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A COGNITIVE-CYBERNETIC THEORY OF JUDICIAL DECISION MAKING: A THEORY AND EMPIRICAL ANALYSIS OF UNITED STATES SUPREME COURT DECISION MAKING

By

Timothy Mark Hagle

A DISSERTATION

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1988

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ABSTRACT

A COGNITIVE-CYBERNETIC THEORY OF
JUDICIAL DECISION MAKING:
A THEORY AND EMPIRICAL ANALYSIS OF UNITED STATES
SUPREME COURT DECISION MAKING

By

Timothy M. Hagle

This study examines United States Supreme Court decision making from a cognitive-cybernetic perspective. Neither the comprehensive rational model of decision making or the traditional theory of legal decision making can account for the ability of judicial decision makers to operate effectively in a highly complex decisional environment requiring the processing of voluminous amounts of information. The cognitive-cybernetic theory of judicial decision making is characterized by four main principles: simplification of the complex problem, a stable decisional environment, a focus on a small number of major factors, and a limited choice set.

The search and seizure decisions of the United States Supreme Court from 1961 through 1987 are used to test the theory. The dichotomous choice set, concentration on major factors, and simplification of the decision making process result in a form of judicial balancing. The major factors weigh for or against a specific choice; the specific combination determining the outcome. The maximum-likelihood technique probit is used to test the model derived from the

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theory. Probit emphasizes the weighing of factors in a fashion which increases or decreases the probability of a particular choice. This technique is more analogous to the cognitive-cybernetic theory than regression techniques which do not account for the limited choice set.

Two judicial decision makers are examined: the individual justices and the Supreme Court. The estimated votes of the justices are aggregated to estimate the Court's decisions. The decisions of the Court as the judicial decision maker are also examined. Estimating the Court's decisions from primary data is more appealing than aggregating estimations of individual votes. Examination of both judicial decision makers allows consideration of whether the whole is greater than the sum of its parts.

The model derived from the theory proves highly successful at correctly classifying the votes of the individual justices and the decisions of the Court. The variables operationalized from the hypotheses provide high degrees of explanatory power for both judicial decision makers. The examination of the Court's decisions demonstrates how increases in the stability of the decisional environment, internally and externally, increase the ability of the model to correctly classify the decisions.

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TIMOTHY MARK HAGLE

1988

To my father Gordon E. Hagle

who was patient

Profess
through
its gre
ous sub
proved
in one
thanks.

ACKNOWLEDGMENTS

Professor Harold J. Spaeth provided advice and guidance throughout the course of this project. His guiding hand had its greatest impact when it was applied most lightly. Numerous substantive and strategic discussions with Joseph Ignagni proved to be most helpful. Many more people provided support in one form or another. To them I give a collective sigh of thanks.

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Chapter 1: Introduction

The judicial branch is a coequal part of the United States government, and yet it has escaped the degree of scientific scrutiny given to the executive and legislative branches. This is not to say the judicial branch has lacked all scrutiny, only that it has traditionally been viewed from a perspective different from the other two branches of government. The executive and legislative branches have traditionally been viewed as political entities. Judges and the judicial branch have fostered the idea that they are nonpolitical arbiters of the law. In Marbury v. Madison, the landmark United States Supreme Court case which established judicial review under the United States Constitution, Chief Justice John Marshall rhetorically asked who should determine the meaning of the Constitution. He answered himself by pointing to the fact that members of the other two branches were intimately involved in that nasty business of politics, and only judges were qualified to be truly nonpolitical arbiters of the law. These statements by Chief Justice Marshall were certainly not the beginning of what is generally known as the "cult of the robe," but they are certainly a classic example in American jurisprudence.

Following Marshall's reasoning, the study of the judiciary has traditionally concentrated on individual cases. Each case must be decided on the basis of cases which have preceded it. Although it may be acknowledged that each case is different from any other in many ways, past cases must

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This reliance on precedent, known in legal terms as stare decisis, and its accompanying detailed examination of each case has caused legal scholars, to paraphrase Wieland, to not be able to see the forest for the trees. To get a more accurate picture of the workings of the judiciary it is necessary to step back from the cases. One must remain cognizant of the details, but not to such a degree that they inhibit the ability to see the greater whole. This is not to say analysis of individual cases has no place in the scientific study of the judiciary. Indeed, as was pointed out by Joyce Kilmer, there is always a place to appreciate the beauty of a tree, but there are also times when we must consider the tree as a part of the greater forest.

Although judicial scholars by and large do not subscribe to the myth that judges are nonpolitical arbiters of the law, there does seem to be substantial interest in judicial biographies, case studies, and narrowly drawn issue areas containing only a few observations. Judicial biographies and case studies are certainly useful in interpreting particular judicial decisions, examining the opinions of a particular jurist, or discussing specific points of law, but to optimize the results of such efforts, in terms of scientific study, it is necessary to view such research within the framework of a more comprehensive theory of judicial decision making.

This work will construct such a comprehensive theory of judicial decision making by building on a theory of human

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decision making. The assumptions and requirements of rationality and the comprehensive rational actor model will be examined in the context of the Cuban missile crisis. Next, these assumptions and requirements will be examined in light of real world and human limitations. Real world limitations include various barriers to obtaining the information necessary to fulfill the requirements of the comprehensive rational actor model of decision making. Human limitations include the cognitive limits on the processing, retention, and recall of information.

A cybernetic model of decision making supplemented by cognitive theory will be offered as an alternative to the comprehensive rational actor model. Evidence will be presented to show that decision makers, especially those who must deal with inordinate amounts of information, find shortcuts and ways of streamlining the processing of information. In essence, this involves searching for a relatively small number of important cues or factors on which the decision can be based. In this respect, the decision making process is like a servomechanism. The mechanism is built (or trained) to monitor a small number of factors. When the factors change the mechanism changes accordingly. Humans are clearly not automatons, but cognitive limitations and the need to process large amounts of information force decision makers to adopt strategies designed to cope with their limitations. These strategies focus on a limited number of factors in making decisions.

Judges are professional decision makers, but they are

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still subject to human cognitive limitations. Judges, and in particular the justices of the United States Supreme Court, must process voluminous amounts of material before arriving at a decision in a case. In addition to cognitive limitations, judges are also constrained by the judicial system itself which places demands on the judges as to the form and content of their decisions. Thus, judges must also adopt strategies and shortcuts designed to allow them to process the information necessary for them to reach a decision.

In the behavior of rational actors and human decision makers we do not try to predict individual decisions. There are two reasons for this. First, Lave and March point out that models of individual decision making may not be used to model individuals. They make this point as follows:

> Although our model is formally a model of individual behavior, we rarely use it to predict individual behavior. Instead, we use it to predict the behavior of groups of people. If we are interested in applying our model of choice to consumer behavior, for example, we do not try to say what each individual consumer will do in the face of a price change. Rather, we try to say what the aggregate movement of consumers will be. (1975:134-135)

The cybernetic decision makers which are most interesting are those which are exceedingly complex and probabilistic (Beer 1964). This means that their inner workings cannot be described in a complete and precise fashion. With respect to human decision makers, it means we cannot know with certainty every factor which has an impact on a human decision maker.

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Even the decision maker may not know, since many factors may operate on a subconscious level. Many of these factors will be specific to the particular individual (e.g., a fear of water due to some childhood mishap). Other factors will be consistently important across individuals, especially if there are similarities in the group or the decision-making situation forces a certain amount of homogeneity into the decisions, as is the case with the justices of the Court. Nevertheless, if we attempt to model the behavior of individuals we may be confronted with fluctuations and random errors which cause the model to do poorly in correctly predicting individual behavior. Using the model of individual behavior over a large group of decisions, these fluctuations and random errors will even out and the model will do much better.

Second, as noted by Steinbruner, cognitive theory acknowledges that in terms of substantive content human beings differ so greatly that "empirical generalizations are simply overwhelmed" (1974:95). However, in terms of the structure of beliefs and the decision making process itself there is a greater similarity across individuals.

In examining judicial decision making, and in particular the decisions of the United States Supreme Court, one must decide whether to examine the decisions of the individual justices or those of the Court. Can a court composed of several individual justices be considered a decision maker in the theoretical sense?

One of the proponents of the cybernetic model does not even assume the decision maker has a consciousness of its own

in order to be considered a cybernetic decision maker (Ashby 1960). Another author notes that it is not necessary to posit a utility function for a goal-seeking organism (Simon 1957:261-273). This allows for a group of individual decision makers to be considered as an individual "actor" or "decision maker." We often speak of large groups of people as if they were an individual decision maker. In international politics, whole nations may be considered the actor; in elections, whole segments of the population are often analyzed on the basis of their demographic characteristics (e.g., blacks, Catholics, union members); in sports, we talk about what a team must do to beat another team; and in judicial politics, we are concerned with the decisions of courts, not individual justices.

In addition, certain factors specific to multi-judge courts suggest a preference for examination of the Court's decisions rather than those of the individual justices. When the Court makes a decision, that decision has the same force of law whether the decision was unanimous (e.g., 9-0) or minimum winning (e.g., 5-4). It has been argued that minimum winning decisions may be less stable and more prone to resistance (Brenner, Hagle, and Spaeth 1988:2). However, resistance can be just as strong against unanimous decisions (e.g. Brown v. Board of Education), and although it is mathematically obvious that only one justice need defect to change the outcome in a minimum winning decision, five of nine justices are still required to form a majority.[1]

One may wonder if the preferences of the individual

justices may simply be summed to arrive at a model for the Court's behavior. A group of individual decision makers may each have utility functions and goal directed behavior and yet the actions of the group may still be suboptimal. Often these suboptimal results are due to a voting paradox or collective action problem (Frohlich and Oppenheimer 1978:15-48). More simply, it may be explained by the maxim "the whole is greater than the sum of its parts." Despite the comment that the Court functions like nine separate law firms, interactions occur among the justices before, during, and after the individual votes are cast, but before the Court announces its decision.

The cognitive-cybernetic theory developed in Chapter 2 is not dependent on the type of decision maker being examined (i.e., individual versus group). Since the theory applies to both types of judicial decision makers, the model derived from the theory will be used to examine the votes of the individual justices and the decisions of the Court. The dual application of the model provides an opportunity to observe the differences between a reductionist and a holistic view of judicial decision making.

The cognitive-cybernetic theory of judicial decision making requires a stable decisional environment. Thus, a single issue area is chosen for examination: search and seizure. Chapter 3 provides the details regarding the data set, operationalization of variables, and the methodology used. Chapter 4 presents the results of the examination. Chapter 5 presents a summary and conclusion.

Chapter 2: The Cognitive-Cybernetic Theory of Judicial Decision Making

This chapter begins by presenting the comprehensive rational actor model. The next section examines a number of the limitations which make the comprehensive rational actor model unworkable as a model of human decision making. The third section presents a cognitive-cybernetic theory of human decision making which incorporates the methods of human learning and adaptation of cognitive theory in a cybernetic structure applicable to judicial decision making. In the final section, several hypotheses are drawn from the cognitive-cybernetic theory and the specific issue area to be examined.

A. Rationality in Decision Making

When we speak of a "rational" actor (be it an individual, a group, or an institution), it is generally assumed the actor is engaged in goal-directed behavior (Laver 1981:21). Rational actors choose those actions which maximize the probability of obtaining the desired goals. The assumption of rationality, with respect to the study of social choice theory, allows observers to examine actions with the assumption that the actor chose a course of action because it was the most preferred, in terms of obtaining the desired goal (Frohlich and Oppenheimer 1978:1-13). If rationality cannot be assumed, the study of social choice would be pointless, or at least reduced to the statistics of a distribution of

random actions.

When behavior is to be considered rational it meets certain conditions. First, the preferences of an actor must be connected and transitive (Frohlich and Oppenheimer 1978:7-9). Connectedness requires that any two outcomes can be ordered (A>B, A<B, or A=B). Transitivity requires that among three or more outcomes, if A is preferred to B, and B is preferred to C, then A is preferred to C. This adds stability and predictability to the actor's preferences and eliminates the possibility of preference cycles (Frohlich and Oppenheimer 1978:9).

Second, the choice process is not necessarily done consciously; it is usually internalized in some fashion. The rational decision maker does not literally make calculations in order to arrive at a decision. Related to this is the fact that as observers we do not know exactly what a given actor's preferences are, only the choices he has made based on those preferences.

We also do not assume that all actors will make the same choices even if their preferences are the same. The goals actors seek are not necessarily the same. Risks actors are willing to take may vary, as might the information on which decisions are based. In addition, actors can make mistakes in their perception of the risks involved and the expected consequences due to incomplete information or simply erroneous beliefs as to the state of the world. However, so as not to fall into the trap of rationalization, we must make some assumption of an actor's preferences or have prior

information about those preferences (past behavior).

Frohlich and Oppenheimer examine some general characteristics of choice and list some restrictions on preferences. They summarize these characteristics and restrictions into four rules. Choices which conform to these rules are said to be rational (1978:6-11).

The first of these rules requires preferences to be nonprobablistic. They indicate this means preferences must be deterministic. A rational actor would not say, "I probably prefer X to Y." Without the "probably" the statement is deterministic (1978:6).

The second rule incorporates transitivity and indifference into the decision making process. Transitivity, as noted above, requires that preferences can be ordered. Indifference indicates the situation where one cannot say that X is preferred to Y or that Y is preferred to X. When this occurs, the actor is indifferent as to the choice between X and Y (1978:7-8).

The third rule is one of forced choice. Simply stated the decision set must be exhaustive. No possible alternatives can be excluded. This may include the decision not to choose or decide and the authors provide an example from Allison's The Essence of Decision where one of the six major choices of action considered by Kennedy and his advisors during the Cuban missile crisis was to do nothing (1978:9-10).

Finally, nonperverse selection rules are required. A perverse selection occurs when an actor expresses a

preference for X, but chooses Y nevertheless (1978:10).

An additional assumption of the comprehensive rational actor model (though not always explicitly stated) is that the rational actor will effectively examine all available alternatives and choose the alternative which produces an anticipated outcome closest to the actor's indicated preferences.[1] This is slightly different from Frohlich and Oppenheimer's rule of forced choice. Forced choice merely requires that the final choice come from the specified set of alternatives. Comprehensive rational decision making requires that the set of potential alternatives be as large as possible.[2]

We see how this method works in practice as illustrated in Graham Allison's The Essence of Decision. When the information that secret missile bases were being constructed in Cuba reached President Kennedy, he gathered his advisors and explored the possible responses and their probable consequences. Each potential alternative was examined individually and evaluated on the basis of how its implementation would affect United States relations with Cuba, the Soviet Union, and the world at large. This method of decision making is also referred to as the comprehensive method (Harris 1983:542).

