1. Introduction

Judgment and choice are at the core of all politics. Given Easton’s (1953) definition of politics as the “authoritative allocation of values,” then the study of politics must certainly involve, as a central organizing theme, how those authoritative allocation decisions are made.

Broadly speaking, political decision making falls into two domains. One concerns how individual political actors, whether politicians or ordinary citizens, make political decisions. For the most part this first perspective views decision making as a question of individual psychology: individual preferences, information search, evaluation, and choice. A second domain considers how the institutions of politics – the legislative, executive, judicial and bureaucratic branches of government, as well as organizations that interact with them -- make decisions. All institutions are made up of individuals, of course, but all institutions also have their own particular ways – laws, traditions, “standard operating procedures” – for gathering information, aggregating preferences, and taking actions. In many instances, institutional norms and procedures can override individual decision making processes. March (1994) tries to capture this difference in perspectives by asking whether decision makers are generally seen as autonomous actors or as being primarily guided by the “systematic properties of an interacting ecology” (p. ix).

Without meaning to minimize the importance of institutional factors in political decisions, we focus on how individual actors make political decisions. Individual decision making has been a primary concern of psychologists and behavioral economists. In contrast,
most economists, sociologists and organizational theorists study larger aggregates like institutions and firms. The literatures are largely distinct; both are voluminous. For good overviews of research aimed more at the institutional level, the reader is referred to the many works of March (e.g., 1988, 1994; March & Olsen, 1989; March & Simon, 1958) and the earliest research of Simon (1947). Allison and Zelikow (1999) do an excellent job of contrasting the two perspectives in the context of the Cuban missile crisis (see also Chapter 13.)

Our goal is to provide a general framework for studying individual decision making that applies to both everyday citizens and to political elites. Political elites and common citizens differ not only in the amount of expertise they typically bring to the decision making task, however, but also in the type of decisions they are asked to make. Even so, the examples and extensions of the basic decision making framework here will concentrate the decision making of everyday citizens, and in particular on voter decision making. One very important topic of elite decision making, foreign policy, is the specific focus of chapter 10 in this volume. We develop our framework within the broader program of behavioral decision theory (Edwards, 1961; Einhorn & Hogarth, 1981; Hastie & Dawes, 2001) contrasting this psychological approach with rational choice theory (RCT) which, while generally ignoring much of what we know about limitations of human cognition, purports to provide “as-if” models of individual decision making. Much more is said about RCT in chapter 9, where it is compared directly to psychological approaches to political behavior.

Political scientists rarely differentiate between “judgment” and “decision making.” The two have often been linked (e.g., Slovic & Lichtenstein, 1971; Billings & Scherer, 1988; Gilovich & Griffin, 2010), and normatively they are equivalent in the sense that normally a decision maker should choose an alternative if and only if it is preferred more than any other. But
as Johnson and Russo (1984) argue, “choosing one alternative from a set can invoke difference psychological processes than judging alternatives which are presumably evaluated one at a time” [emphasis in original]. Judgment involves the evaluation of a single entity along some dimension: how heavy or light, or bright or dark, an object is (psychophysical judgment); how attractive/funny/likable/smart some person is (person judgment); how likely some event is to occur (probabilistic judgment). Judgment thus involves mapping some ambiguous stimuli onto a perceptual system. The tendency to make judgments is particularly true of entities – i.e., people - - in the social world. Chapter 18 reviews this literature as it applies to perceptions of political actors.

A decision, in contrast, involves a choice between two or more alternatives: whether to take drugs, who to marry, when to retire, which candidate to support in the election. Each alternative is associated with a set of beliefs about the outcomes that are believed to be associated with each alternative, and every outcome must be associated with a value or preference (although these beliefs and values may well be idiosyncratic to every decision maker. But making a choice implies more commitment to the chosen alternative than making a judgment suggests about the judged entity, and may well also involve searching for reasons to justify the choice (Slovic, Fischhoff, & Lichtenstein, 1982). People make judgments all the time without necessarily “putting those judgments into action.”

Decisions are often treated as if they are nothing more than choosing the most highly evaluated alternative. This is a mistake, for at least two reasons. First, people (and institutions) make all sorts of decisions without first globally evaluating the alternatives. “Spur of the moment” decisions are of this type, as are habitual or “standing” decisions (Quadrel, Fischhoff, & Davis, 1993), but the problem is much broader than this. If you knew you were going to die
tomorrow you might think carefully about what your last meal should be and where to eat it. But most of the time the decision to eat Chinese or Italian or Mexican food, is not made because of any judgment about the quality or tastiness or healthiness of these different cuisines, nor because of any judgment about the quality of the service or the skill of the chef in any of the nearby restaurants, but rather because you “feel” like having Chinese tonight. Such decisions may also be generated from gut responses -- that is, emotional drives rather than our active thinking.

We suspect, however, that the vote decision in particular -- or any choice between different people -- is rarely made without first forming some global evaluation of the different candidates for the position, no matter how little information goes into the evaluation. So candidate evaluation is intimately involved in the vote choice. But a second reason that it is wrong to equate judgment and decision making is that global evaluations, even when they are made, do not necessarily dictate choice. People may vote “strategically” – that is, choose a less preferred alternative because their most preferred candidate has no chance of winning (Cox, 1997). People may vote for a candidate they do not particularly like for some reason largely external to the decision itself (acting “against my better judgment”), for example to please a parent or girlfriend. Or, they may simply find it a challenge to “vote correctly” (Lau & Redlawsk, 1997.) Elsewhere (Lau & Redlawsk, 2006, chapter 8) we develop this argument in more detail. For now, we will leave the literature on person (candidate) impression to Chapter 18, and focus here on processes that generally lead to decisions, though necessarily we cannot completely ignore judgment in doing so.

The rest of this chapter proceeds by laying out more fully a general framework for what constitutes a “decision,” a discussion which begins with the classic economic rational choice approach to decision making associated with von Neuman and Morgenstern (1947). This
approach has been regularly used as a normative standard against which particular decisions can be judged. No one who has actually observed decision making believes that RCT provides an accurate description of how decision makers actually behave, however, and we will spend more time discussing an approach that takes accurate description as its primary goal: behavioral decision theory (BDT). BDT takes as its starting point a very different (and more limited) view of human cognitive abilities than RCT. Ironically, this more limited starting point provides many more dimensions along which to study decision making. Consequently we will spend some time discussing process tracing methods for studying decision making. Finally we examine how the psychological models from BDT have been applied to voter decision making.

2. Rational Choice/Economic Theories of Decision Making

In its most general form, a decision involves multiple alternatives, beliefs about outcomes, and values associated with those outcomes. Economists have generally been concerned with how consumers and firms make decisions. Their earliest theories were normative in orientation, describing how decision makers should behave. At the same time the research seemed to also suggest people could behave in the “rational” ways described by the theories. If people failed to meet normative standards, it was due to errors – biases – that could, given sufficient information and ample learning opportunities, be overcome with appropriate effort. This standard RCT approach views humans (homo economicus) as “omniscient calculators” (Lupia, McCubbins, & Popkin, 2000) or demons (Gigerenzer & Todd, 1999) who can readily perform the cognitive manipulations required to reach a decision given adequate motivation. Other social sciences, including social psychology (see Gilovich & Griffin, 2010) and political science (Downs, 1957) adopted these theories to describe their own types of decision making.
Our intent is not to survey the literature in RCT – see Chapter 9 for a more complete version. But it is important to understand what motivated the development of BDT as a reaction to the excesses in attempting to make RCT fit what people actually do. The term “rational” has become loaded, and has many different meanings (March, 1978; Rubenstein, 1998). But for the most part our interest is in procedural rationality; has a rational process been followed during information search, evaluations, and choice? A “rational choice” is one, then, based on relatively fixed preferences and following a logic of consequence, by which current actions are dictated by anticipation of the value associated with future outcomes (March, 1994). Rational decision makers are motivated to maximize their “interests,” although the theory is silent about what those interests ought to be. This restriction on the meaning of rationality also draws attention to the fact that RCT does not guarantee that the value-maximizing outcome will be obtained, only that it is the most likely outcome.

