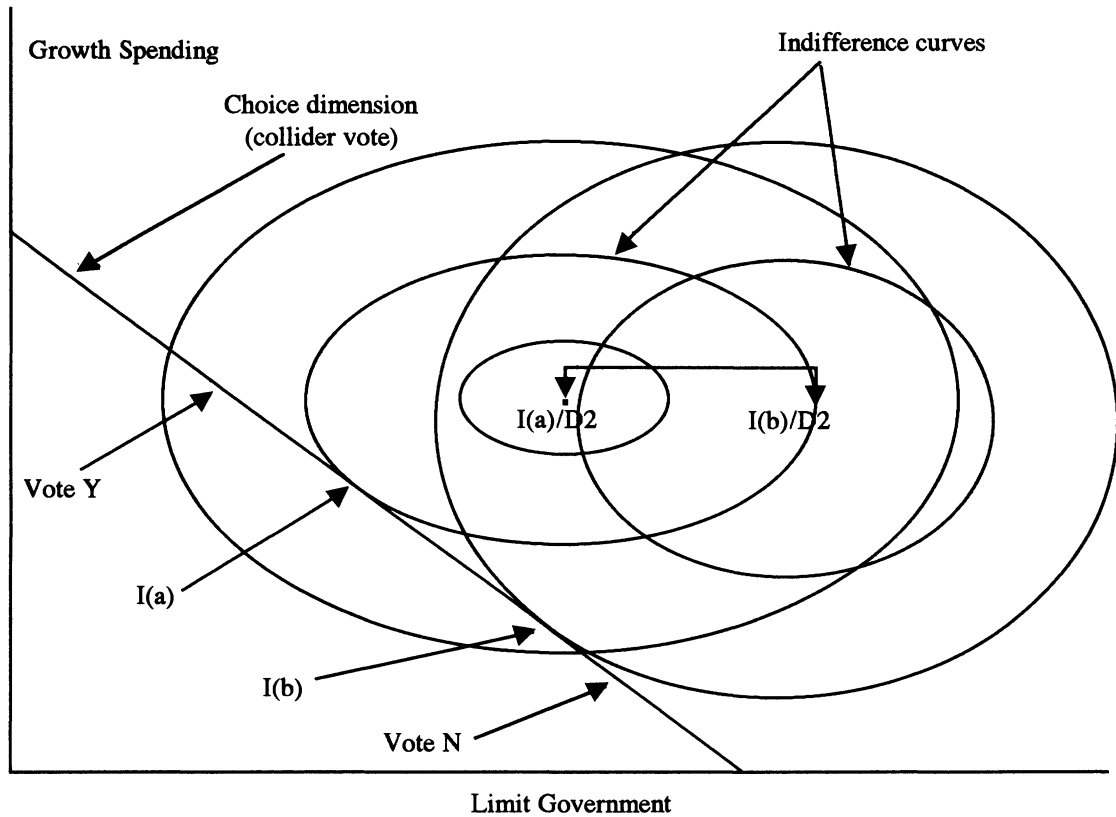
Exhibit 3
The Supercollider Vote in Two Dimensions



budgetary limits, however. Generally, Stimson (1991, 24) notes, "constant values can produce variable value trade-offs over time. In A vs. B we always value both A and B. But changing circumstance might well lead rational electorates to change the A/B cut point, how much A is to be sacrificed to gain how much B." Trade-offs also can be created by the institutional structure and by the manipulation of agendas by agenda setters. In any model using the dimensions of public spending for growth and limited government as its outcome structure, a trade-off between the dimensions (and, consequently, downward-sloping choice dimension) is a strict necessity.

Exhibit 4 depicts a model of the voting situation in which legislators changed their minds. In this instance, they decided to move in the direction of *more* budget cutting, without wishing to

Exhibit 4
A Change of Mind



shifting the average i-point from $I(a)/D2$ to $I(b)/D2$ and the preferred condition under constraint from $I(a)$ to $I(b)$. This moves the preferred position on the choice dimension in the direction of a "No" vote (and presumably closer to the "No" vote than the "Yes" vote). Note also that because legislators were unwilling to forgo any growth spending, the position of tangency at $I(b)$ is on a lower indifference curve than $I(a)$ was. That is, their ideal point is further from any point on the choice dimension. By changing their minds, they are worse off than before—but of course that does not matter. If they changed their minds, they changed their minds, so that being worse off is a consequence of the real shift in preferences. Other changes of mind could yield a better outcome for decision makers; the general point is that changing one's preferences in a structured choice situation changes utilities deriving from the choice.