A form of the comprehensive method is used in cost-benefit analysis. Cost-benefit analysis "is a technique that can be used to evaluate government projects. The basic concept is quite simple: identify the benefits and costs of a project then measure them in comparable units (such as dollars)" (Browning and Browning 1979:114).[3] Such an analysis

may be performed post hoc to evaluate a program. In many cases, for a project to be considered successful it is sufficient that the benefits outweigh the costs.

The analysis can also be performed before selection of the specific program to be implemented. This was the basis of Zero-Base Budgeting (ZBB).[4] Under ZBB, the costs and benefits of the proposed programs were to be analyzed and selected on the basis of the greatest benefit that could be obtained given the expected budget. During the budgeting process Congress and various agencies act as rational decision makers who must weigh the various alternatives for budgetary allocations to obtain the outcome closest to their preferences. Perceived costs will reduce the probability of selecting a particular alternative; perceived benefits will increase that probability.

Although the budgetary process is of a different magnitude than the Cuban missile crisis with respect to the variables involved (which is not to say that it is of more importance), the parallels, in terms of the decision making process, are easily seen. Kennedy and his staff had a decision to make. They explored the possible alternatives, weighed the positive and negative aspects of each alternative, and chose the one closest to their preferred position.[5]

Clearly, budgetary decisions are made by group efforts. Kennedy made his decision with the assistance of his advisors (though the ultimate decision was his alone). The comprehensive, cost-benefit method of decision making applies to the individual decision maker who must make everyday decisions

such as whether to purchase a new car, where to vacation, or what to fix for dinner, as well as group or institutional decision makers, such as Congress or the Supreme Court. In any of these decisions, the rational actor must take into account all the relevant alternatives and the positive and/or negative consequences associated with each, before making a decision. In economic cost-benefit analysis, the standard units of measure are monetary. For noneconomic decisions the units are more ambiguous.

"Utiles" is the name most often used to refer to these internal units of exchange. A utile is intended to represent a unit of utility which the decision maker experiences with regard to some specific state of the world. Von Neumann and Morgenstern acknowledge this notion of utility to be more than a little amorphous (1980:16-17). They liken this problem to that encountered in the early stages of many of the physical sciences. The problem is one of measurement and sensation. They note that all measurement must ultimately be based on some form of sensation, and it is not always possible to measure the most basic sensations. In the physical sciences, it was sometimes necessary to accept initial ambiguities until more accurate measurement techniques were developed. It is suggested that the same be done regarding the notion of utility. Namely, that we accept it as a basic sensation which may not be accurately measured at present (1980:17).[6]

Another way to view the decision making process for the rational actor is in terms of a maximization problem: the

decision maker is attempting to maximize the benefits of the decision to be made. This view is closely related to the cost-benefit method of analysis. The decision maker may wish to simply maximize the cost-benefit ratio. As Browning and Browning point out (1983:119), the largest cost-benefit ratio may not produce the most efficient project. To determine the most efficient project, the one with the largest net benefits, the cost and benefit curves must be examined (see Figure 4-10 in Browning and Browning 1983:120). The benefit curve is drawn such that initially benefits are large in relation to costs (thus causing large cost-benefit ratios) with gains gradually decreasing as the scale of the project increases. At some point the benefits will no longer increase and may in fact begin to decrease.[7] The costs start small and make increasing gains as the size of the project expands. Given this particular form of the cost and benefit curves, at some point the slope of the benefit curve (which is decreasing) will equal the slope of the cost curve (which is increasing). At this point the project will yield the greatest net benefits. The decision maker is expected to be able to gather and assimilate the information necessary to determine the slopes of the cost and benefit curves as well as determine the point at which the greatest net benefits occur.[8]

The key feature of the comprehensive rational actor model is the comprehensiveness of the actor's search for information or alternatives. The comprehensive rational actor considers all alternatives and their consequences then selects

the one which comes closest to fulfilling the actor's preferences. It is unlikely that any decision maker has the wherewithal to examine all possible alternatives. Limitations on time, money, effort, and perceptions, restrict the potential choice set from which the alternatives are drawn. Bounded rationality, as it is commonly called, allows the rational decision maker to limit his decision to the bounded choice set, but the assumption of comprehensiveness within that choice set still holds. The rational decision maker is still a maximizer engaged in goal-directed behavior, and must examine all alternatives within the bounds.

Another factor which concerns the rational decision maker, is whether the consequences of the alternative chosen are deterministic or probabilistic. Discussions of decision making often differentiate between decision making under certainty (deterministic) and decision making under risk (probabilistic) (e.g., Ordeshook 1986:28-41). Decision making under risk may be more complex because of the calculations of probabilities and expected values of each possible alternative, but the decision maker is still expected to perform these calculations to find the alternative which maximizes his utility (e.g., Lave and March 1975:85-137; Ordeshook 1986:37-42).

The next section will show the assumptions of comprehensiveness and maximization may not be practical or even possible for human decision makers.

B. Human Decision Making

The description of the comprehensive rational actor presented in the previous section is an ideal rather than a genuine model of behavior. Bounded rationality and decision making under risk (or uncertainty) do not obviate the basic premise of rationality, viz., the rational actor maximizes the attainment of his goals within the limited choice set or conditions of risk.

That decision makers engage in goal-directed behavior cannot be questioned; to do so would make social science research meaningless. What can be questioned, however, are the assumptions about how a specific course of action is selected by the decision maker. It must be remembered that the rational actor model is often used to model economic behavior[9], but noneconomic conditions force a number of limitations on the model. In addition, human cognitive limitations further lessen the applicability of the comprehensive rational actor model to many actual political situations, including the decision making of the United States Supreme Court.

1. General Limitations

As noted above, the comprehensive rational actor model assumes a person can assemble all the data relevant to a decision, fit the data into some internal equation, and arrive at the best possible decision, given the goals and preferences of the decision maker. This serves as a starting point for a discussion of a number of shortfalls of the

comprehensive rational actor model.

It is quite often impossible to gather all the data necessary to make a rational decision. To some degree, certain relevant information may simply not be available. The information may not be gathered, or there may be technological barriers which prevent its being compiled. In examining the alternative responses the United States could have made to the placement of Soviet missiles in Cuba, it would have been very helpful to have known why the Soviets put them there. Unfortunately, this information was lacking and Kennedy, et al., had to begin by hypothesizing as to Soviet motives (Allison (1971:40-56). The probability of each of the hypothesized motives directly influenced the choice of the United States' action. For any given alternative, the Soviet response could vary depending on their initial reasons for the placement of missiles in Cuba (Allison 1971:57-66).

Not knowing with certainty the reaction of the Soviets was compounded by an equal uncertainty as to the reaction of the world community to particular responses by the United States. Had such information been available the situation would probably not have lasted as long or been as interesting as an exercise in decision making. If Kennedy and his advisors had known what the Soviet response to particular actions would have been, they could have quickly and easily chosen the alternative yielding the result closest to their preferences. The fact that such knowledge was not available is a manifestation of the control problem.

Harris notes four principal barriers to the comprehensive

method of decision making (1983:542-545). The first of these is the problem of control. Decision makers often cannot control all the elements of a problem. Certainly Kennedy could not force or even foresee the Soviet reaction with a high degree of certainty. Educated estimates could be made on the basis of perceived Soviet goals and past Soviet behavior, but these estimates were no more than guesses.

Adherents of the comprehensive rational actor model do not require that the decision maker have control over all elements relevant to the decision. This is also true when the decision is being made under risk or uncertainty. They do, however, generally make approximations as to what they believe the probabilities to be. This allows the decision maker to calculate estimated probabilities of various outcomes and the expected value of the decision as a whole, but it must be remembered that these are only approximations which leave much room for error.

Kennedy had no such probabilities to work with. One method of determining probabilities is to examine past behavior (Lave and March 1975:108-126). Taking advantage of past behavior requires the additional probability or expectation that present or future behavior will conform to previous patterns. When talking about the weather this may be the case (cf., Gleick 1987:9-32). When talking about behavior which is out of the ordinary to start with, past behavior may be of little value.

In a less gross context, it is also difficult to strictly control every facet of the elements which are under the

decision maker's control. Kennedy may have been the Commander in Chief, but he cannot control every action made by every member of the United States armed forces, nor even by the small number military personnel actually involved in the blockade. Misunderstood or misinterpreted orders combined with the tension of a military confrontation could have easily resulted in unwanted and perhaps unanticipated actions. Military personnel may undergo rigorous training and indoctrination with respect to correct procedures and following orders, but until actually faced with the emergency situation it cannot be determined with absolute certainty how one will react.

The second barrier noted by Harris is that of unintended results. Even if the various actors react as predicted, additional unforeseen results may also occur. Suppose that during the blockade a storm had arisen which capsized one or more of the Soviet vessels. Certainly the United States did not directly cause the loss of the Soviet ship, but just as surely if the United States had not prevented the ship from reaching its destination it would not have been caught in the storm.

Unintended results may be considered a control problem that reaches beyond the initial stages of the decision at issue. The decision makers may have estimates of potential reactions to initial actions, but further rounds of actions and reactions increase the difficulty of estimation and control exponentially.[10] To some extent this problem of compounding difficulty may be alleviated by applying the

rational actor model to each stage. Even assuming that this is possible in terms of time available, small problems may grow to be large ones if they are not considered early enough in the process.

In the game of chess, two standard bits of advice given to beginners are to develop the major pieces and to control the center of the board.[11] The beginner may feel it is safer to keep his pieces at close quarters rather than seemingly exposing them at the center of the board. The folly of this strategy soon becomes apparent when the beginner is forced to give up piece after piece because of a poor defense and no offense. The rational actor is caught between an inability to adequately foresee all potential consequences of initial actions and the need to do just that to prevent being put in an unnecessarily disadvantageous position for continued interaction.

Third, it is not always easy to make an accurate cost-benefit analysis of the possible solutions to a problem. Both President Carter's Zero-Base Budgeting (ZBB) and the Planning Programming Budget System instituted by President Johnson made an attempt at comprehensive policy formulation which made use of cost-benefit analysis. This led to what Harris has termed "policy politics" (Harris 1983:545) wherein the departments best able to quantify the justifications for their budgetary requests did better than those that were not able to quantify. Thus the Department of Defense, which can quite easily quantify the number and cost of necessary personnel and armaments, does better than the Department of

Energy given the difficulty in determining the actual cost of protecting the environment (Harris 1983:545, 623).

Part of the difficulty facing the Department of Energy lies in the consequences which would follow from the actions required to end pollution. If a manufacturing plant polluting the air is closed, we have less pollution and more clean air. We also have fewer goods being produced, more people out of work and in need of government assistance, less business for local commerce, and so on. The ripple effect clearly exists even if its actual size and extent are not precisely known.

The fourth barrier is that the goals of the decision maker may not be known or adequately identified. What exactly were the goals of Kennedy and his advisors when they were attempting to find a solution to the crisis? Certainly a major goal was the preservation of the freedom and independence of the United States. But what can be said beyond that? Did they merely want to save face, or would they have liked to smash the Soviets in the process of reestablishing American dominance in the area? It would be unlikely that each of those participating in the deliberations would have agreed on the precise goals they were trying to achieve in their search for a solution to the problem.

The individuals which comprise group or institutional decision makers may not share precisely the same goals. Even a single decision maker may only have a general idea of the desired goal and may be unable to state in clear and definite language the exact nature of the goal.

Keeping in mind these barriers to comprehensively rational decision making, if we turn to Frohlich and Oppenheimer's rules for rationality we can see that in an actual decision making situation the rules may not be met or perhaps even apply. A major underlying problem with the rules of rationality is their dependence on simplicity. The rules assume the preference is binary (Frohlich and Oppenheimer 1978:6). The actor can choose X or Y. Many choices can be reduced to a binary, "will I, or won't I," but the myriad factors affecting that choice are often ignored.

Nonprobabilistic preferences require that the actor have sufficient information regarding the alternative set to make the choice a logical one. A deterministic choice between X and Y often requires more information about X and Y than is available to the actor. Certainly Kennedy's decision would have been much easier if he had known both the Soviet motives and the reaction to specific American responses. Unfortunately, this information was not available. Instead, probabilities had to be calculated regarding the hypothesized motives and probable counteractions. Given a lack of certainty, it was not possible to state definitively that one response was preferred over another. The choice was made for a blockade, but this choice was made on the basis of a particular state of the world which may not have existed, or may have been misinterpreted by the decision makers.

Clearly, the requirements of transitivity and indifference are also affected by inadequate information. Changes in information result in changes in the choice environment. An

initial preference of X over Y may be reversed if additional information is provided. Technically this does not violate the rule of transitivity, but transitivity is dependent on nonprobabilistic preferences[12] and when preferences are frequently subject to change due a high degree of uncertainty as to the state of the world, transitivity becomes meaningless. Given the limitations on nonprobabilistic preferences noted above, the rule of transitivity becomes ineffectual.

As has been mentioned previously, forced choice only demands that the alternative set be constructed so as "to exhaust the possibilities perceived as open to the individual. To do this, the set needs to contain some sort of residual category" (Frohlich and Oppenheimer 1978:9). Just as an actor's preferences cannot be directly observed, neither can perceptions as to possible alternatives. Again, the limitations involve inadequate information, false information, distorted information, and a willingness to take risks. Outside observers may be able to make reasonable guesses as to the most likely alternatives, just as the authors of chess books can suggest the moves most likely to ensure victory, but it may not always be justifiable to relegate all other alternatives to a residual category, which is quite often labeled "other."

With respect to the nonperverse selection rule, Frohlich and Oppenheimer state that this rule assumes that in a choice situation the preferred alternative is the one chosen (1978:10). An example of behavior violating this rule is where an actor professes a preference for X over Y, but still

chooses Y. The problem with this behavior is not that the selection is perverse, rather it is a limitation imposed by the authors. In their discussion of nonprobabilistic preferences they state,

> . . . we are ignoring certain problems that psychologists have pointed out about human preferences: individuals, at times, give contradictory evidence about their preferences (1978:6).

The fact that people do not always tell the truth should come as no surprise to researchers. If we are to assume that the chosen alternative is the preferred one, we cannot be totally constrained by the verbal statements of the actor. It is quite possible that the actor derives pleasure from confusing and frustrating the observer. The actor's preference may not be simply to choose Y, but rather to choose Y with maximum obfuscation.