When RCT considers risk, it has an “expected value” framework. Decision makers should gather sufficient information about every plausible course of action. Every consequence or outcome associated with each alternative is assumed to have a certain fixed value for the decision maker. The value of the outcomes associated with each alternative, weighted by their expected probability of occurring, are combined in a simple additive fashion to determine the overall value associated with each alternative. After going through this process of information gathering and alternative evaluating, decision makers choose among alternatives by some value-maximizing process (e.g., choose the alternative with the greatest expected value; choose the alternative that minimizes the worst thing that would be associated with every alternative -- i.e., minimizes maximum regret).¹

The most general expectancy-value theory is subjective expected utility (SEU) theory
The concept of “utility” is a clever solution to a very tricky analytic problem. If all outcomes were easily evaluated in terms of money – say a proposed tax cut that is designed to spur the economy – it would be a relatively simple matter to compare the desirability of any two outcomes to each other. But they cannot. Some outcomes have primarily expressive costs and benefits – a peaceful world, greater social equality – that cannot easily be translated into monetary values. This makes the prospect of comparing two such outcomes to each other quite daunting. The problem is one of incommensurability – the inability to directly compare the various outcomes. And the clever solution of subjective expected utility theory is to use the hypothetical concept of subjective “utility” into which all costs and benefits can be translated. With this assumption, all values (i.e., utilities) become commensurable, and an expected value analysis can proceed.

But would anyone actually do this? Rationally, a decision maker must seek out all relevant information (with “relevance” usually defined subjectively as anything the decision maker cares about). Even assuming he has a “utility register” in his brain that can easily assign utilities to different outcomes, once there are more than a few outcomes to keep in mind, each weighed by some subjective probability of occurring, keeping track of the calculations becomes quite challenging.

Many RCT models, most notably Downs (1957), consider the cost of gathering information as a means of limiting the burdens on the decision maker. Such models can be viewed as “optimization under constraints.” New information should be gathered until the marginal costs of additional information exceed the marginal returns from that information. Although considering information costs seems at first glance a plausible way of limiting cognitive effort, in fact any stopping rule actually takes more cognitive effort to employ.
In practical terms, information search—data gathering—is probably the most effortful and influential aspect of decision making, yet it is outside the realm of most RCT models.

There are two issues here, one concerning ability, the second concerning motivation. Is it possible for the unaided decision maker to craft anything but the simplest decisions in the manner directed by the rational choice approach? Given the number of computations involved, and the limitations of working memory (see below), the answer must be “No.” Give that same person a pencil and paper, however, and the answer is probably “Yes”—for the most part the computational demands are within reason, and the memory problem can be overcome by simply making lists of pluses and minuses associated with any alternative.

But would many decision makers go to all this effort to make a decision? Here the issue of motivation arises, and it is a serious challenge to RCT. Citizens could, probably, follow most of the dictates of subjective expected utility theory for arriving at a good decision about which candidate to support in an election—but why would he bother? It is a lot of work to learn everything there is to know about the competing candidates. According to the theory, it is only rational for someone to expend all of this effort if the expected value of making the correct vote choice is greater than the cost of all of this information gathering and computation. A serious conundrum in RCT is the problem of stopping information search. How can anyone know if the cost of the next piece of information exceeds its value? As best as we can tell, RCT is silent on this question, but it is a point made explicit by Gigerenzer and colleagues (1999) as we describe below.

It is important to realize that we are not just trading off the greater expected utility of, say, Roger Republican winning rather than Debra Democrat, against the information gathering
and computation costs that it takes to figure out which candidate to support. That utility could be substantial. But, it must be weighed against the probability that one vote will determine the outcome of the election – and that probability is, for all practical purposes, nil. In other words, even if the difference in utilities associated with either candidate’s victory is quite large, everyone is still going to receive that utility irrespective of how they vote. This is another example of the collective action problem. Figuring out which candidate to vote for – indeed, going to the polls at all – is, according to RCT, an irrational activity. This argument can be pushed further, but the only way “rationality” can be saved is by adopting the economist’s notion of “revealed preferences”: because people do vote, we know the utility of voting must be greater than the costs. Thus notions like fulfilling one’s “civic duty” are given great utility (Riker & Ordeshook, 1968). Unfortunately, this “solution” quickly makes the entire approach tautological.²

That so many people nonetheless do bother to vote suggests either that many people are irrational or that RCT is somehow flawed. The flaw, we think, is not in assuming that people want to be rational, but in pretending that people actually make decisions this way. March (1994) captures this perfectly when he asks if “decision makers pursue a logic of consequence, making choices among alternatives by evaluating their consequences in terms of prior preferences” (p. viii). A “logic of consequence” simply does not describe how people make the vast majority of the decisions they make in all aspects of their lives, including (but certainly not restricted to) politics.

The subjective expected utility approach should not be applied as a behavioral description of how people (or organizations) actually make decisions. But this limitation does not eliminate the most attractive aspects of the perspective; its strong normative component and great
“theoretical utility” in allowing researchers to make predictions of many types of behavior, particularly in the aggregate when individual stochastic deviations from rationality cancel out. If a decision maker were to follow the dictates of RCT, she would be assured that she would likely make what is, for her, the “best” decision. Given certain reasonable (but not indisputable) assumptions, such as maximizing the interests of the most people, the rationality of individual decision making can also be “aggregated up” to make normative judgments about institutional arrangements for decision making (see Jones, 1994).

3. Behavioral Decision Theory

In contrast to the normative focus of RCT, BDT takes as its primary goal describing, and thus understanding, how people actually make decisions. Every study of decision making in the real world has shown that rarely are all alternatives known, all outcomes considered, or all values evoked simultaneously. People generally settle for alternatives that are “good enough” rather than value maximizing. Named by Edwards (1961), BDT begins with the view of humans as limited information processors, with neither the motivation nor the ability to make the sort of “consequential” calculations described by rational choice (Anderson, 1983; Gilovich & Griffin, 2010; Hastie & Dawes, 2001; Simon, 1979). The term “cognitive miser” was once popular to represent this view (Taylor, 1981), but that term is misleading in that it suggests a conscious hoarding of cognitive resources, which is simply inaccurate. “Bounded rationality,” coined by Simon (1947, 1957) is a better term to characterize human cognition.

3.1 Cognitive Limits on Rationality

But what, exactly, are the bounds on information processing? Bounded rationality is
thoroughly described in Chapter 9, but let us highlight where some of the limits on omniscience occur and are very clear. We can categorize them as limitations on processing and limitations on retrieval. Processing limitations begin with our sense organs. Except perhaps for mothers, human beings do not have eyes in the back of their heads nor ears that can hear distant conversations. Even limiting consideration to sights that are somehow before our eyes and sounds that are nearby, there is usually more in our visual and auditory fields than can be processed because all incoming stimuli must pass through “short-term” or “working” memory, which has a very limited capacity (of approximately 7, ± 2, bits of information; Miller, 1956). This attention bottleneck is in practice the most important “bound” on classic rationality. As a consequence, attention and factors that influence it are crucially important to information processing. The limits on working memory also dictate that most information processing will occur serially, one goal at a time.

Now, if an incoming stimulus is processed by working memory – and again, that is a big if – it can be more or less permanently stored in long-term memory. Long-term memory is usually envisioned as an associative network of nodes and the connections between them, that for all practical purposes has an unlimited capacity. Retrieval from long-term memory, on the other hand, is far from perfect, and is a function of how the initial stimulus was processed (that is, what was associated with it), pre-existing memory structures (schemas) related to it, the frequency and recency of exposure to the same stimulus (which influences the strength of the connections between nodes), and so on (Anderson, 1983; Simon, 1957, 1979). Limits on memory retrieval mean that one of the fundamental assumptions of rational decision making, that people have preexisting preferences for outcomes, and that they are relatively fixed and immediately available, is frequently not going to be the case (Zaller & Feldman, 1992).
Together, these cognitive limitations make the omniscient calculator of *homo economicus* an unapproachable ideal.