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Fixed Preferences, Varying Attention

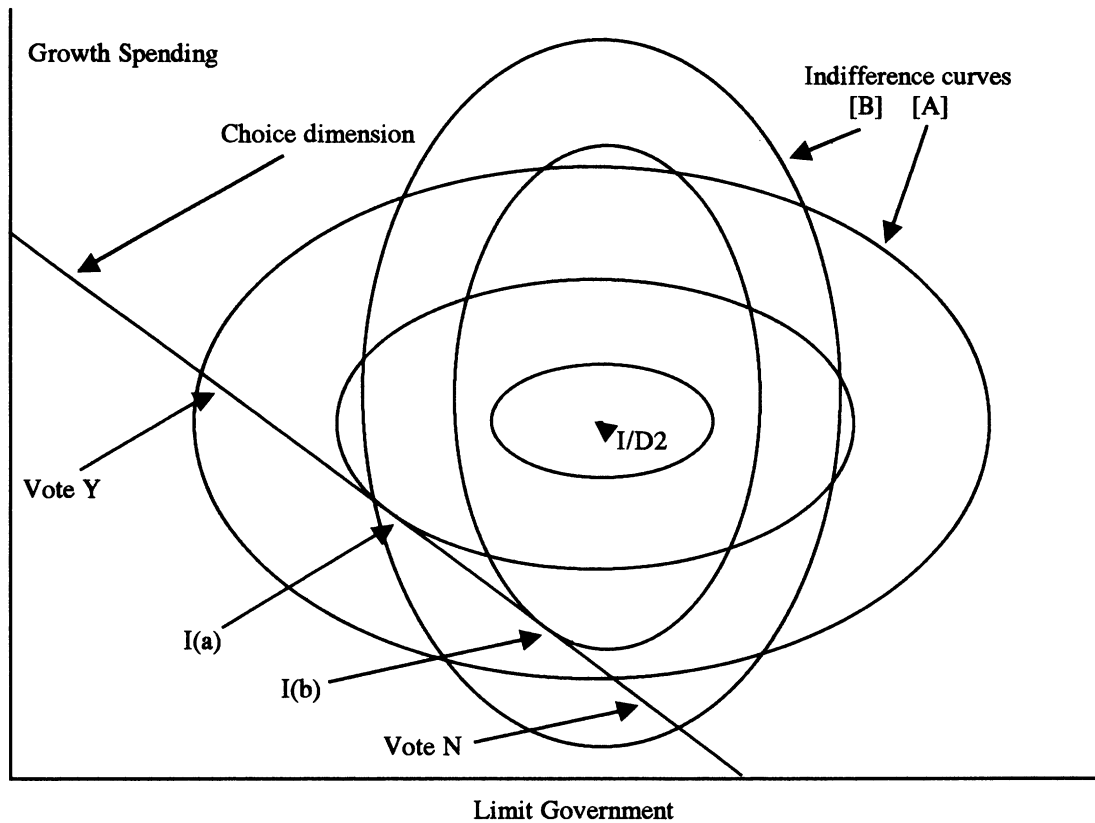
One way to account for the shift in vote between the two points in time is a change in preferences. Decision makers do change their minds, perhaps when new information is available. The problem in decision making is not so much the lack of information, but its overabundance (Simon 1981, 167). This suggests that the structure of information is more important than its availability. Put otherwise, what is important is the information that the decision maker attends to.

In examining shifts in attentiveness to conflict dimensions, the shape of the indifference curves of decision makers is quite important. Circular indifference contours in multidimensional space imply indifference between the two dimensions, while elliptical curves imply that one dimension is more "important" or salient to the decision maker (Ordeshook 1986, chap. 1). It takes a smaller change in the dimension parallel to the minor axis of the ellipse to move a legislator to a higher indifference curve. So it is the dimension associated with the minor axis that is more important to the legislator.

The axes of the utility ellipses may be parallel to the policy axes, as depicted in exhibits 3 through 5, or they may be oblique to the axes (see figure 1, Enelow and Hinich 1983, 438). The latter would imply that the evaluative dimensions are inseparable, or at least linked. The model developed in this article requires that evaluative dimensions be separable, and therefore indifference curves that are parallel to the outcome axes, because preferences are allowed to be contradictory.

So spatial choice models have been developed that allow for differences in the salience of outcome dimensions among decision makers. That is, decision makers can evaluate some outcome dimensions as more important than others, and these evaluations may differ among decision makers. We are interested here in temporal variations in salience. Let us now explore a model that treats preferences as fixed, as in the social choice models, and allows attention to the conflict structure to vary. This situation is depicted in exhibit 5. There, two sets of indifference ellipses are superimposed on a single ideal point (I/D2). The two sets of indifference curves can be interpreted as the averages for the seventy-nine legislators who voted differently in 1991 and 1992. The ellipses labeled "A" represent the 1991 vote, and they have their minor axes parallel to the Y-axis, which represents the Hamiltonian position of using public spending to promote

Exhibit 5
A Change of Focus



economic progress. This implies that the legislators were more sensitive to variations along this dimension than along the Jeffersonian, limited government dimension (the X-axis). At time 2, the legislators have become most sensitive to the limited government dimension; this is represented by the "B" ellipse.