Since I have repeatedly referred to Allison's example of decision making during the Cuban missile crisis to illustrate the shortcomings of the common assumptions of rational action, one may wonder how Allison was able to consider his model rational. Allison avoids many of these pitfalls in his representation of the model of rational action. He lists four basic concepts (goals and objectives, alternatives, consequences, and choice) which are loosely defined so as not to unduly constrain the model (1971:29-30). The flavor of these loose definitions can be had by looking at the description for the concept choice.

> Rational choice consists simply of selecting that alternative whose consequences rank highest in the decision-maker's payoff function (1971:30).

No specification of the actor's payoff function is made. Undoubtedly Allison assumes the actor actually selects the alternative which has the highest payoff. Such an assumption is required since we are not privy to the intricacies of an actor's personal payoff function. This assumption does not restrict the model, it merely affirms the most basic assumption of rationality: that rational behavior is goal directed.

To sum up, a number of the rules and assumptions commonly associated with rationality are not applicable in uncontrolled situations where adequate information may not be available to allow the actor sufficient opportunity to complete the decision making process in a comprehensive manner. A much less structured form of rationality is necessary to effectively examine decision making under uncertainty and risk.

2. Cognitive Limitations

Even if it were possible to overcome the various limitations of the rational actor model noted above, there are limits to human cognitive capacity which further restrict the level of comprehensiveness which may be attained.

In his book Models of Thought, Herbert Simon pulls together twenty-five years of his work in the area of human thought and decision making. The various sections of the book are comprised of papers and articles written by Simon,

occasionally with other well-known scholars in this area. In these sections, a number of aspects of human decision making are examined, including system principles, memory structures, and learning processes. It is necessary to examine these areas of human decision making in order to proceed to the more specialized area of judicial decision making.

Simon begins by reviewing an article entitled, "The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information," in which George A. Miller examines the ability of a subject to discriminate among differing stimuli such as differences in auditory loudness or pitch. Miller used the term "channel capacity" to denote the point at which the subject could no longer make accurate distinctions between the stimuli. Channel capacity is measured in "bits" of information. Miller defines a bit of information as "the amount of information that we need to make a decision between two equally likely alternatives" (1956:83). If the channel capacity for some type of stimuli is found to be three bits of information, the subject is able to distinguish between eight alternatives (2^3).

Channel capacity is not constant across all subjects, nor across all types of stimuli. In four single-type stimuli experiments (Miller referred to the stimuli as inputs), the channel capacity ranged from a low of 1.9 in distinguishing the taste of saline concentrations, to a high of 3.25 in distinguishing points on a line (1956:83-85). Miller found the mean to be 2.6 bits or approximately six categories (1956:86).[13] In multi-dimensional stimuli the channel

capacity rose to 7.2 bits or approximately 150 categories.

Simon points out that Miller's experiments basically deal with what is known as short-term or immediate memory (STM), as opposed to long-term memory (LTM) (Simon 1979:41). STM is known for its rapid access time and limited capacity, while LTM requires longer processing time but has virtually limitless storage capacity (Reber 1985:430-431). Simon believes that Miller's magical number seven is too large, and prefers the number four (Simon 1979:43). Simon also notes that the actual number will depend on the particular task involved and the strategies employed by the subject (Simon 1979:43), but whether the number is four or seven, a limit exists.

Miller's experiments deal with merely distinguishing between different levels of stimuli. In another set of experiments, Douwe B. Yntema and Gayle E. Mueser tested the ability to remember the present state of a number of variables. They found as the number of variables increased, the subject's ability to correctly answer questions regarding the present state or value of the variables decreased. It is interesting to note that if the variables in question all possessed the same possible values the fraction of correct answers decreased more rapidly as the number of variables increased than if the variables each contained a different set of possible values. (1960:19-21)

The Yntema and Mueser experiments do not conflict with the Miller experiments. Rather, they explore different aspects of the cognitive limitations of humans. Miller examined these limitations in terms of an individual's

ability to correctly categorize stimuli. Yntema and Mueser go one step further and examine the limitations in terms of a subject's ability to correctly recall present values of a number of variables. The essential point of both sets of experiments is that humans have limitations in their ability to process information. Simon has indicated that there are two basic limits to human problem solving[14] (1981:72-82). The first of these limits is the time necessary to process information. As noted above, STM generally requires very little time, perhaps on the order of 200 milliseconds (Simon 1979:41), whereas LTM requires about five to ten seconds for items to be stored (Simon 1979:60).

With such a short processing time for STM it would seem humans could handle great amounts of information very quickly. Unfortunately, the second limiting factor is the small capacity involved. Here is where Miller's seven or Simon's four comes into play. This small number, whatever its precise value, is "the approximate number of discrete pieces of information that can be held in short-term memory at one time" (Reber 1985:690).

Simon proposes a set of experiments which would show these two limitations in practice. He then concludes,

> . . . human beings do not have sufficient means for storing information in memory to enable them to apply the efficient strategy unless the presentation of stimuli is greatly slowed down or the subjects are permited [sic] external memory aids, or both. (1981:74)

This does not mean that the processing of large amounts

of information merely requires sufficient time and a pencil and paper. Although he acknowledges the point is not universally accepted, Simon specifies human information processing as being serial (as opposed to parallel) (1979:4). This does not mean that no mental activity contains elements of parallel processing, rather, any activity which requires one's attention must have access to STM for inputs and outputs, and is thus constrained by the limits of STM (1979:4). Simon explains apparent counterexamples thus:

> Some phenomena that seem to contradict this claim (e.g., carrying on a conversation while driving a car) are only apparent exceptions. It is easy to show, in the car-driving case for example, that what is actually going on is not parallelism but time sharing--a relatively rapid alternation in control over the short-term memory by the two competing activities. A simple but sometimes dangerous experiment to show this is to engage a driver in a conversation of varying complexity in traffic of varying density and to observe and record the rate of his or her speech as compared with the rate of speech when there is no competing activity (1979:4).

It may seem that more than one fairly trivial or routine task can be carried on at the same time, but as the complexity of the tasks increase one or the other will demand full attention. Even something as common as reading the paper while the television is on is most likely an example of time sharing. It certainly does not require one's full attention to get the general idea of most television programs. One may read during extended dialogue, lengthy chase or fight scenes, or commercials. At the end of a program, a subject may be able to give a fairly accurate description of the storyline, but it is doubtful the subject will be able to remember what

commercials were shown during the program. This is due to the serial nature of the activities and the dissimilarity of the commercials from the rest of the program. Undoubtedly some details of the storyline can be derived from those that are known, whereas the same is not true for commercials.

To summarize, it has been shown that human memory and information processing has certain limits. One limit is the speed with which new information can be processed. Subjects must have a certain amount of access time to the stimulus for it to be stored in either STM or LTM. The availability of pencil and paper to write things down does not discount the limitations on STM or the time it takes to shift an item into LTM. In fact, Simon (1981:67) suggests that this would increase the time required to complete the decision making process.

A more severe limitation is the capacity of STM which is somewhere between four and nine dissimilar bits of information. LTM has essentially unlimited capacity provided sufficient access time is allowed. Activities which require one's attention also require access to the input/output mechanisms of STM, and are thus subject to STM's limitations. On a practical level the distinction between serial and parallel processing becomes a moot point as the complexity of the task increases. It should be clear from everyday experiences that for the most part humans can only perform one complex nonroutine task at a time.

Even if the comprehensively rational actor is only making one decision at a time, these cognitive limitations severely

limit the scope of factors, alternatives, and consequences which can be considered. The boundaries of bounded rationality are generally imposed by time, money, or feasibility, but not the cognitive limitations of the decision maker. A consumer planning to purchase a major appliance may have limits on the amount of money available for the purchase, time he is willing to spend on the decision, and even the size of the machine, but the number of factors remaining which affect the maximization of the consumer's goal of getting the best appliance possible are still beyond his human cognitive limitations.

These cognitive limitations are not avoided when the decision maker under examination is composed of a group of individuals (such as the Supreme Court). If a group decision must be made, the limitations may compound the difficulty of finding the preferred course of action since individual goals may differ as well as means perceived as most efficient in obtaining them. If the problem or decision is divisible, each member of the group could be given a part to solve. This may increase the output of the group, but it is no longer a group decision.

3. Human Limitations and Judicial Decision Making

In Chapter 6 of Supreme Court Policy Making, Harold J. Spaeth asks whether computers can replace courts (1979:164). Although computers would be able to weigh all the facts and circumstances present in a particular case and be able to quickly and accurately reach a decision based on the

guidelines programmed into them, "[t]hey lack creativity and are unable to exercise wisdom, imagination, or initiative--to say nothing of common sense" (1979:164).

In spite of the pretensions of the "Cult of the Robe"[15] to the contrary, courts are composed of humans with human limitations. Miller noted that some variation exists between human subjects (1956:84), but even assuming that most judges possess attributes which place them in the high end of the range, the limits remain finite and quite small. Americans tend to be quite litigious and court caseloads have been steadily on the rise (Howard 1982). The workload of the United States Supreme Court is no exception (Greenhouse 1983). The noted increase in the workload of the Court has put a great deal of pressure on the justices in terms of their performance. This increased burden has led Justice Blackmun to comment that "[o]ne, therefore, to a large degree, relies on innate and hopefully already developed proper judicial reaction" (Ripple 1980:175).

This statement by Justice Blackmun implies something that should be obvious to those who study the judiciary in general and the Supreme Court in particular: it is not humanly possible for the justices to comprehensively assimilate all the information presented to them. The United States Supreme Court annually examines and rules on well over five thousand petitions submitted to them for review. Of the approximately two hundred cases granted full review each year the justices must read the briefs of both sides and any amicus curiae briefs which are permitted.[16] In addition, the justices may

need to review past precedents before they begin the task of writing their own opinions. Each justice has a number of law clerks who do much of the initial reading, research, and possibly even writing, but this fact serves to affirm the contention that the justices cannot do it all themselves, they must and do find ways to cut down the amount of information they need to process, and this is the topic of the next section.

C. Cognitive-Cybernetic Decision Making

We have seen that the more rigorous manifestations of the rational actor model do not take into consideration the frailties of humans or the inadequacies of the decisional environment. Allison noted that most theories of individual choice contain some notion of "comprehensive rationality" (1971:71). In broad terms, and without the mathematical rigor of Frohlich and Oppenheimer, this form of rationality still requires more comprehensiveness than is realistically possible. Allison's own Rational Actor Paradigm requires a significant ability to calculate specific costs and benefits (1971:33-35); an ability which was certainly lacking in the crisis used to illustrate the model. Steinbruner also attacks the rational choice model. He states its simplest version and proceeds to point out the assumptions which remain implicit in the model and which cannot be met in real world examples (1974:8, 25-87). Given this rejection of the comprehensive rational choice model, we must find another model which more accurately represents human decision making.

1. Human Learning

Although a great deal has been written on various aspects of human learning and memory, we are mainly concerned with the pattern-finding abilities of humans. In his previously mentioned experiments, Miller makes a distinction between bits and chunks (1956:92-93). Bits are basic units of information, and Miller found the number seven to be the approximate limit for the span of bits that can be processed by immediate memory. This assumes, however, that the bits are independent, unrelated pieces of information. Chunking occurs when these bits are related or recognized by the subject as forming a familiar pattern. Seven is still the magic number, but it is seven chunks rather than seven bits. Miller also Miller notes that the "span of immediate memory seems to be almost independent of the number of bits per chunk . . ." (1956:93). Miller emphasizes the importance of the grouping and organizing of information into chunks since it provides a method of increasing the amount of information that can be handled by immediate memory (1956:93). Beyond the relatedness of the bits, Miller is vague as to what constitutes a chunk, and rightly so. Like beauty, whether two or more bits of information are related is in the eye (or mind) of the beholder.

Simon (1979) also examines this distinction between bits and chunks. He gives a personal example as follows:

> I tried to recall after one reading the following list of words: Lincoln, milky, criminal,

differential, address, way, lawyer, calculus, Gettysburg. I had no success whatsoever. I should not have expected success, for the list exceeded my span of six or seven words. Then I rearranged the list a bit, as follows:

Lincoln's Gettysburg Address
Milky Way
Criminal lawyer
Differential calculus

I had no difficulty at all. Obvious? It is only obvious if one accepts the chunk hypothesis . . . (1979:52).

Simon's point is not that the chunk is not necessarily a word and may be phrases or longer groupings. Two points need to be made regarding this example. First, Simon has shown by this example not only that chunks may be larger than single words, he has also shown that chunks may be composed of hierarchical groupings of chunks. Suppose Simon's task had been to recall the 66 letters that comprise the words in the list. Clearly this is far beyond the span of immediate memory. Rearranging these letters into the 22 syllables they form would not have improved the result. Miller would consider nine words to be the outside limit of the span, but Simon believes the magical number to be smaller than seven and thus the list of nine words exceeded his limit. A final grouping of the words into four phrases allowed completion of the task. The original bits were organized and reorganized until they comprised four recognizable chunks. This confirms Miller's earlier finding of the large number of bits which may be retained in a chunk and highlights the importance of recoding in information processing.

Second, one may wonder if the limit of seven is of any

real significance if a seemingly limitless number of bits may be contained in a chunk. It is important to remember that the recoded bits in Simon's example were items contained in his long term memory. Immediate memory was merely serving as the cue indicating which of the thousands of phrases in his long term memory were to be presently recalled. Memory artists are able to recall dozens of names after only hearing them once. They emphasize the fact that they will recite the list of names in the same order as given. In fact, they have to recite them in that given order (or perhaps reverse order) because they have not expanded their span of immediate memory, rather they have used a mnemonic method to create one large chunk.[17]

The ability to recode large amounts of information into recognizable chunks greatly adds to one's ability to deal with large amounts of information. This recoding ability is an adaptive strategy used to lessen the impact of human memory limitations. The next section carries this technique forward and shows how it is used to temper the effects of the previously noted general limitations on the comprehensive rational choice model.

2. Adaptive Strategies

In the previous section it was shown how subjects can increase the amount of information processed by chunking: coding the information into recognizable patterns. The effect of this chunking procedure is to provide keys to long term memory. Note 2-17 provides an example of how the entire

chunk need not be contained in immediate memory, only the important initial phrase or cue (e.g., remembering that album is the cue for Alabama).