### 3.2 So, How Do People Cope?

We assert that people *want* to make good decisions – they just generally cannot do so in the ideal manner described by RCT. So human beings have developed mechanisms, or rules, to deal with information overload. These mechanisms are typically employed automatically without conscious forethought. Most are quite general and have ramifications for many aspects of human life. For example, *categorization* or grouping seems to be a basic property of human perception, such that when a new stimulus is perceived, the first thing people try to do is categorize the stimulus as another instance of some familiar group (Rosch, 1978). Category- (or schema-) based processing is cognitively efficient because once a stimulus is perceived as another instance of some preexisting category, the details of the new stimulus can be largely ignored and “default values” associated with the category can be assumed to hold. Conover and Feldman (1989) and Lodge (Hamill, Lodge, & Blake, 1985; Lodge & Hamill, 1986) provide many political examples of such processing.

Decision makers seem to simplify their task in at least three fundamental ways: decomposition, editing, and heuristic use.

- **Decomposition** means breaking a decision down into component parts, each of which is presumably easier to evaluate than the entire decision. Problem decomposition is closely related to the specialization and division of labor that is essential in any successful organization.

- **Editing** refers to eliminating (i.e., ignoring) relevant aspects of a decision. Voters might
simplify their task by restricting attention to familiar candidates, effectively removing one or more alternatives from the choice set. “Single issue voters” limit the number of “outcomes” associated with each candidate to a manageable number, thus also largely avoiding the need to resolve goal conflicts. A decision maker could simply count the number of pluses and minuses associated with each alternative rather than trying to weight them by importance or devise an evaluative scale with more than two levels. All of these editing procedures would greatly simplify any decision.

- **Heuristics** are problem solving strategies (often employed automatically or unconsciously) that serve to “keep the information processing demands of the task within bounds” (Abelson & Levi, 1985, p 255). They are cognitive shortcuts, rules of thumb for making certain judgments or inferences that are useful in decision making. Their key attribute is that heuristics reduce the need for the complete search for alternatives and their consequences dictated by RCT.

These three very general simplification mechanisms are applied to many different types of decisions by all types of people. We can adopt an evolutionary perspective and conclude that they must, in general, “work,” in the sense of producing choices that are, if not optimal, at least “good enough” most of the time to encourage their reproduction – and rarely bad enough to lead to extinction (Simon, 1957; also see Gigerenzer & Todd 1999 for development of this argument).

Nonetheless, it is important to recognize that all three of these mechanisms can at times lead to poor decisions. Decomposition, for example, can lead to very embarrassing results when the components of a decision are treated as independent when in fact they are not. A candidate who stresses one set of policies in personal appearances and another set of policies in political advertisements at best puts forth a very diffuse and unfocused message and at worst can be
caught espousing contradictory policies. Editing can lead to poor decisions when the ignored aspects of the decision would result, cumulatively, in a new preference order across alternatives if those ignored aspects had been considered. And heuristics can lead to systematic biases when the reason the heuristic is generally effective (e.g., more frequent occurrences really are easier to recall; numerical anchors provided by the decision context usually are reasonable) is not true in some particular instance (see Lau & Redlawsk, 2001a).

While editing in particular would seem to align nicely with processes described by political scientists such as single issue voting, there has been little research into the first two mechanisms, while a large literature has developed about heuristics and their role in decision making. This literature takes two directions. In one, exemplified by the heuristics and biases program of Kahneman & Tversky (1973, 1984; Tversky & Kahneman, 1973, 1974), heuristics lead to bias — failures of rational decision making. The use of heuristics is not so much adaptive as something to be minimized, in order to make better decisions.

Gilovich and Griffin (2010) see Tversky and Kahneman’s research as arising out of a “guiding evolutionary principle … that existing processes in perceptual analysis were co-opted as tools for higher level cognitive processing” (p. 545). Heuristics that might have been adaptive in pre-technological environments can lead to bias in the complex environment of modern society. Tversky and Kahneman (1974) identify three common cognitive heuristics employed in lieu of detailed information gathering and analysis. While allowing decision makers to simplify complex judgments by focusing on a small subset of all possible information, they come with the likely cost of failing to maximize utility. These heuristics include availability — judging frequency, probability, and causality by how accessible or available concrete examples are in memory, or how easy it is to generate a plausible scenario; representativeness — assigning
specific instances to specific categories (stereotypes, schemata) according to how well the specific instance fits the essential properties of one category rather than another; and anchoring and adjustment -- forming a tentative response first and then adjusting by reviewing relevant data. These processes are ubiquitous; the problem is how to make good decisions in spite of them. The overarching conclusion of this program of research is that in the end decision makers do cope with their cognitive limits by using heuristics, but using these heuristics results – most often – in a lower quality decision than if a fully rational process had been used.

The heuristics and biases program examines the limits of rational decision making while arguing that utility maximizing is the normative standard against which decisions should be tested. But earlier work by Simon (1957) rejects this normative criterion for a standard of bounded rationality through satisficing. Decision makers can cope with their cognitive limits and make “rational” decisions if we loosen the definition to be “good enough” rather than maximizing. Satisficing assumes that decision makers set aspiration levels for every attribute of judgment about which they care, and consider alternatives one-at-a-time in random order, continuing search until an alternative is discovered that meets or exceeds the aspiration level for every criteria. Search then stops and this alternative is chosen. If no such alternative is found, aspiration levels are lowered and the process repeated until an alternative that “satisfies” all criteria is found. Satisficing involves relatively simple cognitive processes. An alternative is sought that is satisfactory on every criterion of judgment, without comparing the alternatives to each other. Indeed, some alternatives may be totally ignored, and there is no guarantee that anything approaching the “best” alternative will be selected. Obviously the order in which alternatives are considered can completely determine which alternative is selected.

Satisficing provides a framework for the second perspective on the role of heuristics, the
“adaptive toolbox” of Gigerenzer and his colleagues (1999; 2008.) Their “fast and frugal” heuristics build on Simon’s insight that decision making operates within the interaction between an organism’s cognitive limits and the environment in which it exists. They posit an “ecological rationality” where fast and frugal heuristics are an even more efficient and effective decision making approach than satisficing. A satisficer, in effect, edits the decision environment, deciding to choose the alternative that is good enough. As long as good enough is good enough to survive, there is no reason to maximize. But this process still takes more cognitive effort than any of a number of fast and frugal heuristics which can be consciously adapted as needed based on the context of the decision to be made.

Thus Gigerenzer and his colleagues take a different approach to the study of heuristics, viewing them as adaptive mechanisms -- rules of thumb -- which can be fruitfully used in the modern world. There are a number of these “simple heuristics” of which satisficing is but one, though it is the most complicated one. Much easier is applying an ignorance-based heuristic like recognition, which draws from our innate ability to recognize a cue from experience and to apply it quickly and effectively. Additional heuristics in the adaptive toolbox include a series of “one-reason” heuristics, such as “Take the Best,” which posits simply using the most accessible or apparently relevant information to make a quick decision. Take the Best includes rules for information search, stopping search, and making a choice, and thus is also more comprehensive than standard RCT models which have a hard time explaining how and when information search stops. An application of Take the Best by Graefe and Armstrong (forthcoming) finds that identifying what voters consider the “most important problem” in polls, and assuming they use that one issue to determine their preferred candidate -- that is, they “take the best” candidate on this one issue -- results in a model that predicts election outcomes as well as econometric models.
While there are other fast and frugal heuristics, the point here is that decision makers can rely on multiple heuristics adaptable to particular decision environments. With ecological rationality, a decision’s “rationality” is based not on cost/benefit analysis and complicated information search, but on how well the decision fits with the environmental structure in which it is made.

We can make sense of many of the diverse findings of BDT by suggesting that decision makers are generally guided by two competing goals: (1) the desire to make a good decision; and (2) the desire to reach a decision with the minimal cognitive effort (see for example Lau & Redlawsk, 2006; Payne, Bettman, & Johnson, 1993). This leads to another important distinction between RCT and BDT. RCT focuses attention on the structure or elements of a decision – the multiple alternatives, and the value of the different outcomes that are associated, with some probability, with each alternative. BDT, in contrast, is much more likely to be concerned with the dynamic processes of how decisions are made, focusing on information search and strategies for making choices. The underlying assumption of much of this research is that the best way to study decision making is to observe it while the decision is being made (Abelson & Levi, 1985).