Note that the result of this approach is to shift the ideal point projected on the choice dimension (the point of tangency) from I(a) to I(b). Here, this implies a shift from a "yes" to a "no" vote. The vote has changed even though the i-point has not, and we have assumed no strategic manipulation such as altering the presentation of alternatives. The only aspect of the standard spatial choice model that we have relaxed is the (unstated) assumption that indifference curves hold their shape for

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individuals over time, thus allowing for variation in attention to the structure of the choice situation.¹⁰

"Broken" Utility Functions and the Aggregation of Attention

Changes in choice can be a function of shifts in dimensional salience rather than any changes in preferences. That is, if one keeps preferences of decision makers fixed, and allows attention to the dimensions of conflict to vary, then voting choices can be changed. This happens because changes in attentiveness shift the point of tangency of the decision makers' indifference curve and the choice dimension.

There are two major implications of this, one at the individual level and one at the level of the collective decision-making unit. First, attentiveness can destabilize preference functions. Along each dimension of evaluation, decision makers in this model have well-behaved preference functions: They are well ordered and no cycling is possible. At any one time, preferences are also well ordered in multidimensional issue space; that is, preferences are complete and transitive (Ordeshook 1986, 12). But between two time points, a shift in relative attentiveness to the dimensions causes a reordering of preferences. Across time, utility functions are "broken" by the intrusion of attentiveness. Within the same general preference structure for a decision maker, choices at two points in time can be quite inconsistent. Decision makers are not being irrational; in this model they are still maximizers. They are just incorporating new information, and they are doing so without reevaluating their underlying policy preferences.

The collective implication is this: Collective choice may have as much to do with the aggregation of attentiveness as with the aggregation of preferences. The sensitivity of outcomes to agenda manipulation where preferences are structured multidimensionally is well known. Equilibria of preference are dependent on the workings of institutions, including the structure of committees and the order of proposal presentation. So preference aggregation, and thus majority rule, is dependent on institutional structure. Now we may see a second, critical source of instability: shifts in attentiveness to issue dimensions. Attentiveness itself can be organized through political institutions, and Simon (1977, 159) has studied what he calls "attention directing structures" in business organizations. These parts of organizations serve to focus attention on one part of the environment and monitor it for the decision maker. In a similar vein, McCubbins and Schwartz (1984) note that oversight that relies on interest groups to raise

¹⁰The model developed above fits a constrained choice situation where the actual choice falls along a single dimension, and the alternatives offered occupy two points on the choice dimension. An underlying assumption of this is that decision makers most prefer the choice point closest to their multidimensional i-point (weighted by the attention coefficients). But what they get is a dichotomous choice on the continuous choice dimension. So a second assumption is added: A decision maker will minimize the distance between the preferred point on the choice dimension and the actual offered choice.

In the case of circular indifference contours, this is not an important distinction. The choice dimension is perpendicular to the decision maker's actual i-point at the point of tangency to the indifference circle. That means that the distance between the preferred actual choice positions and the i-point is shorter than the distance between the i-point and the less preferred alternative. In the case of elliptical indifference contours, however, the assumption is not so trivial, because the preferred position on the choice dimension is not perpendicular to the decision maker's i-point; so the (simple) distance between the i-point and the preferred alternative and can be larger than the distance to the rejected alternative. We know, however that preferences on the choice dimension will be single peaked where preferences on the basic evaluative dimensions are linear mappings onto the choice dimension (Enelow and Hinich 1990).

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the importance of issues, a mode that they term "fire alarm oversight," can be "rational" for Congress.

The key questions are, how often does the attentiveness shift occur, and when it occurs, does it change outcomes? In the case of the supercollider, the shift can account for the change in outcomes between the two votes, but the structure of the institution allowed legislative leaders to use their control of the agenda at conference committee time to overcome the shift. After the favorable Senate vote, House leaders appointed conferees supportive of the project. The funding was buried in the comprehensive budget for energy and water projects, and the House could vote only on the package. Because of the complexities, one never can rule out strategic voting on the original bill, with supporters voting to oppose in order to gain "political cover" on the deficit bill, strongly suspecting that funding would be restored later in the process. Nevertheless, one can infer that the structure of the political situation changed between the two collider funding votes if political cover were needed on the second vote but not on the first.

Finally, there was strategic action on the bill that ultimately passed. Senate Democrats added a provision that banned nuclear testing starting in 1996. President Bush and his national security advisors strongly opposed the ban. Rather than veto the bill, however, the president accepted the ban with only minor modifications. The reasoning centered on the supercollider funding: A veto would have given opponents the opportunity to attack the project anew (see Rosenthal 1992). So while the shift in this instance was locally destabilizing, it was not globally disruptive.