In the general limitations to the comprehensive rational actor model (control of elements, unintended results, inaccurate cost-benefit analysis, and lack of goal specification) an underlying theme is the inability of the decision maker to obtain all information relevant to the decision. The decision maker may have access to a great deal of information with respect to one of the limitations, but the interaction of the limitations will minimize even this small advantage. In chess it is possible to diagram a complete decision tree for a game which makes the possibility of unintended results nil. This knowledge will not guarantee victory due to a lack of control over the moves chosen by the opponent.[18] Similarly, Kennedy may have had a great deal of knowledge about past Soviet behavior but there was no guarantee that the Soviets would restrict their behavior to established patterns.

Kennedy also faced the difficult task of assessing costs and benefits of possible American responses and the costs and benefits of various options open to the Soviets. It is not enough to know your own goals, costs, and benefits. To minimize unintended effects one must attempt to predict as accurately as possible the responses of your opponent which requires a knowledge of the opponent's goals, costs, and benefits[19].

It should be clear that even if the desired information

is available, it would be too voluminous to allow for speedy and thorough analysis by one or even several individuals. The problem of information is a double-edged sword. Too little information and the decision maker is forced to decide in a climate of uncertainty.[20] Too much information and the decision maker may endlessly wallow in a morass of minutiae. The strategies adopted to deal with these difficulties are strikingly similar and involve chunking, hierarchical organization, and pattern recognition.

We saw the use of hierarchical recoding in Simon's personal example. Probabilistic learning theories have taken the view that man "is not only a learning animal; he is a pattern-finding and concept-forming animal" (Simon 1959:272). We can see how he sought patterns in the words to form concepts that he recognized which placed the task of remembering the words within his span of immediate memory. It is important to note at this point that the recoded versions contained all the information that the original versions contained: nothing was lost, nothing was added. In most situations the recoding and reorganization will not be so neat due to the limitations on information gathering and processing.

The problem and its accompanying solution are summed up in the following two passages:

> To put it in the language of psychology, there are limits on the number of distinct concepts which we can manipulate cognitively at any one time, and we are therefore forced, if we wish to get a view of the whole problem, to re-encode these items. (Alexander 1964:61)

> The sins of omission in perception are more important than the sins of commission. The decision-maker's model of the world encompasses only a minute fraction of all the relevant characteristics of the real environment, and his inferences extract only a minute fraction of all the information that is present even in his model.
>
> Perception is sometimes referred to as a "filter," . . . the filtering is not merely a passive selection of some part of a presented whole, but an active process involving attention to a very small part of the whole and exclusion, from the outset, of almost all that is not within the scope of attention. (Simon 1959:272-273)

In examining the task of designing a kettle, Alexander lists some of the many requirements, features, and functions the kettle must have and meet (1964:60). The designer cannot cognitively grasp and manipulate all of these necessary concepts at the same time and is forced to reorganize the concepts into a hierarchical pyramid (1964:62). At the top of the pyramid sits the kettle; the ultimate goal, and the broadest generalization of the concepts involved.

At the second level, two broad categories are present: function and economics. These two areas are directly related to the two basic questions any consumer will ask regarding a product: "Does it work?" and "Can I afford it?" At the next level more detailed aspects of function and economics begin to emerge, and the final level contains the specific requirements listed by Alexander.

By arranging the requirements in a hierarchical fashion, the designer has organized the concepts so as to limit the complexity of the whole. The designer can follow any path until the number of remaining requirements is sufficiently small in number to allow them to be handled without undue

difficulty. For example, if the designer wants only to consider the functional aspects of the kettle, he will only be concerned with eleven of the original requirements, but this is still too many to handle at one time. Following the function path to the next level divides these eleven requirements into portions which can be dealt with individually. Once the production, safety, and use requirements have been met, the designer returns to the function level where he now is only faced with integrating the solutions to the three functional aspects of the kettle.[21] Essentially the designer has chunked the solutions to the production, safety, and use requirements and now is only left with three chunks to consider rather than eleven.

In a similar vein, Harris notes the way information is processed before it reaches the President of the United States. Clearly the President needs a great deal of information in order to make decisions, but at the same time it is not possible for him to process all of this incoming data. Generally the information is filtered through the White House staff who condense it into summaries for the President to read (1983:439). If enough information is contained in the summary for the President to reach a decision he need not read additional material on the subject. But as with the designer, if more specification is desired it is only necessary to go to the next level and read memoranda or even request additional reports.

The Supreme Court also has its filters. Law clerks for the justices have the unenviable task of reading the

thousands of cert petitions and drafting cert memos for their justices. These memos summarize the important points of law raised in the petition. If the justices feel they need more information to make a decision they can read the petition itself.

Suppose that Alexander's designer now wishes to design a pan. Most of the original 21 requirements still exist in one respect or another, plus some new requirements may also be present. The same hierarchical pyramid may also be used. Pan, of course, replaces kettle at the top, and some of the specific requirements will have changed, but the two middle levels can remain the same. Why would the designer use the same basic pyramid? The designer may want to attempt to recreate a successful strategy. If the pyramid allowed the designer to easily handle the various aspects of the problem he may feel that the system was successful and will repeat it with modifications for the differences inherent in the new problem. This can be summed up by the attitude "if it's not broken, why fix it?"

Cyert and March, in discussing adaptation in search rules, state the rule thus:

> . . . when an organization discovers a solution to a problem by searching in a particular way, it will be more likely to search in that way in future problems of the same type; when an organization fails to find a solution by searching in a particular way, it will be less likely to search in that way in future problems of the same type. (1963:124)

Cyert and March were specifically concerned with organizational behavior, but in this regard individual decision

makers operate in the same fashion. According to this view when a problem is encountered the decision maker only looks far enough to solve the problem adequately and does not search for the best solution. "Problemistic search is engineering rather than pure science" (Cyert and March 1963:121). Why would an individual or an organization adopt such a search strategy? Part of the answer lies in the general and cognitive limitations that have been discussed thus far. In addition, there are often external constraints on the decision makers which do not allow for an extended search. If a football fan's television quits two days before the Super Bowl, he has a very limited time constraint and will be unwilling to engage in a lengthy search which may not conclude in time for the game. In addition to temporal constraints, searches usually have costs associated with them. These costs can take the form of actual monetary outlays to hire personnel or pay for supplies and equipment necessary, or simply in opportunity costs associated with the time and energy lost in extending the search beyond minimal levels.

Alexander touches on this problem when he says,

> The constant burden of decision which [the decision maker] comes across . . . is a tiring one. So he avoids it where he can by using rules (or general principles), which he formulates in terms of his invented concepts. (1964:62)

Simon refers to these rules as "heuristic principles that people use to reduce these [immense search] spaces to manageable proportions" (1979:50). For the large organization or institution these rules may take the form of standard

operating procedures and explicit rules for routing and filtering information. To the individual decision maker these rules may simply be rules of thumb used in an informal way. An example of this type of informal heuristic can be found in the classroom. Most will be familiar with the tendency of students to sit in the same area, if not the same seat, for every class period (assuming no seating chart of course).

This behavior can be analyzed in the same fashion as the kettle design problem. On the first day of class the student is faced with an initial choice of where to sit. Requirements may include adequate visibility of the instructor and blackboards, proper distancing for hearing the instructor, not too near windows or doors or other distractions, near a friend or attractive classmate, far enough away from the front for unobtrusive naps, etc. The first step might be to divide the problem into educational and social/personal concerns. Educational concerns may be subdivided into those involving the instructor, the student, and the classroom itself. The process continues until a seat is selected. If the result is successful the problem of selection on the second day can be reduced to selecting the same seat based on the rule advanced by Cyert and March. From Alexander's viewpoint the student may simply not want to have to make a new decision each class period. Other matters may be more important to the student and a simple repetitive decision may offer the most satisfying alternative to this trivial concern.

The preceding discussion on the adaptive strategies used

by humans in the face of general and cognitive limitations should not lead one to conclude that decision makers who engage in these strategies are irrational. Simon clearly states that, "A theory of administration or of organization cannot exist without a theory of rational choice" (1957:196). This applies with equal force to a theory of decision making. It is not that human decision makers are not rational, rather the models and assumptions usually associated with comprehensive rational choice theories are unrealistic in the face of the severe limitations on cognitive abilities and available resources. Simon's approach is based on what he calls the "principle of bounded rationality"[22] and states it thus:

> The capacity of the human mind for formulating and solving complex problems is very small compared with the size of the problems whose solution is required for objectively rational behavior in the real world--or even for a reasonable approximation to such objective rationality. (1957:198)

Under Simon's form of bounded rationality, also known as satisficing, the decision maker endeavors to make a rational choice within the constraints set by available information, cognition, and memory. The analysis may not be complete in the scientific sense, but is good enough in the engineering sense as used by Cyert and March (1963:121). Cyert and March make this distinction in their discussion of problemistic search. The difference between science and engineering is not simply one between theory and practice, but also between an open-ended search for the best and most complete explanation or choice and a search which finds an acceptable

solution to the problem. The engineer charged with designing a bridge will not have the resources to design the best bridge possible. Even within recognized financial limitations, the search will be constrained by cognitive and temporal limitations. The engineer does not design the best possible bridge, but rather, one which meets acceptable criteria with regard to the purposes of a bridge.

Two major consequences follow from this principle. First, if these limits did not in fact exist administrative and decision making theory would be very simple: "Always select that alternative, among those available, which will lead to the most complete achievement of your goals." It is only the fact that these limitations exist that makes the study of these topics interesting (Simon 1957:199).

The second consequence is extremely important for our present purposes. Simon states that the principle of bounded rationality requires that the decision maker construct a simplified model of the problem in order to deal with it (1957:199). The next section addresses the question of the type of simplified model decision makers construct under bounded rationality or satisficing.

3. Cybernetic Decision Making

The previous two sections discussed the limitations of human learning and a number of the strategies adopted by human decisions makers to allow them to make rational (though not comprehensive) decisions in spite of these limitations. The strategies used by human decision makers may appear to be

random or chaotic, but on closer examination patterns to the decision making activity become clear. Simon makes this point in describing the meandering path of an ant across a beach. The ant has a general sense of where his home lies, but cannot take the shortest route because of the numerous obstacles which lie in its path (1981:63-64).

Similarly, the human decision maker cannot make the best decisions, but must settle for ones which will avoid the obstacles of cognitive and environmental limitations. In studying human decision making, we must examine how decision makers deal with these limitations. A consideration of cybernetic decision making aids us in this task.

Webster's New World Dictionary defines cybernetics as "a science dealing with the comparative study of the operations of complex electronic computers and the human nervous system." W. Ross Ashby has written two books which look at cybernetics from this rather technical standpoint. These works analyze the functioning of the brain (in terms of human behavior) from a mechanistic point of view. In particular, Ashby wants to discover and/or model how the brain produces adaptive behavior (1960:1). In certain respects the brain resembles a machine, albeit a highly complex one. The brain is also a living entity, but Ashby makes it quite clear that consciousness plays no part in his work. He states:

> Throughout the book, consciousness and its related subjective elements are not used for the simple reason that at no point have I found their introduction necessary. This is not surprising, for the book deals with only one of the properties of the brain, and with a property--learning--that has long

> been recognized to have no necessary dependence on consciousness. . . . Science deals, and can deal, only with what one man can demonstrate to another. Vivid though consciousness may be to its possessor, there is as yet no method known by which he can demonstrate his experience to another. (1960:11-12, emphasis in original)

This latter point echoes the well known rule in utility theory that one cannot compare utilities across individuals. Utilities are representations of individual preferences (Von Neumann and Morgenstern 1980:8) and as such are part of the individual's consciousness. A lack of consciousness does not prohibit even a fairly simple machine from producing adaptive behavior. The Watt governor for steam engines is often used as an example of such a machine. Steinbruner gives a good description of the machine:

> The [Watt governor] involves two steel balls . . . on arms suspended from a central shaft. The shaft of the governor is attached to the shaft of the engine and rotates as a direct function of the speed of the engine. The swinging arms of the governor are attached to the throttle of the steam engine such that as the arms swing outward they begin to close the throttle and as they swing inward they open it. As the speed of the engine increases, the balls on the governor swing outward by centrifugal force and close the throttle, thus decreasing the speed of the engine. As the engine slows down, the balls swing toward the shaft by gravity, thus increasing the speed of the engine. The overall effect of the governor is to keep engine speed within a particular range . . . (1974:51)

This type of simple machine is also referred to as a servomechanism (Steinbruner 1974:51). An ordinary household thermostat is another example of a servomechanism. Both the thermostat and the Watt governor operate to keep some variable within a specified range: the Watt governor operates to

keep the throttle opening at a certain level, the thermostat operates to keep room temperature within specified limits. This behavior may be seen as a rudimentary form of decision making (Steinbruner 1974:52) but this term generally refers to the making up of one's mind (Guralnik 1982:366).[23]

Ashby recognizes the purposeful (another word implying the existence of a mind) aspects of the living organism (1960:1), but this is not a contradiction from his remarks as noted above. Rather, it serves to point out a difference between cybernetic and comprehensive rational choice models. The comprehensive rational choice model assumes that the decision maker consciously proceeds through the steps of the model to reach a decision; it is less a model than a method. The cybernetic model is simply that: a model. According to Ashby, consciousness is not a part of the model which means the decision maker need not even be aware that his decisions are being made in a particular fashion, which allows for the consideration of the servomechanism as a decision maker.[24]

What then is part of the model? Stafford Beer in his book Cybernetics and Management has examined the basic notions of cybernetics: systems, control, feedback, purposiveness and information, and the Black Box. In order to proceed, a brief examination of each of these notions is in order.

Beer loosely defines a system as "anything that consists of parts connected together" (1964:9). Systems can be quite simple such as a pair of scissors or a ball point pen, or complex such as a car or the economy. Systems can also be

combined with other systems to form larger and more complex systems. A political example would be the government of the United States; the entire government is a system and each of the three branches is a system. Because of this ability to expand or contract the scope of a system one must carefully define the particular elements that are to be included. The simplicity of a pair of scissors could become quite complex if the characteristics of the metal and the structure of the molecules were to be considered.

Having defined the system, it will contain a certain number of elements. These elements will interact with one another. Such interactions are communications between the elements of the system. It may be difficult to see how inanimate objects can "communicate," but consider the Watt governor. As the engine speed increases, the outward swing of the rotating balls communicates to the engine via the throttle that it is running too fast; the throttle closes and the balls swing inward. Should the balls move too far inward they once again communicate to the engine this time indicating that it is running too slow, and the throttle opens.