4. Understanding Decision Strategies

Behavioral decision researchers have developed several process tracing methodologies for studying decisions “while they happen,” by far the most popular of which is the information board (Carroll & Johnson, 1990). If studying verbal protocols resembles eavesdropping on a decision as it is being made, information boards are more like voyeurism. Information boards generally present subjects with some sort of matrix where the alternatives under consideration are placed in columns and the different attributes of choice (that is, the outcomes associated with
every alternative) are the rows. The actual information is hidden from view, and decision makers must *actively* decide to learn any specific bit of information by choosing a particular cell of the matrix. Every action the decision maker takes is recorded, so that at the end there is a complete record of what the decision maker accessed, how long every bit of information was considered, and the order in which it was examined.

Process tracing lets the researcher see the decision strategies that people use. A decision strategy is a set of mental and physical operations employed in reaching a decision. It includes identifying alternatives, searching for information about the possible outcomes associated with each alternative, making probabilistic judgments about the likelihood of those different outcomes, searching through memory to determine how much each of those outcomes is valued, and how important it is in this particular context, and so on. A decision strategy also includes a method for choosing among the alternatives. Elsewhere (Lau & Redlawsk, 2006) we have described decision strategies in detail; here we will just quickly summarize. BDT researchers have identified a number of different decision strategies which differ in terms of how cognitively difficult they are to use, how much of the available information they consider, and their likelihood of reaching a “best” decision. We will refer to strategies that employ all available information as decision *rules* and those that ignore some information as decision *heuristics*.

Decision strategies are typically categorized in the literature by the extent to which they confront or avoid conflict (Billings & Marcus, 1983; Ford, Schmitt, Schechtman, Hults, & Doherty, 1989). When one alternative is preferred on one dimension of judgment but a different alternative is preferred on another dimension, the potential for value conflict or tradeoffs exists. Compensatory strategies are cognitively complex information integration rules where decision makers are assumed to assign a value to every attribute associated with each alternative.
of those values can be positive and others negative, but when they are combined into an overall evaluation or decision, a positive value on one dimension can compensate for or trade-off against a negative value on another dimension. Different compensatory strategies vary on the extent to which information is weighted and whether outcome importance or probability is considered, but they are all based on full information, that is, the decision maker includes all relevant attributes and outcomes for all relevant alternatives.

*Noncompensatory* strategies rely on incomplete information search to avoid conflicts. Negative values on one attribute or possible outcome cannot trade off against positive values on another attribute or outcome; instead, alternatives are eliminated once negative information is encountered or some attributes are simply ignored. Incommensurability is not a problem. A great deal of research has shown that most decision makers, most of the time, try to avoid value tradeoffs (Hogarth, 1987). But this avoidance has a cost: potentially less value maximizing decisions. Some noncompensatory strategies rely on considering only a limited subset of attributes for all alternatives, while others focus on a subset of alternatives. If decision makers use compensatory strategies, process tracing will show reasonably equal information search across alternatives and attributes. But if the cognitively limited decision maker uses heuristics and other simplifying strategies, this will appear as imbalanced search, with some alternative and attributes receiving more attention than others, suggesting a noncompensatory strategy is in use.

Where some compensatory strategies – particularly the expected utility (EU) rule – map onto RCT in its full-blown mode, others are more akin to boundedly rational search. While all compensatory strategies require full information search, some simplifying heuristics may still be used, including assuming weights/probabilities are 1.0 for each attribute (EqW; Hastie & Dawes, 2001; Einhorn & Hogarth, 1975), limiting the evaluation to the frequency of good and bad
features (FreqGB; Alba & Marmorstein, 1987), or comparing alternatives one attribute at a time, calculating the differences between each and summarizing (AddDIF rule). In a simplified version of AddDif, the majority of confirming dimensions heuristic (MCD), alternatives are compared pairwise on every dimension, but only to judge which is preferred, and then to keep the winning (or confirming) alternative to compare to another until all alternatives have been considered.

Described earlier, Simon’s satisficing heuristic was the first and most famous noncompensatory strategy identified (SAT; Simon, 1957.) Satisficers are looking to meet an aspiration level and take the first alternative they run across that meets that level. The lexicographic heuristic (LEX) considers the value of every alternative on the most important attribute of judgment, and selects the alternative with the highest value (Tversky, 1969). If two or more alternatives are tied, those alternatives are compared on the second most important attribute, and so on, until only one remains. A third noncompensatory strategy is the elimination-by-aspects heuristic (EBA; Tversky 1972) which combines satisficing and lexicographic strategies, and is generally simpler than both of them. As with LEX, decision makers rank the attributes of judgment in terms of importance, and consider the most important first. As with SAT, decision makers have an aspiration level for every attribute. Alternatives are eliminated if they do not meet or exceed the aspiration level of each attribute which are examined in decreasing order of importance until only one alternative remains. Like SAT and LEX, EBA avoids conflicts by eliminating alternatives before conflicts occur.

The preceding descriptions of different decision strategies are idealized accounts, of course, and would rarely be observed in such pure states. One may well ask, then, how do we tell which strategy a decision maker is using? A very important finding of BDT research is that different patterns of information acquisition clearly reflect distinguishable choice strategies.
Thus a key to understanding any decision is observing how people acquire information, because this in turn sheds light on the decision rules or heuristics that people follow in making their choice.

4.1 Measures of Information Search

Information boards provide a large amount of detailed information about the process of decision making, particularly information search. Since decision makers are cognitively limited and will almost certainly make any complex decision without full information, the order of information acquisition can be crucially important. It should be obvious that how much information is obtained can influence choice. Somewhat less obviously, even controlling on amount of information, how information comes to a decision maker can also influence choice. As summarized in Table 1, each of the decision strategies specifies a particular depth and order of information search.

***** Insert Table 1 about here *****

Consider first the depth of information search. Rationally, all relevant information about every alternative should be obtained. With information boards it is easy to calculate the proportion of all alternatives, all attributes, and all possible information about every alternative that is considered, and so on – all reasonable measures of the depth of information search. Compensatory decision strategies assume that all relevant information about every alternative will be considered, and thus search will be relatively deep. Each of the noncompensatory strategies allows for much shallower search, although the choice set and aspiration levels could be such that all information ends up being considered before a satisfactory alternative is found, or all but one alternative eliminated.
We can also consider the sequence of information acquisition. Irrespective of how much information is gathered, the search sequence can be relatively ordered, or largely haphazard. Using an information board sequence can be studied formally with a “transition analysis” (Jacoby, Chestnut, Weigl, & Fischer, 1976). Ordered search is of two types, as follows.

- With alternative-based search (more formally, intra-alternative, inter-attribute), sometimes also called holistic search, decision makers consider the different alternatives sequentially. A voter following this search strategy would learn about the issue stands, political experience, personal values, and whatever else he considered important about one candidate in an election, before trying to learn the same information about a second candidate, and so on, until all of the competing candidates are explored. WAdd, EU, EqW, FreqGB, and SAT all assume alternative-based searching.

- With attribute-based search (intra-attribute, inter-alternative), sometimes also called dimensional search, a decision maker chooses one attribute for consideration and compares the values of all competing candidates on that issue, before turning to another attribute and comparing all of the competing alternatives on it. AddDif, MCD, LEX, and EBA all assume attribute-based searching.

Haphazard search then is everything else – inter-attribute, inter-alternative transitions.

Most research using information boards focuses on the relative proportion of alternative-based to attribute-based search, with the latter usually considered cognitively easier (Russo & Dosher, 1983; Rahn, 1993). But either type of ordered search must be much simpler, cognitively, than haphazard search. When information acquisition is completely under the decision maker’s control, as it is with information boards, the great majority of all transitions are ordered (Jacoby, Jaccard, Kuss, Troutman, & Mazursky, 1987), reflecting the decision maker’s overriding goal of
minimizing cognitive effort. Ordered information can be processed and stored more efficiently, aiding decision making. When information acquisition is not entirely controllable, however – as with, we would argue – an election, the sequence in which information becomes available, the structure of information in the environment, and the decision maker’s ability to at least partially restructure that sequence in some coherent manner, can have important effects on decision making, even changing preferences among alternatives (Tversky & Sattath, 1979).

A third measure is the variance of information search across alternatives. Compensatory strategies all assume that the same information should be considered for every alternative, while noncompensatory strategies allow for unequal search across alternatives. Thus the within-subject variance in the amount of information considered about each alternative is another way to distinguish between choice strategies. Compensatory strategies dictate equal variance, while noncompensatory strategies allow for unequal search. Variance measures are particularly useful in distinguishing between decision strategies when task constraints (e.g., time) make it impossible for all information to be considered.