At any rate, this is fundamentally an empirical question, not an analytical one. There seems to be no mechanism that can push legislatures toward equilibrium in the face of the shift.

CONCLUSIONS

This article has examined a relatively rare situation in which decision makers choose differently on the same alternatives at two different times. This is only a device to illuminate far more important processes in politics: situations in which the decisional context changes even as institutional choice procedures continue as they have in the past. It is easy to see that whether the choices available are the same or different is unimportant.

This article has unified certain known characteristics of decision making, and in particular the necessity to attend to

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issues serially, with the well-developed formal spatial approach to voting. First, I have introduced a distinction between the choice space and the outcome or policy space, and I have considered the choice space to be embedded in the outcome space. The choice space thus is related imperfectly to the outcome space even under conditions of certainty. One may view the outcome space as *goals*; the choice space then often forces trade-offs among goals. In many cases, the choice space will be one-dimensional, because it involves more or less of a policy. The policy itself, however, is structured by multidimensional goals (the outcome space). Decision makers must infer how a policy dimension is relevant to their goals; this problem has been studied formally by social choice theorists Melvin Hinich and James Enelow in their theory of predictive mappings.

Second, I have allowed the salience of dimensions to vary temporally for a single decision maker and have modeled this by changes in the shape of the indifference curves of the decision maker. Using differences in the shape of indifference curves among decision makers to model differences in dimensional salience is common practice. What is different here is conceiving the possibility of changes in salience across time.

The implication of this is that utility functions are "broken" temporally; that is, they are reordered by the shift in focus. This happens because evaluative dimensions are differently weighted in the judgment process at two points, even though the ideal point remains fixed. This shift in focus easily can account for *choice reversals* when a decision maker changes his or her choice in seemingly similar intertemporal situations. This gives flesh to Simon's observation on the inconsistencies introduced by fluctuating attention.

Peter Ordeshook, after comparing preferences for angel food cake to those for a Bach prelude, notes that the comparison seems rather silly, and it is problematic not because of any failure of rational assumptions about preferences but because "the example fails to specify a decision context" (Ordeshook 1986, 12). What kind of political theories can be built if the theorist always has to specify decisional contexts in an ad hoc manner? Context, after all, is always changing. Moreover, if we really do believe in overarching utility functions, such comparisons should be handled with ease. That we feel uncomfortable with Ordeshook's comparison speaks to the influence of context on decision making.

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Incorporating attention into models of political choice is certainly more consonant with empirical findings. First, because attention tends to shift episodically rather than gradually, this model of decision making fits the findings from studies of policy agendas better than a model that requires changing policy preferences. Second, it captures a central tenet of the issue-definition literature, that the distribution of winners and losers in a conflict often changes when new issue definitions are proposed. Now we can see how this might work at the level of the individual decision maker.

Finally, we might note the plight of a public administrator trying to set goals, factor problems, and maximize benefits—the ideal model set forth by Stokey and Zeckhauser (1978). These authors lay out a model of rational public decision making in a well-behaved world, with decision makers specifying preferences and choosing policy alternatives that maximize those preferences. The model addresses the classic issue of trade-offs among policy attributes: One often has to choose, for example, between efficiency and equity. But, in the world of Stokey and Zeckhauser, equity and efficiency are fixed axes in the policy space, and the decision maker need only to specify how to trade off these attributes against one another.

The problem is that the relevance of the attributes varies disjointedly over time. Political decisions often concern the weightings of the very attributes that are traded off against one another. When weightings change, choices may change. They are still quite rational in the sense of maximizing the preferences of the decision maker, but they may not be consistent because the decision frame has changed. The decision maker may have failed to anticipate the shifts in the frame of the debate and thus can look remarkably fickle.

The political decision-making process can be substantially different than economic decision making, because of the tendency of the former to fall prey to shifting frames. There is an important area where economic decision making resembles political decision making. That is in how technology and the introduction of new products affect established companies. Richard Foster (1986) notes that innovation is discontinuous, and that there is a period of time in which new innovations look remarkably unproductive. Great effort goes into development, with little payoff. If a company does a cost-benefit analysis of its existing technology and the new technology, the old technology wins hands down. The marginal rate of return in the near future is far higher for the old technology. But the new technology, through

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the initial costly development period, takes off and rapidly eclipses the productivity of the old product line. Hence the use of standard cost-benefit frameworks can be misleading. One needs a business strategy that anticipates the discontinuities.

One also needs a political strategy that anticipates the discontinuities of shifting frames of reference that characterize politics. This does not mean that planning and rational decision making will not work. It means that they will not work sometimes, but when they fail, they will do so spectacularly. The challenge of modern public administration theory is to design models that are capable of giving guidance when the inevitable discontinuities occur.

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