Cybernetics studies adaptive systems and adaptive systems do not remain static. Thus the link between any two elements may or may not be present at any given point in time. The particular state of the lines of communication at a point in time reflects the amount of information in the system. The amount of information that an element receives determines the state of that element. With the Watt governor, the arms of the swinging balls are connected to a mechanism which is

connected to the throttle; arms communicate with mechanism which communicates with throttle. A change in the state of the arms is communicated through the mechanism to the throttle which changes its state. If the mechanism is disconnected the arms may move inward or outward with no effect because no information reaches the throttle so its state does not change. This situation can be represented by a system whose lines of communication are unidirectional; the first element can pass information to the second element, and the second element can pass information to the third element, but the third element cannot communicate with the first. Such a system has no feedback mechanism. The first element has no information as to the state of the other elements in the system, and thus does not know when some change in behavior is necessary to preserve the stability or achieve the goals of the system. This problem can be corrected by allowing existing lines of communications to be bidirectional, or by construction of a direct link from the third element to the first.

Beer classifies systems according to two criteria: complexity and predictability (1964:12). Of the six possible categories, it is exceedingly complex probabilistic systems which we will be concerned with here. A system which is exceedingly complex is one that is so complex that it "cannot be described in a precise and detailed fashion" (1964:12). The best way to define a probabilistic system is to look at its opposite, the deterministic system. A deterministic system is one in which the interactions of the elements are

perfectly predictable; such as the Watt governor. A probabilistic system is one in which the interactions of the elements cannot be perfectly predicted. The human brain is an example of an exceedingly complex probabilistic system. Beer notes that a major purpose for this classification of systems is to group them "according to the kinds of control, and hence the scientific methods, to which they are susceptible" (1964:17), and it is the exceedingly complex probabilistic system which "is the province of cybernetics" (1964:18).

Under the notion of control, Beer looks at the linkages between the elements of the system. How strong are they? How quickly and accurately can information be transmitted? How fast can the elements change states based on the information? The example used to illustrate the point is of a person catching a ball which has been thrown at him. The number of elements involved and the amount of information which must be transmitted in the small amount of time available makes the simple act of catching a ball quite amazing.

Beer is not just concerned with the amount of control of the system, but whether the system can act to maintain some variable within specified limits. Thermostats, Watt governors, and other servomechanisms are types of control devices which are part of complex deterministic systems and act to hold some variable within specified limits. In exceedingly complex probabilistic systems, such control devices are referred to as homeostats, and the "classic biological example is the homeostasis of blood temperature" (1964:22).[25]

Two final points need to be made regarding control.

First, "[a]t this stage, the general principle which can be deduced is that a cybernetic system is no loose conflux of events, but a tightly knit network of information" (Beer 1964:23). Second is the effect of entropy on a cybernetic system. Generally entropy refers to the evening out of the energy in a closed system. At the point of maximum entropy the system no longer has an ability to do work and is considered heat (energy) dead (Flew 1984:107). However, cybernetic systems are generally not closed. For the most part this is due to our definition of what constitutes the system under examination. We may be able to identify all the elements of the system we wish to study, but generally we cannot isolate this system from all else. Thus, there is an abundant supply of free energy entering the system. This free energy allows growth in the system, and growth leads to more complexity. Evolution is a prime example of this phenomenon. The effects of entropy on a system highlight the system's "self-regulating tendency to attain stability or orderliness" (Beer 1964:26).

Feedback is the key idea behind the concept of control according to Beer (1964:28). The Watt governor again provides a simple example. The swinging arms are connected to a mechanism which regulates the throttle, this is the output of the governor. Input information comes from the engine speed which determines how fast the arms rotate and swing outward. It is this input information which forms the feedback loop for the system. The crucial importance of this point comes from the fact that the governor can regulate engine speed

even when that speed is influenced by factors other than the size of the throttle opening (1964:30, see also Ashby 1960:100-121). The feedback governor is able to deal with problems which arise outside the system under examination. The Watt governor is designed for a steam engine. Let's suppose that engine is on a locomotive. Traveling along a flat expanse with a constant load, the governor will function entirely within the system we have been considering. If the engine begins an uphill climb, although the throttle opening has not as yet changed, the engine speed nonetheless begins to slow. This in turn causes the governor's arms to swing inward and the throttle to open to increase engine speed to its former level. On the other side of the hill the opposite sequence of events occurs, and once again the governor operates to keep the engine speed within specified limits.

Steinbruner also recognizes that it is the input information which comprises the feedback of the system (1974:67-68). He says, "[t]he cybernetic decision maker is sensitive to information only if it enters through an established highly focused feedback channel, and hence many factors which do in fact affect the outcomes have no effect in his decision process" (1974:67). This statement is not in conflict with Beer's notion of the ability of the feedback control device to deal with problems originating outside the system. In the Watt governor example above, the feedback channel is the engine speed which rotates the arms.[26] The inputs of a heavier load or uphill path enter the system prior to the feedback loop, and thus do reach the governor through the

established channel. Suppose in the example someone had greased the tracks at the beginning of the incline. It is quite possible that the locomotive would simply spin its wheels without moving forward. This is clearly an undesirable situation, but one which the governor takes no notice of since the amount of forward progress is not an element of the system.

Ashby's concepts of stability and ultrastability are based on feedback within the system. A single feedback loop, such as in the Watt governor, allows the system to reach and maintain a state of equilibrium (1960:44). Ultrastability is achieved through the use of a second feedback loop. This second loop monitors a different set of variables which indicate a particular state of the environment. Generally this second loop occurs in more complex systems but it can be illustrated using the Watt governor. Consider the example used above where the tracks had been greased and the locomotive is making no forward progress. The wheels would be spinning freely and the governor could do nothing about it. On the other hand, the engine may be attempting to climb a hill which is too steep. The governor would open the throttle as much as possible but if it is not enough damage may occur to the engine. In both cases the problem is with the amount of load on the engine; either not enough or too much. A mechanism could be installed which monitors this variable and inputs the information to the governor. As long as the load remains within a certain range the governor operates to keep the variable of the first feedback loop (engine

speed) within its limits. Should the load go above or below a certain range, the governor may be set to shut itself off completely, or in the case of too much load, to shift gears like an automatic clutch in a car.

As has been previously noted, the type of systems which we wish to examine using cybernetic techniques are highly complex and cannot be completely described. In essence, this means that uncertainty exists in the system. Beer explains this conclusion using the game of billiards as an example (1964:13-14). Billiards, when appropriately defined, is classified as a simple deterministic system. Although one must consider all the balls, cue sticks, and table, theoretically the system can still be understood with a basic knowledge of physics and a good calculator. In practice however, one must enter imperfections of the various elements (balls, table, etc.) as well as the inability of the players to apply the necessary force in the correct amount and direction into the decisional calculus. These practical considerations, introduced into an otherwise deterministic system, make the system so complex that it is essentially rendered probabilistic (Beer 1964:14).

Probabilism in a system means that uncertainty exists in the system, regardless of whether the system is simple (penny tossing), complex (stockholding), or exceedingly complex (the brain). Steinbruner notes that the assumption of uncertainty control is basic to the cybernetic paradigm (1974:66). He states:

> According to this assumption, the decision maker --primarily and necessarily engaged in buffering himself against the overwhelming variety which inheres in his world--simply avoids direct outcome calculations. Such a decision maker possesses procedures for processing information which in fact generate decisions and outcomes . . . The psychological effects of uncertainty are therefore held to a minimum.
>
> Cybernetic mechanisms which achieve uncertainty control do so by focusing the decision process on a few incoming variables while eliminating entirely any serious calculation of probable outcomes. The decision maker is assumed to have a small set of "responses" and decision rules which determine the course of action to take once he has received information to which he is sensitive. (1974:66)

These few incoming variables comprise the feedback loops which allow the system, the decision maker, to maintain a stable existence. As was seen in the previous section, the human decision maker is constantly inundated with information. To sort through the information, the decision maker keys himself to a small number of inputs[27] which then form the basis of subsequent behavior. Clearly the inputs do not remain the same for all types of activity; riding a bicycle versus playing tennis. It is here that Beer's fourth basic notion of cybernetics comes into play.

He labels this notion "purposive systems and information" and says that "[t]he important point here is that when a scientist wishes to study a given effect E, he would do well to look for and to define the particular system that is 'the machine for doing E'" (1964:39).[28] If the effect to be studied is riding a bicycle, we must define the human decision maker as a machine for riding a bicycle. Such a machine would monitor a particular set of variables to keep the

system stable. If the effect we wish to study is playing tennis, our system would be defined as a machine for playing tennis. The set of variables monitored in the second effect would not necessarily be the same as in the first effect even though the actual control device, the human decision maker remains essentially unchanged. This is the result of the large capacity of long term memory and the small capacity of short term memory. The human decision makers can have a huge number of feedback loops and variables to monitor, but can only consciously deal with them in small quantities.

This is related to the concept of variety in cybernetic systems. Variety basically refers to "the number of distinct elements in the system" (Beer 1964:43). Such variety generally occurs in highly complex systems. In the example used above, when we wanted the Watt governor to be able to shut off the engine depending on the load, we added the additional variable of load to the system and at the same time were forced to add an additional mechanism to the governor to provide a feedback channel to the governor to receive this information. We increased the complexity of the system and were forced to make a corresponding increase in the response repertoire of the governor. Ashby puts the principle (which he calls the law of requisite variety) rather bluntly when he says, "only variety can destroy variety" (1956:207). Additional variety may cause a problem for the cybernetic system; Steinbruner states the situation as follows:

> Since greater complexity clearly entails greater variety, it follows that under conditions of

> complexity the cybernetic decision maker must have a more elaborate response repertory if he is to retain adaptive capacity. This logic then poses a fundamental problem. If one attributes to the decision maker an arbitrarily elaborate set of responses in order to account for adaptive capacity under complexity, then it seems clear that the simplicity of the decision process is thereby compromised and along with it a major principle of cybernetic analysis. If, however, simplicity is preserved, then the adaptive capacity of the decision maker is apparently threatened under conditions of complexity. (1974:68, footnote deleted)

This may certainly be a dilemma when considering the individual or group decision maker, but the "fundamental problem" can be obviated by limiting as much as possible the system to be examined. Elements of the decision maker's universe which relate to job performance generally do not impinge on the elements involved in playing tennis (unless of course he is a professional tennis player, or perhaps if he is playing his boss). Steinbruner deals with the more expansive view of the human decision maker in his chapter on cognitive processes (1974:88-139). He notes that the problems encountered by the cognitive paradigm reduce to those of the cybernetic paradigm if certain restrictions are tightened (1974:123-124, 139). Essentially the cognitive paradigm attempts to look inside the Black Box of cybernetics, and it is to this concept which we now turn.

The fifth and final basic notion of cybernetics listed by Beer is the Black Box. The Black Box is the approach used to deal with the extreme complexity of the cybernetic system (1964:49). As previously noted, exceedingly complex systems are those which are so complex as to be indefinable in

detail. We would like to be able to model the system, but it is inaccessible and unknown, hence the name Black Box. Although we cannot detail the exact processes which occur within the box, we can monitor the inputs and outputs and examine them for clues as to what occurred within.[29]

One thing can be said about the Black Box, because of Ashby's law of requisite variety (1956:207) the variety employed to make a correct decision (one within the specified variable limits) must parallel the variety to be controlled (Beer 1964:53). The procedure which accomplishes this task most efficiently is the one with the highest entropy at each selection (1964:53). Such a procedure would divide the possibilities into equal divisions at each selection. One example of this procedure is the game of high-low. One player thinks of a number and the other player must guess it. Once the upper and lower limits have been established, the most reliably efficient method for determining the exact number is to divide the remaining possibilities in half with each guess. If done properly, the solution should never be greater than the next whole number larger than $\log_2(N)$ where N is the number of possibilities. A second example comes from the game of twenty questions. After initially determining whether the object in question is animal, vegetable, or mineral, the questioner generally embarks on a series of dichotomous questions designed to limit the potential solution set: living/dead? man/woman? mammal/nonmammal?

When the individual or group decision maker is examined as a complete system the Black Box is needed to cover the

myriad details of the human ability to switch feedback loops, process information, selectively perceive inputs, wishfully alter information, form values, and so on. In short, the Black Box represents the types of problems the cognitive paradigm attempts to handle.

To summarize, the cybernetic model agrees with the human learning information of the previous section. Both reject the strict requirements of comprehensive rationality, both incorporate the limited capacity of human memory, and both have ways of dealing with uncertainty and complexity. The human learning material provides an illustration of how a great amount of information can be reorganized and represented by a very few chunks. However, the cybernetic model presented by Ashby, Beer, and Steinbruner fails to account for the uniquely adaptive abilities of the human decision maker. Ashby and Beer come from the fields of medicine and business respectively, and are unaccustomed to thoroughly examining the adaptive strategies of human decision makers. Although elements of cognitive theory can be found in the work of both Ashby and Beer, Steinbruner explicitly examines cognitive theory and uses it to supplement his cybernetic model. The next section will describe the elements of cognitive theory which are used to supplement the cybernetic model.

4. Cognitive Theory

The sections which discussed human learning and adaptive strategies also contained information on cognitive theory.

In identifying the cognitive limitations under which human decision makers must operate, researchers such as Miller and Simon also examine how these limitations affect the decision making process.

The strategies used by human decision makers involve chunking and hierarchical organization. By using these strategies, human decision makers can make seemingly complex decisions based on a limited amount of information which is within the processing capabilities of short term memory. Keying in on a small number of important elements in order to make a decision is a form of cybernetic decision making. Simon notes that man is a pattern-finding animal (1959:272). Adaptive strategies make it easier to find patterns in complex situations.

To summarize and expand on the previous discussion of cognitive limitations and strategies, we have seen that certain regularities exist in the cognitive operations of humans. These regularities are not dependent on the content of the information which is processed. Steinbruner has identified five of these regularities which are important supplementary elements to cybernetic theory: inferential memory, consistency, reality, simplicity, and stability (Steinbruner 1974:95-103).

Inferential memory concerns differential memory decay which is related to the hierarchical and lateral associations made in originally processing the information. Strong associations inhibit memory decay but the strength of associations is unlikely to be consistent. Thus, when the ability

to recall more weakly associated elements declines, the details are inferred by the patterns formed by the more strongly associated elements.

This inferential nature of memory can also be illustrated using material being learned for the first time. When information is lacking important details, the mind will try to fit the information present into previously learned patterns, and in so doing, infers the details.[30]

The principle of consistency refers to constraints placed on the inferential mechanisms by the mind's desire to maintain consistency among internal belief relationships. This principle can also be illustrated by optical illusions where perceptions of the size and length of objects is distorted to conform with expectations. Perceptions are also influenced by attitudes, the simplest example being the optimist who sees the glass as half full and the pessimist who sees it as half empty.