Comparable alternatives are those about which the same attribute information is known, as is always possible with a standard information board. Noncomparable alternatives, on the other hand, are those with at least some attributes that are unique to each alternative (Johnson, 1986). Alternatives can be inherently noncomparable – guns versus butter, say – or de facto noncomparable because information about some alternatives exists but is unknown to the decision maker. Rationally, information that is available about some but not all alternatives should be ignored in making a choice – but we suspect it rarely is. Instead, people use what information they have and whenever possible make category-based inferences about the missing information. More generally, however, the possibility (probability, in most instances) of
incomplete search of available information means that virtually any decision may involve noncomparable alternatives.

5. Determinants of Choice Strategies – Deciding How to Decide

Having described a number of different decision strategies, and means of determining when a particular strategy is being employed, it is worth asking whether these strategies are available to and used by almost everyone, or if instead different people tend to specialize in the use of one or another strategy, employing across different types of decisions. Asked differently, are there some people who tend to be very rational and methodical in their decision making, while others typically employ more intuitive and heuristic-based decision strategies? The broad answer is that there is little evidence for systematic individual differences in use of these different strategies. Instead, almost all people seem to have available a wide variety of different decision strategies that they can and do employ in making decisions. Choice of decision strategy seems to be highly contingent on the nature of the decision task (Payne, Bettman, & Johnson, 1993, Lau & Redlawsk, 2006). Hence BDT research, rather than searching for individual differences in decision making, has instead focused on contextual factors which make it more likely that one or another strategy will be employed.\textsuperscript{5}

One very important set of factors involves the complexity or size of the decision task. Task complexity is usually defined in terms of the number of alternatives under consideration and the number of different attributes across which they vary; the more complex the task the more reliance on simplifying decision heuristics. This is true for both variation in the number of alternatives (Lau & Redlawsk, 2001b) and the number of attributes under consideration (Keller & Staelin, 1987), although the former seems to have much more consistent effects than the latter.
Generally speaking, decision makers rely on noncompensatory decision strategies when there are more than two alternatives, but they may use compensatory strategies if there are only two alternatives (Tversky, 1972).

There are additional factors that can affect the difficulty of the choice facing decision makers, holding task size constant. One is time pressure, which may shift a decision maker’s goals from accuracy to efficiency. Thus decision makers faced with time pressure – say the deadline of election day - may accelerate processing (that is, work faster); reduce the amount of information considered, focusing on the most important factors; or change decision strategies, shifting from a compensatory to a noncompensatory strategy (Holsti, 1989; Payne, Bettman, & Johnson, 1988). Another factor which affects task complexity is the similarity of the alternatives to each other. When alternatives are very dissimilar, it is relatively easy to distinguish between them and choose the best one. A noncompensatory choice strategy might very well lead to a different choice than a compensatory strategy, however. When alternatives are relatively similar to each other, it is much more difficult to find the best alternative (Lau & Redlawsk, 2001a). Depth of search should increase (Bockenholt, Albert, Aschenbrenner, & Schmalhofer, 1991), and decision makers may be more likely to employ a compensatory decision strategy. Decision makers may also infer that when a decision is difficult, the alternatives must be relatively equally attractive while in an easy decision they must be far apart (Liberman & Forster, 2006). Of course, it usually doesn’t matter very much if one picks the second- or third-best alternative if they are all very similar to each other.

The more important the decision is to the decision maker, the more she will be motivated by decision accuracy rather than decision ease, and the greater will be the effort expended in making the decision (Payne et al., 1993). Thus information search should be deeper, and
compensatory decision strategies will be more likely to be employed (Lindberg, Garling, & Montgomery, 1989). This reasoning assumes that deeper information search leads to better decisions, a conclusion that is easy to reach granted omniscient rationality and demonic abilities, but may not actually hold for limited information processors. Indeed, we (Lau & Redlawsk, 2006) as well as Gigerenzer & Goldstein (1999; Czerlinski, Gigerenzer, & Goldstein, 1999) have demonstrated at least some instances when additional information actually results in lower quality judgments.

Variations in how information is displayed or becomes available are also known to affect decision making. Information rarely becomes available in an orderly, controllable manner, especially in the context of political decisions. If information is obtained about alternatives sequentially, the decision maker has little choice but to engage in alternative-based decision strategies, while simultaneous acquisition of information about multiple alternatives makes attribute-based search possible (Tversky, 1969). More subtle variations of information display can also make alternative-based or attribute-based processing more likely (e.g., Herstein, 1981) and even determine whether particular information is utilized at all (Russo, 1977). During an election campaign, watching a rally, speech or party convention for a single candidate provides primarily alternative-based information; a political debate, on the other hand, provides largely attribute-based information (Rahn, Aldrich, & Borgida, 1994). The completeness of the information – that is, whether the same information is available about every alternative – determines whether inferences about the missing data are necessary (Ford & Smith, 1987) but can also influence whether information “outside of the box” is even considered in making the decision.
6. Studying the Vote Decision: Dynamic Process Tracing

When political scientists attempt to understand individual vote decisions, they typically turn to the sample survey as their methodology of choice (e.g., Campbell, Converse, Miller, & Stokes, 1960; Fiorina, 1981; Lazarsfeld, Berelson, & Gaudet, 1944; Miller & Shanks, 1998; Nie, Verba, & Petrocik, 1976). Surveys do an excellent job of recording what decision was made (e.g., Are you going to vote in the upcoming election? Which candidate do you support?), but they are a poor vehicle for studying how that decision was reached. Surveys usually ask about opinions or decisions that were reached some time in the past, and thus the information provided is based on respondents’ memories. Moreover, the reasons people provide for why they might vote for or against a candidate are often justifications of a decision already reached rather than a veridical representation of the information that went into that decision in (Lau, 1982; Rahn, Krosnick, & Breuning, 1994; Civettini & Redlawsk, 2009). And it may be that voters keep an “on-line tally” or summary evaluation of familiar candidates in their heads, which they update whenever new information is encountered, but often forget the details of that new information (Lodge, McGraw, & Stroh, 1989; Lodge, Steenbergen, & Broh, 1995; but see Redlawsk, 2001; Lau & Redlawsk, 2006 for the role memory plays in choice). Memory, then, usually provides a poor trace of how a decision was reached.

More recently, political scientists have turned to experiments – laboratory, field, and survey based – to better address the causal questions raised in voter decision making. Our particular approach has been to use process tracing experiments. Studies of voting using the standard information board we described above have provided some insights (Herstein, 1981; Riggle & Johnson, 1996; Huang, 2000; Huang & Price, 2001). Yet this standard information board provides a poor analog to a political campaign since the decision maker can access any
information any time he wants. Campaigns though, have a dynamic quality about them such that information easily available today might be harder to find tomorrow. All information on a standard board is equally easy to access, while in a political campaign certain types of information (e.g., hoopla and horse race) are typically easier to find than others (e.g., detailed issue stands). Decision makers must actively choose to learn about the alternatives with a standard information board, but much information during political campaigns (e.g., political commercials) comes without any active effort by the decision maker to learn that information. And, most importantly, decision making with an information board is far too "manageable," too controllable, too easy; while during a typical high level political campaign (e.g., presidential elections and many statewide races), voters can be overwhelmed by far more information than they can possibly process. This latter point may be even truer in the age of the internet and information overload. In many ways the static information board represents an ideal world for decision making that can be contrasted to an actual political campaign.

The tradeoffs between internal and external validity with any methodology are well known. We have sought a middle ground for studying the vote decision, trying to devise a more ecologically valid research technique that would approximates the realities of modern political campaigns while still providing the experimental control and detailed evidence on information search that is available from a traditional information board (Lau, 1995; Lau & Redlawsk, 2006). To accomplish these goals we have designed a *dynamic process tracing environment (DPTE)*, retaining the most essential features of the standard information board while creating a better analog of an actual political campaign. DPTE has the information boxes scroll down a computer screen rather than sitting in a fixed location (see Redlawsk, 2004; Lau & Redlawsk, 2006; Redlawsk & Lau, 2009 for details.) If a standard information board is artificial because it is static
and too "manageable," DPTE potentially overwhelms participants (voters) with information. If the static board is unrealistic by making all information available all the time, we mimic the ongoing flow of information during a campaign with the scrolling, where information available today might be much harder to find tomorrow. If the standard information board is artificial because all types of information are equally available, DPTE realistically models the relative ease or difficulty of learning different types of information during a campaign. And if a standard information board only allows for information actively accessed by the decision makers, we provide voters with a good deal of relevant information "free of charge" in the form of campaign advertisements that occasionally take over the computer screen without any active decision on the voter’s part to learn that information. Our research program aims to discover which of the various findings of the BDT literature apply to voting during political campaigns.

We have used DPTE to examine cognitive heuristics and other aspects of “low information rationality” that are common explanations for how people make pretty good decisions without a lot of cognitive effort, and without gathering an inordinate amount of information (Lau & Redlawsk, 2001a; 2006). We have also been explicit in recognizing that a vote decision, made in the context of an election campaign where voters know they must ultimately make a choice, is in important ways different from the process of making a judgment or forming an evaluation (such as of an incumbent president’s job performance), even though it is common to treat the two as essentially identical.

We disagree. If voters are motivated by the desire to make good decisions and the desire to make easy decisions, storing in memory nothing more about the candidates than summary evaluations is certainly an easy way to make a decision, but it is not a particularly good way, especially if those evaluations are formed on the basis of two independent sets of criteria. A
good decision, as most people intuitively realize, should be based on comparing alternatives on a common set of criteria, and to do that – except in fairly artificial or contrived situations – requires memory of the particulars upon which an evaluation is based. We have very clear evidence that memory matters to decision quality (Redlawsk, 2001; Lau & Redlawsk, 2006).

Recently we have used DPTE to look more closely at affective processes such motivated reasoning (Kunda, 1987, 1990). In our earlier studies we found evidence that voters were more positive in their evaluations of liked candidates for whom they learned negative information, than those for whom all they learned was positive (Redlawsk, 2002). More recently we have identified ways that memory is enhanced or conditioned by affect (Redlawsk, Lau, & Civettini, 2006; Civettini & Redlawsk, 2009) and at how long polarization might go on before voters begin to re-evaluate and more accurately update their priors (Redlawsk, Civettini, & Emerson, 2010.) Other work using DPTE has examined cognitive processing and aging (Lau & Redlawsk, 2008) and the role gender of candidates and voters plays in information processing (Ditonto & Andersen, 2011; Ditonto, Stalsburg, & Andersen, 2010; Redlawsk & Lau, 2008). The methodology is extremely flexible, allowing us to examine many different questions, the common thread of which is the examination of evaluation and choice as information flows over time.

7. Voter Decision Making and Behavioral Decision Theory

So what do we know about voters, given the basic precepts of behavioral decision theory? We turn now to an overview of recent voter decision making research that implicitly or explicitly takes a perspective supported by BDT. Again this literature is huge, and we are not going to pretend to cover it all here. Instead we will focus on a few key strands. First, the
psychological work in heuristics discussed earlier led to questions about how and when voters use heuristics and the extent to which these heuristics help or hurt. Second, we examine a developing literature that asks to what extent people (voters) are accurate in updating their evaluations. The question is whether voters operate “rationally” as Bayesian updaters, or whether instead they are motivated reasoners (Kunda, 1987; 1990) who maintain existing evaluations rather than challenge them with new information. Third, we examine the question of whether voters do a better (or worse) job by using heuristics, motivated reasoning, or by adopting more or less rational strategies using a standard we call a “correct vote” (Lau & Redlawsk, 1997).

7.1 Heuristics and Voter Decision Making

Political scientists have looked to rehabilitate voter decision making ever since *The American Voter* (Campbell, Converse, Miller, & Stokes 1960) taught us that the capacity of American voters appears to fall well below the standards thought necessary for voters to hold their representatives accountable. We learned that voters have no sense of ideology, no real interest or knowledge of issues, and seem to vote guided mainly by the “nature of the times.” A decades-long debate ensued over voters’ ability to make good decisions. In many ways the debate became tedious, with the accepted wisdom that most voters were either through lack of ability or lack of motivation, just not doing a very good job.

Samuel Popkin, in his book *The Reasoning Voter* (1991) took issue with this accepted wisdom, arguing voters could make perfectly fine decisions using “gut rationality” or “limited information rationality.” Voters can use the limited information they receive through daily life as a kind of heuristic to make sense of politics. Sniderman, Brody, and Tetlock (1991) extended this positive view of heuristic-based voting by arguing citizens could reason through political issues
by simplifying the tasks and relying on the interaction of cognition and affect. That is, voters typically can identify what they like and don’t like. They may in fact be able to identify groups as well and use the affect they have toward them to help make sense of the political world. The argument is much more nuanced then this, of course, but the point is that a “likeability heuristic” can be applied so that knowing what group one likes and knowing what political actor the group likes (endorsements), can allow the voter to transfer that affect to the political actor. But while heuristics may thus facilitate decision quality, they also require a modicum of information – if one does not know that the ACLU stands for something, then knowing the ACLU endorses a candidate or an issue is not very useful. Sniderman and colleagues were careful to note that heterogeneity in political sophistication leads to different expectations on the effectiveness of heuristic and non-heuristic processing.

Pushing back on this effort to rehabilitate at least some American voters, Bartels (1996) argued that it is naïve at best to think that heuristics can replace actual information. Setting a standard based on the most sophisticated voters in the American National Election Studies, Bartels then asked whether less sophisticated voters – whom he presumed were using heuristics – actually voted as if they were sophisticated. The answer of course was no. Bartels ran a series of simulations that showed how presidential elections would have looked different (though not different enough to change outcomes) if all voters made the same choices as the most knowledgeable. His conclusion was that heuristics simply could not be working.

But Bartels could not tell if voters were using heuristics, who was using them, and what heuristics were in use. The limitations of survey data mean that he could only assume that sophisticates did not need to use heuristics and non-sophisticates did use them, and used them badly. In order to do more than assume, we must observe the voter decision making process as it
happens, which can best be done in an experimental environment. Using DPTE we followed voters in the lab, examining their heuristic use. The results (Lau & Redlawsk, 2001a; 2006) suggest that while heuristics are used by everyone – both sophisticated and non-sophisticated – their effectiveness in improving voter decision quality varies. In particular, some heuristics help sophisticated voters when the political environment is predictable, but lead to lower quality decisions when the political environment is not aligned as they expect. And our findings suggest non-sophisticates gain little from the heuristics we tested. Kuklinski and colleagues (2001) make a similar point, finding that the nature of the information environment can either improve or detract from political decision making. Some skepticism over the value of heuristics to “solve” the problem of uninformed voters is clearly warranted.

Yet a number of studies have shown where heuristics appear, if not to make non-sophisticates who use them act as political sophisticates, at least to help them make some decisions that are better than they might otherwise make. Boudreau (2009) reports experiments where an endorsement cue leads to better decisions by unsophisticated experimental participants, closing their gap with sophisticates. Levendusky (2010) finds that as elite cues become clearer – because of political polarization of elites – the mass public is better able to adopt more consistent attitudes. Hobolt (2007) shows that voters in European Union referendums rely on an endorsement heuristic and that this aids some voters – those sophisticated enough to know party positions in the first place. Likewise Arceneaux and Kolodny (2009) examine endorsements, finding that in a field experiment endorsements provided some voters with a useful heuristic that allowed them to compensate for a lack of awareness. Interestingly, this worked only if the endorsement included contextual information about who the endorser was. These latter two studies comport with Sniderman, et al.’s (1991) likeability heuristic.
7.2 Online Processing and Motivated Reasoning

Acting much like heuristics, *online processing* (Lodge, McGraw, & Stroh, 1989; Redlawsk 2001) builds on the well-established tendency of humans to make relatively effortless evaluations of other people rapidly, with no need to recall from memory what went into those evaluations (Hastie & Park, 1986). Evaluation takes place as information is encountered, and an online tally (Lodge, Mcgraw, & Stroh, 1989), summarizing the affective value of that information, is updated, after which the actual information itself can be discarded. Contrasted with *memory-based processing*, online processing is quick and easy, in the sense that when a decision must be made, a voter need only query the online tallies for the candidates and choose the more highly evaluated one. Memory-based decisions require the extra effort of querying memories for the candidates, and then forming an evaluation and making a choice (Kelly & Mirer, 1974). Thus Lodge and his colleagues (Lodge, Steenbergen, & Brau, 1995) argue since voters are essentially making an impression-based decision, online processing is the default.