The third principle, the reality principle, "simply asserts that the human mind is in contact with its environment, that stable, important features of the environment impose themselves quite reliably on the mind" (Steinbruner 1974:100-101). Despite the principles of inferential memory and consistency, if stable and important elements of the environment present themselves, the healthy human mind will adapt its behavior accordingly.

The final two principles, simplicity and stability, are principles of economy. Because of the cognitive limitations presented above, cognitive processing must be selective. It

has been shown that the mind attends to and remembers important details, but pays little or no attention to what are considered unimportant details. As noted by Steinbruner, the selectivity of perception and attention are in accord with the cybernetic paradigm (1974:101). In order to keep cognitive processing within the imposed limits, the mind attempts to keep the belief system as simple as possible. In addition, since major changes in the belief system would require great amounts of reprocessing, the mind operates to keep the system as stable as possible.

5. Cognitive-Cybernetic Judicial Decision Making

Just as comprehensive rationality long dominated notions of individual and group decision making finally to be reevaluated in the face of evidence that humans cannot and do not perform its complicated calculations, the area of judicial decision making has its Goliath to be slain. This Goliath is a set of beliefs, carefully nurtured by the members of the bench, which portrays the judiciary as an august and mystical institution which must bear the burden of judgement on behalf of the populace. Let us now briefly examine these beliefs which are collectively referred to as the "cult of the robe."[31]

Professor Spaeth begins his book, Supreme Court Policy Making: Explanation and Prediction, with the following statement: "No aspect of American government is more suffused with myth than judicial decision making" (1979:1). There are a number of trappings to the judicial mythology. One of the

most obvious is the long black robes worn by judges. Other than the military and police, no other officers of our government wear an official uniform.[32] The length and cut of these judicial robes is reminiscent of clerical attire. The intent is to impress upon the minds of those before the court that their fate may literally lie in the hands of the judges. The color black is chosen to emphasize the solemnity of the office and the seriousness of the proceedings. Being in court is not unlike being in church. Attentiveness is required, dignity must be preserved, respect must be given to the judge, Truth is sought, and Justice is dispensed. In addition, witnesses must take an oath on the Bible that they will tell the truth (although today witnesses may choose to simply affirm the veracity of their testimony).

Judges preside from a raised platform, called a bench, which allows the judge to observe all that occurs in the courtroom. This bench also forces all in the courtroom, formal participants and spectators alike, to physically look up to the judge, a not-so-subtle reminder of who is in control of the proceedings. Additional reminders include requiring everyone in the courtroom to rise when the judge enters to the cry of the bailiff that court is now in session. Indeed, the business of the United States Supreme Court begins with the Marshal's cry:

> Oyez, oyez. All persons having business before the honorable, the Supreme Court of the United States, draw near and give attention. God save this Honorable Court. (Tribe 1985:138)

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Judges are addressed as "Your Honor" and referred to as the "Honorable Judge/Justice So-and-so." At all times the dignity of the court must be preserved, which means showing proper respect to the judge, whether in court or out. Any differences between the judge and the court are blurred. The illusion presented is that the judge is the physical embodiment of the court, and the legal system in general. Here again, the long robes add to the illusion by hiding the sight of human bodies and presenting only a dark and shapeless mass to the observer.

For the most part, the legal system in the United States is descended from the English legal system, and many of these physical aspects of the judiciary have their roots in English legal custom.[33] The same is true for the basic attitudes and conceptions the general citizenry holds regarding the judiciary. Quite often these attitudes were religious in origin. "The earliest kings of England recognized the value of claiming descent from Woden and other gods" (Lyon 1960:39).[34] As Christianity prospered in England, the pagan gods were forsaken and kings ruled by the grace of God.

Since it was these monarches or their representatives who heard the petitions and appeals, it was believed their decisions came from God (which helps to explain the religious overtones present even in the modern judiciary) and thus required a proper showing of respect for the dispensers of divine justice. However, this attitude was not simply an extension of the fact that early judges were representatives of the Crown. Given that these early judges, as is the case

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with the judiciary today, held the lives and fates of the people in their hands, there was a tendency, and perhaps a desire, to look upon these judges as being superior. It is easier to place your fate in the hands of someone who has superior wisdom and an ability to find Truth and Justice than someone you consider your equal.[35]

Judges mirrored these attitudes and adopted the belief that they were in fact dispensing divine justice. The font of their authority may not be the same, but modern American judges hold similar attitudes regarding their role. Most judges subscribe (or at least pay lip service) to the belief that they do not make policy, they merely interpret the Constitution[36]; the foundation on which our system of government is built. If asked, most members of the judiciary would deny that they make policy. They are nothing more than a conduit, so the belief goes, an instrument to clarify, explain, and apply the policies of the Constitution in relation to actions of the other two branches of the government. As Spaeth notes, this is commonly referred to as the declaratory theory of judicial decision making (1979:3). This does not mean, however, that judges are incapable of disagreeing with the dictates of the executive or legislative branches. American judges have a higher law to which they can turn: the Constitution of the United States.

Thus constitutional interpretation is one of the major roles of the judiciary. It is the judiciary which has the last word on whether actions by the other branches are in line with constitutional mandates. This role is known as

judicial review.

Although the Constitution makes no mention of who was to have the authority to interpret the document, Chief Justice John Marshall in Marbury v. Madison[37], claimed this task to be the duty and privilege of the judiciary. His essential argument followed from the attitudes noted above, namely that judges were somehow more qualified to interpret the Constitution[38] than members of Congress or the President, all of whom were tainted from their involvement in the nasty business of politics.

This power of judicial review must not be abused since the judiciary generally lacks the procedures necessary to enforce its will. If courts are viewed as mere policy makers there would be no reason to accept their view rather than that of the executive or legislative branches, and with little or no muscle to back up their policies, the courts would soon become completely ineffectual. Thus, courts strive to dispel any notions that they are making new policy by conjoining their decisions with the Constitution.

Courts also rely on precedent. Precedent, also known as stare decisis, is the method used by courts to justify present decisions based on past decisions. References to past decisions show how the court is following the course it has set, and maintain stability and tradition. To emphasize the importance of precedence to the legal system, consider the opening paragraph from Statsky and Wernet's Case Analysis and Fundamentals of Legal Writing:

In the early Eighteenth Century, Jonathan Swift made a very cynical comment about the preoccupation that lawyers have with court opinions:

> It is a Maxim among these Lawyers, that whatever hath been done before may legally be done again: and therefore they take special Care to Record all the Decisions formerly made against common Justice and the general Reason of Mankind. These, under the Name of Precedents, they produce as Authorities, to justify the most iniquitous Opinions; and the Judges never fail of directing accordingly.[38]

Although people might disagree with Mr. Swift's derogatory comment about how lawyers function, no one can disagree with his suggestion that court opinions are the cornerstone of law and of our legal system. (1977:1)

Do judges have a power or gift which enables them to dispense justice? Hopefully they are more capable than the average citizen at doing what they do, but despite the religious allusions, they are just men and women doing their job. Do judges really base their decisions on Constitutional mandates and precedent? This question must also be answered in the negative, but requires a bit more proof.

The proof is provided in Chapter 3 of Spaeth's Supreme Court Policy Making, and will be summarized here. Generally there are four tactics which allow judges to say precedent is not applicable in a present case. First, they may declare the seemingly controlling material from the previous case to be obiter dicta. As part of their avoidance of appearing to make new policies, courts (especially the U.S. Supreme Court) usually decide only what is necessary to dispose of the case.[40] Anything else in the opinion is superfluous, is not binding on other courts, and is called dicta. If a previous

case conflicts with the desired outcome of the present case, the court may declare the troublesome passages to be dicta.

The second tactic is to distinguish the previous case. This means that the facts of the two cases (past and present) are sufficiently different that the past case is not controlling in the present case. Case analysis is the method used for determining whether a past case can be considered precedent. Essentially case analysis involves an examination of the facts of the case combined with an application of the relevant law to reach a conclusion of law (Statsky and Wernet 1977:153-156). Statsky and Wernet point out the particular importance of facts when they say, "Even a slight change in the facts can result in a totally different conclusion of law" (1977:155).[41] Since it is the judge who decides whether the facts of a previous case are too different (as well as the interpretation of the rule of law) this is a very flexible tool for selectively choosing the precedent which best supports the desired outcome. It should be noted and emphasized that not all the facts are important. Important facts are those which have some bearing on the decision. In a search and seizure case the location of the search is important but the color of the defendant's shirt is probably not. The determination of whether a fact is important adds to a judge's ability to distinguish cases on the basis of the facts. If a fact is troublesome, it may be deemed legally unimportant.

Both of the above tactics may be employed by any court. The next two can be used only by certain courts. The reason

for this distinction lies in the fact that the first two tactics do not affect the past case in any way. The next two methods permanently affect the way that a case may be used as precedent. These changes can only be made by a court with respect to its own prior decisions or those of courts inferior to it and within its jurisdiction.

The third tactic is to limit the previous case. The overall effect of the precedent remains unchanged, but a specific part of the decision no longer applies. An example used by Spaeth to illustrate this tactic comes from Frothingham v. Mellon where the Court banned taxpayer suits which challenged the purposes for which federal expenditures were made (1979:57-58). Later, in Flast v. Cohen, the Court limited Frothingham by carving out an exception to the previous rule.

The final tactic is the most drastic: overrule the previous case. An overruled case is no longer good law, and may not be used as precedent. (Strangely enough, precedent is often used to overrule other precedent.) A case may be overruled when two conflicting lines of cases finally come together in one case, or when changes in public attitudes and morals force a change. A well known example of the latter occurred when the Court effectively overruled Plessy v. Ferguson in its decision of Brown v. Board of Education. Spaeth notes that the Court has overruled itself not much more than 100 times (1979:58). This is not surprising given the desire to maintain an aura of stability. Recent speculation as to the fate of Roe v. Wade, if certain members of the

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Court resign or die, tends to show the Court less as an institution than the group of decision makers they really are: change the group and change the decision.

Clearly, adequate facilities exist for judges to avoid the mandatory use of precedent except in the sense of finding some past decision to support the present position. The question remains as to whether judges do decide cases in the professed manner. In answering this question, one must keep in mind the caseload of the courts.[42] The drastic increase in the Court's workload has been noted by Howard (1982) and Greenhouse (1983) among others. The Court itself has taken note of the increase in an informational booklet available to visitors of the Supreme Court building. In a paragraph titled "The Justices' Caseload" the following is stated:

> The Court's caseload had increased steadily, reaching a total of 5,311 cases on the docket for the Term ending July 1982. The increase has been rapid in recent years. In 1960, only 2,313 cases were on the docket, and in 1945, only 1,460. Plenary review, with oral arguments by attorneys, is granted in 180 to 200 cases per Term. Formal written opinions are delivered in 150 to 170 cases. Approximately 120 additional cases, primarily appeals, are disposed of without granting plenary review. The publication of a Term's written opinions, including concurring opinions, dissenting opinions and orders, approaches 5,000 pages. Some opinions are revised a dozen or more times before they are announced. (Supreme Court of the United States 1982:11)

Unlike other organizations, the Court does not divide the labor.[43] Each justice must deal with all the information from each case (or, as will be pointed out below, as much of the material as is necessary to come to a decision). Each justice may have three or four clerks to help with the work,

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but the numbers cited by the Court would seem to indicate that such a small number of people would find the task of doing all the requisite reading, research, and writing quite impossible in the time allotted prior to an initial vote either on whether to grant certiorari or on the merits of a case. One method of lessening the burden on the justice is the practice of having the law clerks prepare summaries of petitions which highlight the facts, issues, and legal arguments (Woodward and Armstrong 1979:33-34). Spaeth notes that the justices generally cast an initial vote on the merits of a case from 24 to 96 hours after hearing oral arguments (1979:22-24). They are free to change their vote any time prior to the announcement of the Court's decision, but this does not happen with great regularity.[44] This is further evidence that the Court must have shorthand procedures for dealing with the massive amounts of material that comes before the them. Justice Blackmun admitted as much in a statement to the Hruska Commission when he said,

> The heavier the burden, the less is the possibility of adequate performance and the greater is the probability of less-than-well considered adjudication. . . . One, therefore, to a large degree, relies on experience and an innate and hopefully already developed proper judicial reaction. (Ripple 1980:175)

Apparently Brennan has also developed a proper judicial reaction. After a number of years on the Court he was able to dispose of some petitions for certiorari within a matter of seconds and had "developed a special feel for recognizing the important cases" (Woodward and Armstrong 1979:273).

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Undoubtedly, both Blackmun's "judicial reaction" and Brennan's "special feel" were the result of years of training and experience using case analysis; a method which emphasizes the important facts of a situation.[45]

The foregoing details of Court procedures and attitudes seem to indicate that justices do not make their decisions as maximizers under the comprehensive rational choice theory of decision making.[46] A cognitive-cybernetic theory of decision making is more appropriate under the circumstances described.

Beer (1964) noted three characteristics of cybernetic machines; they must be exceedingly complex, probabilistic, and homeostatic. Let us consider each of these characteristics in turn.

There should be little doubt that the Court is exceedingly complex. The judicial system of the United States is composed of 51 court systems; 50 state court systems and the federal court system which includes the Supreme Court. But let us restrict the system to be examined in this work to the operations of the United States Supreme Court. The Supreme Court has nine primary elements; the nine justices of the Court.

Although nine elements would be beyond the average span of immediate memory, it does not necessarily imply that a system is complex. Beer used the game of billiards as an example of a system with approximately 22 elements (16 balls, one cue stick, four rails, and something to supply force) which may still be considered simple (1964:13-14). A complex system is one in which the connections between the elements

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are quite interconnected and highly elaborate. Certainly this describes the Court. Not only will the nine justices interact with each other at various stages in the process of handling a case, but they also interact with their law clerks (who also interact with each other) and quite often with attorneys, either face-to-face or through the briefs submitted to the Court. The elaborateness of the communications is found in the rules which govern how and when certain interactions take place (e.g. attorneys cannot enter a justice's chambers to plead a case (Woodward and Armstrong 1979:79-80)). When complex systems cannot be "described in a precise and detailed fashion" they become exceedingly complex (Beer 1964:12). It may be said, due to the inaccessibility of the human brain for study, that any system which contains human decision making is exceedingly complex. Because the current state of scientific research has been unable to explain the precise workings of the human brain, Beer and Ashby use a Black Box to represent that portion of the system which cannot be precisely defined. In examining the decisions of the Court this Black Box is the workings of the justice's brain when individual votes are the focus of attention. When examining the decisions of the Court as an institution, the Black Box expands somewhat to encompass the workings of the nine justices as a group.