Yet as we noted above, our own work using dynamic process tracing (Redlawsk, 2001; Redlawsk, 2004; Lau & Redlawsk, 2006) finds a significant role for memory in voter decision making, given the asymmetric information flows of the typical political campaign. Some of the variance in findings can be attributed to methods. Lodge uses information sheets showing research participants all the attributes of a single political figure in an easy-to-use format, minimizing the need to engage memory. On the other hand, DPTE presents asymmetric information mimicking a campaign, and the research participant must make a choice. This makes memory recall necessary to make the comparisons between candidates that facilitate high quality
decision making.

More important to the question of rational decision making is evidence that online processing is part of a broader evaluative process that may operate against “accurate” updating in the face of new, contradictory, information. *Motivated reasoners* (Kunda, 1987, 1990; Redlawsk, 2002; Lodge & Taber, 2005) strive to maintain their existing evaluations, discounting, counterarguing, and otherwise dismissing information running counter to their preferences. It is not hard to see how such processes would fly in the face of rational evaluations, where new negative information must lower an evaluation as readily as new positive information must increase it. For voters with existing evaluations and preferences, it appears quite difficult to move them in the correct direction (Redlawsk, Civettini, & Emmerson, 2010; Redlawsk, 2002; Redlawsk, 2006; Taber & Lodge, 2006). This effect appears attenuated when people are held accountable for their decisions (Redlawsk, 2001; Scholten, et al., 2007); accuracy goals inhibit online processing.

But, partisan motivations are at the core of much of politics. If such motivations are in opposition to accuracy goals, then motivated reasoners are unlikely to meet even low standards for rational decision making. Gaines, et al. (2007) show how interpretations of the same information create divergent beliefs on the Iraq war, which lead to divergent opinions, with better informed citizens most likely to show this effect. Lebo and Cassino (2007) identify how partisan motivated reasoning has implications for presidential approval ratings. And Kopko, et al (forthcoming) even find motivated reason effects in ballot counting, especially when rules governing assessing voter intent are ambiguous.

Recently, we have suggested that while motivated reasoning effects are consistent and perhaps even inevitable, all hope for accurate voter decision making is not lost (Redlawsk,
At some point the amount of information encountered that is in opposition to the existing evaluation may overwhelm motivated processes. At this tipping point, voters seem to recognize that the world is not what they thought it was, and they update with greater accuracy. It appears that as the amount of incongruency grows, anxiety grows about the lack of agreement between the existing evaluation and the mounting new evidence. This may then act to motivate a different process – what Marcus, Neumann, and MacKuen (2000) call “affective intelligence” switching processing from the maintenance of existing evaluation to an effort to more systematically process new information.

7.3 Decision Quality

Elections have typically been studied by historians, journalists, and political scientists, all of whom are chiefly concerned with which candidate or which party won the most votes. Yet there is another way to look at the vote decision that is more compatible with a BDT perspective: Did the voter choose correctly – that is, did the voter select the candidate who, in some normative sense, from the voter’s own perspective was the best one? By “best” we mean voting in accord with “fully informed preferences” (Dahl, 1989) – what the voter would have decided had she had full information about all of the candidates available to her. This has been a primary focus of our research (Lau, Anderson & Redlawsk, 2008; Lau, Patel, Fahmy, & Kaufman, 2011; Lau & Redlawsk, 1997; 2001a; 2001b; 2006; 2008; Patel, 2010; Redlawsk, 2002; 2004).

Various individual difference factors, including knowledge, interest, and motivation, have all been linked to correct voting (Lau et al, 2008; Lau & Redlawsk, 2006). But we have also looked at many of the decision strategies described earlier. Probably our most important finding is that voters’ decision strategies influence the quality of the choices they make – a
finding with implications extending well beyond political campaigns. What we find is that voters often make better decisions with less information, a finding clearly at odds with rational decision making models (Lau & Redlawsk, 2006).

Given a standard for voter decision quality, we need to ask under what institutional conditions voters do a better or worse job. We have begun to do this in the American presidential election context (Lau, et al, 2008), where we find that a major third party candidate on the ballot increases the difficulty of the choice and commensurately lowers the probability of a correct choice. Similarly a crowded ballot – defined as the presence of initiative and referenda on the ballot – decreases the attention voters can devote to the presidential election and decreases the level of correct voting. On the other hand, the more intense (competitive) a campaign – and thus the more relevant information available to voters -- the more likely a correct vote.

It seems likely that other institutional arrangements would play an important role in correct voting, and warrant exploration of correct voting in a comparative context (Lau et al, 2011). Preliminary results across 69 elections and 33 democracies suggest that information availability (political rights), the ideological distinctiveness of the candidates, and clear lines of responsibility (parliamentary systems with single-party governments, and presidential systems with unified government), are all associated with higher levels of correct voting, while incentives for personal (as opposed to party) votes, which increase learning requirements for each election, and (as in the U.S.) the number of parties on the ballot, are associated with lower levels of correct voting (see also Hines, 2008.)

Environmental contexts might impact correct voting, in particular the social networks in which voters are embedded. Richey (2008) examines the political discussion environment, finding that as voters interact with more knowledgeable discussants, correct voting is increased.
But, McClurg, Sokhey, and Seib (2009) using their own dynamic process tracing approach find that disagreements within a social network may drive down the level of correct voting. Socially mediated information can cause voters to pay attention, but as Ahn, Huckfeldt and Ryan (2010) find that “when the subject’s prior beliefs conflict with the informant’s message, the subjects are generally well advised to rely on their own priors. This is especially true among the well-informed” (Ahn, et al, p 780). Ryan (2010) further shows that while expertise available within social networks can improve voter decision making, an individual’s own knowledge plays an important role. Much more remains to be done to understand the contexts under which decision quality – a correct vote – is more or less likely.

8. A Quick Word on Behavioral Decision Theory and Emotion

Emotion is tricky and until quite recently political scientists have paid it scant attention. But emotions, we are learning, are critical to decision making. People without the capacity for emotion are generally without the capacity for making decisions, even if otherwise psychologically undamaged (Damasio 1999). Kahneman writes that even “[u]tility cannot be divorced from emotion…” (2003, 706). While this topic is covered in great detail in the next chapter, a few points might be useful here. One is that evidence is strong that one’s mood can act as cues during information processing, which can be incorporated into perceptions of the information environment, in a process called affect-as-information (see Wyer, Clore, & Isbell 1999 for a review). Second, mood may activate positive or negative information and lead to changes in its accessibility (Clore & Huntsinger, 2007).

Third, emotional states may trigger processing styles, so that people in positive states process information differently than those feeling negative. Positive feelings tend to result in less
effortful processing, while negative feelings lead to more careful systematic consideration of new information (Park & Banaji, 2000). Drawing on this dual process idea, Marcus, Neumann, and MacKuen (2000; Marcus & MacKuen, 1993) have posited affective intelligence theory, where anxiety arising from an unexpected stimulus activates a surveillance system which attempts to make sense of the incoming stimulus, interrupting the dispositional system which otherwise would result in less effortful processing. The result, they suggest, is that anxious voters may be better voters (Redlawsk, Civettini, & Emmerson, 2010). Yet, we doubt that anxiety would improve decision making in all circumstances. Clinically high levels of anxiety, for example, can be seriously deleterious to effective cognitive processing (Clark & Beck, 2010), but even much lower levels of anxiety are often associated with learning deficits (Eysenck, Derakshan, Santo, & Calvo, 2007; MacIntyre & Gardner, 1994). And while low to moderate levels of anxiety have been shown to disrupt reliance on automatic heuristic-based processing and to increase interest in contemporary information (MacKuen, Wollack, Keele, & Marcus, 2010), too much information search may lower decision quality (Lau & Redlawsk, 2006).

Marcus and colleagues (2006) make the important point that emotions must be thought of as more than a simple positive-negative valence. Instead discrete emotions – such as anxiety, enthusiasm, and anger -- are key to understanding affect. Gilovich and Griffin (2010) provide a nice summary of the research in psychology on these points, while Isbell, Otatti, and Burns (2006) review the implications of this research for political decision making.

This new turn toward emotions brings us to the very old idea of “gut” feelings that a choice is right or wrong. Damasio’s (1999) work provides important context, describing how as decisions are made our mind and body interact; we may well “feel” a choice before we can think about it. In political science, Popkin (1991) developed this argument quite a while ago. People
may operate on a very simple heuristic – what feels right. After all, decision making is in the end about how we will feel in some future – more or less happy, more or less sad – if we make a particular choice.

Perhaps our increasing understanding of emotion can bridge between RCT and psychological theories, an argument developed by Bueno de Mesquita and McDermott (2004). Kim (Kim, Taber, & Lodge, 2010) models this process by linking cognitive and affective processing in an agent-based computational model that does a much better job than a Bayesian updating model in predicting individual change in evaluations as information is encountered and processed. This model works well because it combines both affective and cognitive processing, where each interacts with the other. In many respects work like this defines the newest frontier in our quest to understand how decisions are made in the real world of the decision maker rather than in the idealized world of rational choice.

9. Conclusion
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We began by considering the classic, rational choice perspective on decision making, but suggested that a behaviorally oriented theory based on a view of humans as limited information processors was a more useful and accurate perspective if the goal is to understand how decisions are actually made. We have tried to shape our review of the BDT literature so as to highlight issues that should be of use to political psychologists. The focus on description in the BDT literature can leave the casual reader of that literature with a view more of the trees than the forest. Our goal was to provide a map of the forest rather than describe all the trees, because the latter obscures the fact that while the process of making a decision is much more varied than the
single ideal procedure suggested by RCT, it is still far from random (Jacoby et al., 1987). The regularities in human behavior are what social scientists must study, and there are more than enough in the decision making field to go around.

Can RCT and BDT approaches ever be reconciled? It is fairly easy to integrate the notion of bounded rationality into a rational choice perspective. Information costs have long been recognized as an integral part of the approach (e.g., Downs, 1957; Fiorina, 1981). Bounded rationality provides a more complete understanding, not only in terms of the costs of gathering the information but also in terms of the costs of utilizing it once it has been gathered. Some versions of RCT view decision makers as “intendedly rational;” doing the best they can under the circumstances and with acknowledged cognitive limitations (Jones, 1994; Lupia et al. 2000). But this reconciliation misses the boat. Sometimes people are intendedly rational; but much more often they make decisions automatically or semi-automatically with no conscious consideration or how or why they are choosing as they are. The view of decision makers as “omniscient calculators,” even as an ideal, should probably be dropped: it can be misleading, when people confuse “ought” with “is,” and as a consequence set unrealistically high standards (Lau & Redlawsk, 1997). But the normative concerns of RCT are important, and the guidelines of procedural rationality are worthwhile standards for making good decisions. Rather than intendedly rational behavior, however, we would characterize most decision making -- and certainly most political decision making -- as semiautomatic rule following, with any conscious deliberation focused on determining which heuristic is appropriate rather than value-maximization.

We echo Kahneman (1994) in arguing that instead of asking whether decisions are rational or not, or revising our definition of “rationality” so that it can include more actual choice
behavior, a better question for future decision research to address is under what conditions decision makers are at least “reasonably” rational in their decision processes; and when they are not, what cognitive shortcuts or heuristics do they employ in lieu of thorough information search and value-maximizing choice strategies? People can, and often do, follow a logic of consequence, if not omnisciently, at least reasonably, given their cognitive limitations. And people can, and often do, make many decisions automatically, by unconsciously following well-learned rules for making decisions. The question for political psychologists is not whether people are always or ever procedurally rational in their decision processes, but what they do when they are not, and what effect it has on the quality of the decision that is reached.

As political scientists, we also are interested in the implications of information processing and decision making for institutional design. Of course there is the possibility of assessing different institutions and systems for the degree that they do or do not improve decision making by both political elites and the mass public. Our own idea of “voting correctly” is one possible way for doing this. But a recent paper by a computer scientist suggests another possible implication: that knowing how voters process information might allow us to design systems that “support information gathering, organizing, and sharing, deliberation, decision making, and voting.” (Robertson 2005). As the world moves online, decision tasks like voting become both simultaneously more information rich, and yet potentially more difficult. BDT can help us understand both the strengths and weaknesses of how people make decisions, perhaps leading to system designs that play to the strengths and minimize the weaknesses. Robertson’s goal strikes us as a challenging one, but one that is worth pursuing.
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Table 1
Characteristics of Different Decision Strategies

<table>
<thead>
<tr>
<th>Decision rule</th>
<th>Type</th>
<th>Depth of Search</th>
<th>Variance of search</th>
<th>Sequence of search</th>
<th>Cognitive effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Additive Rule (WAdd) or Expected Utility Rule (EU)</td>
<td>Compensatory</td>
<td>Very Deep</td>
<td>Equal</td>
<td>Alternative-Based</td>
<td>Very High</td>
</tr>
<tr>
<td>Equal Weights Heuristic (EqW)</td>
<td>Compensatory</td>
<td>Deep</td>
<td>Equal</td>
<td>Alternative-Based</td>
<td>Moderately High</td>
</tr>
<tr>
<td>Frequency of Good and Bad Features Heuristic (FreqGB)</td>
<td>Compensatory</td>
<td>Deep</td>
<td>Equal</td>
<td>Alternative-Based</td>
<td>Moderate</td>
</tr>
<tr>
<td>Additive Difference Rule (AddDif)</td>
<td>Compensatory</td>
<td>Very Deep</td>
<td>Equal</td>
<td>Attribute-Based</td>
<td>Very High</td>
</tr>
<tr>
<td>Majority Confirming Dimensions Heuristic (MCD)</td>
<td>Compensatory</td>
<td>Deep</td>
<td>Equal</td>
<td>Attribute-Based</td>
<td>Moderately High</td>
</tr>
<tr>
<td>Satisficing Heuristic (SAT)</td>
<td>Noncompensatory</td>
<td>Depends: Shallow to Deep</td>
<td>Generally Unequal</td>
<td>Alternative-Based</td>
<td>Moderately Low</td>
</tr>
<tr>
<td>Lexicographic Heuristic (LEX)</td>
<td>Noncompensatory</td>
<td>Generally Shallow</td>
<td>Generally Unequal</td>
<td>Attribute-Based</td>
<td>Moderately Low</td>
</tr>
<tr>
<td>Elimination-by-Aspects Heuristic (EBA)</td>
<td>Noncompensatory</td>
<td>Generally Shallow</td>
<td>Generally Unequal</td>
<td>Attribute-Based</td>
<td>Low</td>
</tr>
</tbody>
</table>
Acknowledgement: We thank Zaid Abuhouran of Rutgers University for his diligent research assistance.

1. When people refer to a “best” solution, they usually mean the value-maximizing alternative. Rational choice assumes decision makers follow formal mathematical principles in making their probability judgments and value assessments, including regularity, independence from irrelevant alternatives, transitivity, procedure invariance, dominance, and all the dictates of Bayes’ theorem. These principals are quite logical and intuitive, and are widely accepted by decision makers when they are explained. Hastie and Dawes (2001) summarize these principals writing that a decision can be considered “rational” if it is (1) based on the status quo of current assets such that losses or foregone gains are equivalent; (2) based on all possible/plausible outcomes associated with the choice; and (3) where risk is involved, does not violate any of the basic rules of probability. As it turns out, this is a higher bar than it seems.


3. If one alternative is preferred to all others on every dimension of judgment, it “dominates” the other alternatives (Hastie and Dawes, 2001), and there should be no conflict in making a decision.

4. One other type of transition is possible: intra-attribute, intra-alternative, that is, re-accessing the same item of information. This type of transition can usually be considered a random error.

5. The one exception to this statement is expertise, which has been a major focus of attention in
the field; see for example Fiske, Lau, and Smith, 1990; Lau and Erber, 1985.

6. The most recent version of the DPTE system is available to any researcher wishing to develop process tracing experiments, at http://dpte.polisci.uiowa.edu.