Beer's second characteristic is the probabilistic nature of the system. Here again, the presence of human decision makers virtually guarantees probabilistic rather than deterministic decision making. If this were not the case, the

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study of the law would become much simpler and LaFave and Israel would not have written 138 pages on arrest, and search and seizure in their one volume abridgement of their three volume Criminal Procedure. Beer recognizes that, by his definitions, a system cannot be exceedingly complex and deterministic (1964:16,18).

Finally, the cybernetic system must be a homeostat. The key feature of a homeostat is its ability to act to maintain some variable within specified limits (Beer 1964:22). In studying the decisions of the Court, the variable to be maintained will concern the particular area of the law examined, but generally it will pertain to statutory or constitutional interpretation. In the area of search and seizure the Court must maintain a balance between competing constitutional concerns; the rights of the individual versus protection of the public from criminal activity.

This ability of the homeostat is dependent on the presence of a feedback loop in the system. Feedback has been defined to be the inputs to the control device (Steinbruner 1974:67-68). The control device is the element of the system which makes the decision; the Court or the individual justices in judicial decision making. Feedback consists of the cases which enter the subsystem of Supreme Court decision making. Normally we consider feedback to be rather immediate, as in the case of the Watt governor, but in a judicial system feedback can take a very long time. Once the Court issues a decision, the decision must work its way back through the system until it reaches the litigants who must

then adjust their actions in accordance with the decision. If compliance is achieved, the Court does not hear about the case again. It is only if additional problems arise, either through noncompliance or a lack of understanding of the decision, that the Court may have to deal with the problem again.[47] When this occurs, another case must work its way to the Court for review. The particular issues of the second case inform the Court of the problems with the first decision (too inclusive, unclear, too specific, etc.) and the Court can tailor the second decision to correct these problems. In this way the Court receives feedback as to whether its decisions are keeping the relevant variables within the desired limits i.e., whether the proper balance has been struck).

Steinbruner has noted that the cybernetic decision maker deals with uncertainty by focusing on a small number of incoming variables (inputs) (1974:66). In addition, the decision makers are assumed to have a relatively small set of responses and decision rules so that a decision can be easily and quickly reached once certain information is received (1974:66). Uncertainty goes hand in hand with an exceedingly complex probabilistic system like the judicial system. It has been shown that the method of case analysis emphasizes the focusing of attention on a few relevant factors. Decisional rules of the Court are quite narrow, they essentially have two choices in most cases; reverse or affirm.[48]

The five principles of cognitive theory (inferential memory, consistency, reality, simplicity, and stability) also apply to judicial decision making. Judges use inferential

memory to allow them to focus their attention on the important facts of a case. Their experience or judicial reaction supplies the general framework into which these facts may be placed. Inferential memory of the framework allows judges to focus their attention and other resources on a limited number of factors within their cognitive limits.

Consistency operates on two levels when considering the decisions of courts and judges. Like other humans, the minds of judges operate to maintain the consistency of internal belief relationships. This implies that we can expect the decisions of judges to be consistent within a particular framework, such as a specific issue area (e.g. search and seizure) or a more general category of law (e.g. criminal procedure).

Consistency is also built into the judicial process. Although, as discussed above, courts and judges have a number of means at their disposal to avoid the necessity of following precedent, this does not give the judiciary a totally free hand. More than the other two branches of government, the judiciary must rely on the good will and respect of the people to maintain their standing. Along with the various trappings of the Cult of the Robe consistency in their decision making is one of the most powerful generators of respect at their disposal. The Supreme Court's judicious use of the power to overrule previous decisions shows a recognition for the importance of consistency in their decision making.

The case analysis method keeps judicial decision making in touch with the environment in which the litigation arises.

This reflects the reality principle. Judges must account for changes in the decisional environment. In order to make their decision, they must examine the facts of the situation in relation to the relevant law. A more important aspect of the reality principle, and one which points out a failing of Beer's mechanistic view of cybernetic decision making, is the ability of judges to adapt to radical changes in their decisional environment. The invention of electronic communications and wiretaps could not have been envisioned by the drafters of the Fourth Amendment. Nevertheless, when search and seizure issues involving wiretaps presented themselves the courts were able to adapt their decisional frameworks to include this new area of litigation.

Stability is closely related to consistency. As noted by Steinbruner, "human beings have an observable tendency, other things being equal, to regularize complex figures . . ." (1974:102). The reality principle operates to keep judicial decision making in touch with the situational environment, but minor fluctuations in the environment are ignored. This results in the frameworks into which the important facts are placed for evaluation.

The final principle, simplicity, is an obvious one. Economy demands that judicial decision makers develop fast and simple methods of processing the voluminous amounts of information presented to them. One may observe that most judicial opinions are far from simple, especially to the layman uninitiated to the legal jargon. It must be remembered that the decision is made quite quickly and it is only

the explanation of that decision which requires extensive amounts of time and verbiage.

Previous attempts have been made to examine judicial decision making from a cybernetic approach. One attempt, though flawed, is worth examining.

Tanenhaus, et al. (1963) used the basic notions of cybernetic theory in developing a cue theory of certiorari. They based their theory on three initial assumptions. First, that the relevant rule of law "does not provide a very satisfactory explanation for the Court's exercise of its certiorari jurisdiction" (1963:118). This conforms to the previous discussion on why precedent is not a satisfactory explanation for the Court's behavior with respect to the disposition of cases. The second assumption was that "certiorari petitions are so sizable and so numerous that justices saddled with many other heavy obligations . . . can give no more than cursory attention to a large share of the applications for certiorari" (1963:118). This, of course, relates to the limitations on human abilities to process information. The third assumption stated that some petitions are so frivolous, they do not receive any serious consideration at all. This final assumption does not directly relate to the assumptions of the cybernetic model, and in fact causes problems for the cue theory of certiorari since they are assuming what they are essentially trying to prove. The cues chosen to test the theory are too vague and, as pointed out by Teger and Kosinski (1980), they become surrogates for what the Court considers important issues, and thus become

useless tautologies (1980:845).

A more serious problem exists in the conclusions reached by Tanenhaus, et al. They state:

> Insofar as the cue theory itself is concerned, the relative magnitude of the correlations between established cues and the grant or denial of certiorari (outcome) is of no particular consequence. All the cue theory requires is that the presence of a cue is enough to insure that a petition for certiorari will be studied with care. (1963:127)

The problem lies in the fact that although the correlation between grant or denial and the cues is of no consequence, it is precisely that correlation which is used to test the theory. Of the nine tables contained in the article, six have divisions relating to whether certiorari was granted or denied, and a seventh (Table 9, p. 129) attempts to predict the percentage of certiorari petitions that will be granted. Teger and Kosinski recognize this problem and sum up the situation as follows:

> It should be obvious that testing the validity of cue theory is almost impossible. A direct test would require access to the Justice's chambers, preferably while he is sifting through the petitions for certiorari. Thus, in order to gather some empirical support for the theory, an indirect test is required. If cue theory is correct, only cases containing cues will be granted review; those without cues would be consigned to the footless appeals pile and not be voted on in conference. Their chance of being granted is effectively zero. Those cases with cues, however, have a chance of being accepted for review, though not all cued cases will be accepted. The indirect test of cue theory should look to see if, in fact, all cases granted review have cues. (1980:836)

This indirect test proposed by Teger and Kosinski is exactly what Tanenhaus, et al., claim cue theory does not do

(but they did it anyway). The professed dependent variable is whether the petition received serious consideration. Aside from the obvious problems in measuring such a variable, it is not particularly interesting. It would be of little consolation to the petitioner who has invested considerable time and money seeking Supreme Court review to know that the petition was given serious consideration before it was denied. Of greater value would be a determination of the cues which the Court looks for in deciding to grant certiorari. The petitioner might then be able to cut short an effort doomed to fail, or possibly emphasize the cues which are common to granted petitions.

Ulmer, et al. (1972) refined some of the cues and clearly examined the difference between a grant and a denial of certiorari. Unfortunately, the examination is quite short and without sufficient detail. The one interesting result is the finding that when the petitioning party is the federal government the Court is more likely to grant certiorari.

The problems of the cue theory of certiorari do not forestall further efforts to use cognitive-cybernetic theory to model judicial decision making. These problems may be corrected by a proper consideration of the necessary assumptions and a more considered elucidation of the cues to be employed.[49]

Rohde and Spaeth (1976) and Spaeth (1979) set out the assumptions on which a theory of Supreme Court decision making is based. These assumptions fit well with cognitive-cybernetic theory and help to focus the theory on the

realities of judicial decision making. Both sources describe the assumptions at length so they will only be summarized here.

The first assumption is that "actors in political situations are goal oriented . . ." (Rohde and Spaeth (1976:70). As set out above, judges are political actors. Goal orientation simply refers to the fact that the actors are not merely exhibiting random behavior; they have a purpose in the sense used by Ashby and Beer. The goal that judges work toward is the attainment of their personal policy preferences (or their maintenance if the preferences are already the status quo).

The second assumption is that "an actor's choices will depend on the 'rules of the game'" (Rohde and Spaeth 1976:70). These rules refer to the basic structure of the system, the flow of communication, and where inputs and outputs enter and leave the system. With respect to the Supreme Court, only certain types of cases may be heard as set out in Article III of the Constitution. Rules also determine the procedure by which cases come before the Court. Generally, the Supreme Court enjoys a fair amount of autonomy with respect to the rules of the game. Both Congress and the President must answer to an electorate on a periodic basis, whereas federal judges are essentially appointed for life. Many state court judges must also answer to a constituency or at least higher courts. Even state supreme courts must answer to the United States Supreme Court on matters involving federal law and the U. S. Constitution. This autonomy of the Supreme Court allows it a great deal of freedom to

pursue the personal policy goals of the justices. A second category of rules relates to the particular area of the law that a case presents. For example, in cases involving search and seizure, the Fourth Amendment mandates a number of requirements before a search may be considered reasonable (legal). Thus, the discussion in a search and seizure case must revolve around these requirements.

The third assumption is that "decisions are also dependent on particular situations" (Rohde and Spaeth 1976:71). The Court's decisions often require the balancing of competing interests which generally stem from the principle of "majority rule but minority rights." To strike a proper balance the Court considers a number of factors which have evolved from previous decisions. Like Alexander's designer who wishes to switch from building a kettle to a pan, when the Court makes decisions in different areas of law many of the same factors can be successfully employed. The specific manifestations of these factors in a particular area of law are the cues which the Court uses (as indicators of the factors) to strike the proper balance. Utilizing their training in case analysis, the justices examine the factual situations of cases for cues which indicate the decision which must be made in the case which best serves to advance the goals of the Court.

With these assumptions, we may examine the decisions of the Court to determine what factors influenced the particular disposition of a case. These assumptions, resting on cognitive-cybernetic theory, form the "hard core" of this

theory of judicial decision making (see Lakatos 1970:133-134).

To summarize, judicial decision making contains four essential characteristics of the cognitive-cybernetic model of decision making. The first characteristic is simplification. Simplification is desired to enable the judicial decision makers to stay abreast of their workload, but it is also a necessity imposed by human cognitive limitations.

Stable decision rules are the second characteristic. Such stable rules are a mainstay of judicial decision making. The internal belief systems of judges remain stable and decisions are made to maintain consistency. In addition, decisions in particular issue areas remain stable as part of the operative judicial process.

Third, there must be a focus on the attributes of a situation; the gross characteristics. The case analysis method and emphasis on the important facts of a case in relation to the important facts of previously decided related cases forces judicial decision makers to focus their attention on the attributes of the situation. Simplicity and economy also force this attention to be given to the gross characteristics. For example, in the area of search and seizure the fact that a search takes place in a home is a gross characteristic which is important. Whether the home is a two-room apartment or a 40-room mansion is a detail of no legal concern.

Finally, the decision maker must have a limited choice set. Again, a limited choice set is imposed by the human

decision maker's cognitive limitations. However, if time and resources are available a large number of alternatives may be considered a few at a time. Judicial decision makers do not have the time or the resources. Justices on the Supreme Court must make their decision on a case within one to three days after hearing oral argument (Rehnquist 1987:287)(and they do not have the luxury of having only one case to decide at a time). In addition, the justices essentially have only two choices; reverse or affirm (see note 2-48).

To test the applicability of cognitive-cybernetic decision making theory to judicial decision making testable hypotheses must be drawn from the theory. This is the topic of the next section.

6. Hypotheses To Be Tested

To test the cognitive-cybernetic theory of judicial decision making, it is first necessary to select an area of the law for examination. Examining judicial decisions in the context of a single issue area provides the stable decision rules necessary under the cognitive-cybernetic theory. When considering multiple issue areas the overall process remains the same but the specific question to be answered changes. In search and seizure cases the basic question to be answered is whether the search was reasonable. In an obscenity case the question is whether the materials are protected by the First Amendment. These are quite different decisions which require different decisional rules. Combining qualitatively different types of cases would destroy the stability of the

decisional environment.

After selecting an appropriate area of the law for examination, we are still faced with the question of what factors will be relevant to the decision making process. Simon makes an important point which directly relates to the answer to this question. In a discussion of the limits of speed of concept attainment, Simon notes that "human beings do not always discover for themselves clever strategies that they could readily be taught" (1981:74). Moreover, the cognitive principles of stability and simplicity operate to reinforce the use of such learned strategies. Let us examine each of these two points.

The clever strategies Simon speaks of may also be thought of as the "trick." Consider the frequently used drawing of what appears to be a vase, but is it a vase or two people facing each other? Another common example is the drawing of the old hag, or is it a young woman looking away? A more abstract example is the angled drawing of a set of stairs; do the stairs go up or down? The first time we see these drawings we generally see one image or the other, but not both. It is only after we are told that another image exists, and perhaps a few clues, that we can see the second image as well.

In terms of decision making and actual strategies, many of the early video games provide examples of the point Simon makes. Early video games such as "Pac-Man" and "Space Invaders" tend to be quite regimented in the actions of the computer-generated aliens. New players often struggle along

with only moderate success until a more experienced player shows them "the pattern," i.e., the set of moves which, when followed precisely, make it much easier for the player to advance in the game. The much studied game of chess also has its strategies which are more often taught rather than discovered. The primary purpose of the chess books cited earlier is, in fact, to teach these strategies to the less experienced player.

It is possible that in chess or the less sophisticated video games one may do fairly well without instruction. The elements of the game are small enough and simple enough in their relationships that mere repetition may suffice to instruct the player in the fundamentals of the game. However, when the number of elements increases and the relationships become much more complex, the player is faced with cognitive limitations which bar further advancement without strategies to simplify the decisional environment.

This is the problem facing the judicial decision maker. Even in a single area of the law, the elements involved and their relationships among themselves and to the relevant law as well as the judicial structure itself, are well beyond the cognitive limitations of the judicial decision maker. The strategies used by judicial decision makers are taught to them as an integral part of their legal education. As was noted previously, the case analysis method forms the basic approach to legal analysis. In case analysis, the facts of a situation are examined in light of the relevant law to determine a legal conclusion. In any given area of the law (e.g.,

search and seizure, obscenity, involuntary confessions) the case analysis method dictates which aspects of a situation become important in terms of the legal conclusion to be reached.

The cognitive-cybernetic theory of judicial decision making, per se, does not require, for example, that the location of a search be an important factor in the determination of whether a search was reasonable. The theory does require that if location is to be an important factor it must have entered the decisional calculus as part of the established structure of search and seizure decisions or the judicial decision maker's personal preferences, and lie within the cognitive limitations imposed on human decision makers. The specific factors important to a decision are part of the rules of the game noted by Rohde and Spaeth (1976:70).

The important factors must satisfy the consistency, simplicity, stability, and reality principles of cognitive theory, as well as the three assumptions of judicial decision making noted by Rohde and Spaeth (1976:70). The first of these assumptions is that the decision making of judges is goal-oriented. In very broad terms, the goal of judges is to resolve a controversy by making a decision. More specifically, the judicial decision maker desires to make a decision consistent with his personal ideological beliefs. To this end, his decisions are goal-oriented.

The judicial decision maker does not have carte blanche, however. The decisions must conform to the rules of the game with respect to both what decisions are made and how they are

made. This is the second assumption.

The third assumption is that the decisions are dependent on particular situations. To some extent this is part of the rules of the game. It also relates to the reality principle of cognitive theory in that the decisions must be based on reality, or at least the decision maker's perception of reality.

The requirement of consistency operates on two levels. The first is on a cognitive level. The "mind operates in such a way as to keep internal belief relationships. . . consistent with one another" (Steinbruner 1974:97). On a second level, the factors must be consistent with the established rules of the game. With respect to an established structure in an area of the law, this means only certain well established factors are considered appropriate for consideration. For example, the height of the suspect would not be considered an important factor for consideration in a search and seizure case. On the other hand, if a justice has a personal bias against short people, this factor may very well be important, though never mentioned in the justice's opinions.

The stability principle "asserts that cognitive inference mechanisms resist change in the core structure of beliefs (Steinbruner 1974:102). This point is also made by Tversky and Kahneman in their discussion of the heuristics used in making decisions under uncertainty. They not [i]n many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer" (1982:14).

They refer to this reliance on a stable initial position as anchoring. Belief systems must be consistent and simple, but economy also requires the system to be stable (Steinbruner 1974:101-102). This stability or anchoring may very well lead to biased results (Tversky and Kahneman 1982:14-18). At some point, however, when reality is vastly different from the existing beliefs changes will be made (e.g., Steinbruner 1974:102).

One important implication of stability and anchoring is the effect any given factor will have on the decision making process. It is unlikely any two individual decision makers will have the same initial values in their belief systems. Thus, the impact a factor will have on the outcome will vary from decision maker to decision maker.

Discussing stability and consistency begins to take up the second point, that once learned, the clever strategies are reinforced. Steinbruner refers to simplicity and stability as principles of economy (1974:101). The belief system must be simple so it meets cognitive processing limitations, but also so less energy is required to maintain it. Major changes in a belief system require enormous amounts of reprocessing. To avoid this, once established, belief systems remain very stable. In addition, once a belief system is in use the principle of consistency also comes into play. Major changes would not only require reprocessing, but also cause turmoil due to potentially inconsistent beliefs. As noted previously, only when reality indicates that such changes are warranted will they occur.

Given these requirements placed on the relevant factors by the cognitive-cybernetic theory, the next step is to identify an area of the law for examination and the factors relevant to reaching a decision in that area.

Search and seizure decisions of the United States Supreme Court is the issue area chosen for examination. It should be emphasized that the examination is not about search and seizure per se, rather, it is a test of the cognitive-cybernetic theory of judicial decision making which focuses on a specific issue area.

One reason search and seizure is a desirable issue area for examination is because of its stable decisional environment. The cases which come before the Court all fit a general framework: an area was searched, something was seized, and the question revolves around the reasonableness of the government actions. This stability also allows the judicial decision maker to focus on the gross attributes of the situation, which in turn allows for a simplification of the decision-making process.

Second, the basic question to be answered in search and seizure cases involves balancing the interests of the individual against those of society (in the form of law enforcement officials). This balancing process requires the identification of factors which place one side or the other at a constitutional disadvantage. These factors are few in number and can be easily recognized and measured.

Third, the area of search and seizure has been previously examined in a somewhat atheoretical context (Segal 1984;

1985; 1986) and found to be ripe for examination under cognitive-cybernetic theory.

What then are the factors which the Court considers when making decisions in the area of search and seizure? The phrasing of the Fourth Amendment (which contains the clause pertaining to search and seizure) is fairly simple,[50] but this is not unusual for the Constitution. These simple phrases are often open to a variety of interpretations and it has been the job of the judiciary to interpret the Constitution since the early nineteenth century (Marbury v. Madison). With respect to the Fourth Amendment, for a search or seizure to be considered constitutionally permissible, it must be "reasonable." For a search or seizure to be reasonable an arrest warrant or search warrant must have been issued that describes the area to be searched and the things to be seized. For a warrant to issue, there must be some adequate basis to believe that the person to be arrested or the area to be searched will lead to the solution of a crime; this requirement is known as probable cause. A number of exceptions to either or both of these requirements have been fashioned by the Court. Some are based on our common law tradition (the ability to make felony arrests in a public place without a warrant), while others have been developed to meet more modern problems (the expectation of privacy tests). The determination of whether probable cause and/or a warrant are required and whether these requirements have been satisfied is a decision made by the Court based on the factual circumstances surrounding the case. These determinations in turn

answer the question of the reasonableness of the search or seizure.

The factual circumstances on which the Court (and the individual Justices) bases its decision are drawn from the historical purposes behind the Fourth Amendment and, more generally, the conflict between majority rule and minority rights. When the Court is called upon to interpret Constitutional provisions, it must often strike a balance between competing constitutional interests. With regard to criminal procedure, and more specifically search and seizure, the Court is faced with the rights of the majority (via various law enforcement groups) to protect themselves and their property against crime and to provide order and stability in their society versus the rights of the minority (individuals) to have their privacy and due process when they are accused of a crime. The Court must strike the balance so as to allow the majority to protect itself without trampling the rights of the minority in the process. In striking the balance, the Court examines a number of factors to determine whether the majority has taken unfair advantage of the situation.

During the period preceding the American Revolution (roughly 1607 to 1776) American colonists thought of themselves as members of the British family and entitled to the traditional rights of Englishmen (Harris 1983:6-8; McDonald 1985:9-56). One of these rights, which protected the citizen from abuses of the sovereign and was established in both England and America by the late eighteenth century, was the right to be secure against unwarranted searches and seizures

(McDonald 1985:38-39). This right later earned constitutional standing by its ratification as the Fourth Amendment.

The location of the search is of particular importance. The Fourth Amendment specifically mentions "persons, houses, papers, and effects" as protected areas. Additional areas identified by the Court include businesses and automobiles. In considering the rights of citizens versus the needs of the government, the Court will consider how public the location is and how permanent it is. In general, the more private and permanent the location or item is, the more likely the Court will mandate full compliance with the warrant and probable cause requirements. This in turn makes it less likely that the search or seizure will be considered reasonable.

As noted by Rodell (1986:206) of particular interest was the protection of homes, the most private and permanent of the protected areas. Business are considered just as permanent and only slightly less private. Other areas and items will receive a lesser degree of protection due to either their public nature or lack of permanence (increased mobility). Thus, the first hypothesis may be stated as follows:

> H1: In search and seizure cases decided by the Supreme Court, the more private and permanent (or fixed) the location searched or the item seized is, the less likely the Court will be to find the search or seizure to be reasonable.

Control and time are two factors which relate to the government's ability to meet the requirements of the Fourth Amendment in a particular situation.

If the government has control over the location or item

it is less likely that their ability to protect the public will be diminished if they take the time and energy to fulfill the requirements of the Fourth Amendment. For example, if the government has sealed off a house and has control of all that goes on inside it, it would be very difficult to justify not getting sufficient authorization to conduct a search of the dwelling. The second hypothesis may be stated as follows:

> H2: In search and seizure cases decided by the Supreme Court, if the government has control over the location searched or the item seized the Court will be less likely to find the search or seizure reasonable.

Similarly, time is very important to a decision of reasonableness. The more time between when the suspicions of the government are first aroused and when the search or seizure takes place, the more likely the Court will require full compliance. If time is short, fulfilling these requirements may significantly reduce the probability of obtaining the evidence desired. The third hypothesis may be stated as follows:

> H3: In search and seizure cases decided by the Supreme Court, if the time between when suspicions are first aroused and when the search or seizure takes place is short, the Court will be more likely to find the search or seizure to be reasonable.

The next factor involves the nature of the item seized. From a strictly legal perspective, the kind of item seized should make little difference in deciding the legality of the

search and/or seizure. From a practical perspective, if the item is of an inherently dangerous or illegal nature (e.g. handguns) the balance may shift to the protection of the public. Thus, the fourth hypothesis may be stated as follows:

> H4: In search and seizure cases decided by the Supreme Court, when the item seized was inherently dangerous or illegal the Court will be more likely to find the search or seizure to be reasonable.

The next factor considers the severity of the search or seizure. In the course of trying to fulfill their duties government officials may become overzealous and employ tactics and procedures which are clearly unreasonable given the circumstances of the situation. This factor is related to the maxim, "let the punishment fit the crime." Here, the procedures used in the search or seizure must fit the circumstances surrounding the crime involved, the location searched, and the item seized. Thus, the fifth hypothesis may be stated as follows:

> H5: In search and seizure cases decided by the Supreme Court, if the actions of the government are considered severe, the Court will be less likely to find the search or seizure to be reasonable.

Finally, although the U.S. Supreme Court has the last word in interpreting the Constitution, in order to minimize tensions between other levels and branches of government, the Court will consider the decisions of other governmental entities. In particular, the Court will take into consideration

whether the United States is a party to the suit. One explanation for this is that the Supreme Court oversees both the state and federal judiciaries, but is still an arm of the federal government and may be more willing to support the actions that the federal executive branch takes in carrying out the laws. Another possible explanation lies in the fact that the sovereign nature of the states enhances the possibility of federal law violations. State courts may place more emphasis on state laws and constitutions and are more exposed to the vagaries of political opinion than the federal judiciary. With regard to striking a balance between citizen rights and government duties, the Court may view the past history of state violations of civil rights as indicative of a need to keep state courts under greater control than federal courts. Ulmer (1972) identified this as a potential factor in the cue theory of certiorari. Thus, whether a case originates in state or federal courts is a factor which requires consideration and the final hypothesis may be stated as follows:

> H6: In search and seizure cases decided by the Supreme Court, when the case came from a lower federal court, the Court will be more likely to find the search or seizure to be reasonable.

It is these six factors which form the stable decisional environment in which the Court and its Justices make their decisions. These six factors allow for a simplification of a seemingly complex area of the law, and they allow the judicial decision makers to focus their attention on the

important facts of each case.

Chapter 3 will describe the observations contained in the data set and operationalize the variables drawn from these six factors. The model derived from the cognitive-cybernetic theory of judicial decision making and the methodology which will be used to test it is also discussed in Chapter 3. Chapter 4 will present the results of the estimation.

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Chapter 3: Data, Operationalization, and Methodology

In the previous chapter six hypotheses are drawn from the cognitive-cybernetic theory of judicial decision making. The premises of a stable decisional environment and a focus on the important facts require that these hypotheses relate to a specific area of the law. The area chosen is search and seizure. In this chapter the specific data set on which these hypotheses will be tested is identified. Next, the hypotheses are operationalized into several variables which can be coded from the available data. Finally, the statistical method used on the variables will be derived from cognitive-cybernetic theory.

A. Data

As noted in the previous chapter, the issue area selected to test the cognitive-cybernetic theory of judicial decision making is search and seizure. The data set is composed of the search and seizure decisions of the United States Supreme Court and its Justices from 1961 through 1987. The period covered by the data set begins with the Court's decision in the landmark case of Mapp v. Ohio (1961). In Mapp the Court held that state law enforcement agencies, as well as those of the federal government, were subject to the penalties imposed by the judicially created Exclusionary Rule.[1] Thus, in post-Mapp search and seizure decisions both state and federal law enforcement agencies must abide by the same rules, creating an even more stable decisional environment. The period

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Identification of the decisions comes from Professor Harold J. Spaeth's United States Supreme Court Judicial Data Base. Spaeth codes every decision by the Supreme Court according to an extensive list of variables. One of these variables is the issue area (policy context) in which the basis for the Court's decision appears. There are thirteen major groupings of these issue areas, one of which is criminal procedure. Within the criminal procedure group are three areas which pertain to search and seizure: searches involving the Crime Control Act, searches involving vehicles, and all other searches not included in the other two areas. Any decision by the Court involving any one or more of these three issue areas will be part of the data set. In addition, any other decision of the Court based on the Fourth Amendment (which contains the search and seizure clause) or the Exclusionary Rule (in a search or seizure situation), which is not already listed in the three search categories, will also be included in the data set.

Two further items must be discussed with respect to the definition of the data set. First, this study is concerned with the decisions of the Court which do not necessarily coincide with the named cases. Quite often more than one case will be combined by the Court in order to facilitate the decision making process. When this occurs, all the cases are generally identified by the name of the lead case (see case #15, note 1 in Appendix A), but the Court still makes a

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separate decision in each case. Thus, each case will be treated as a separate decision in the data set. Second, even within a single named case, the Court may be called on to decide on the reasonableness of more than one search (see Segura v. U.S. (1984) in Appendix A) or make separate decisions on a search and a seizure (see Florida v. Royer (1983) in Appendix A). When it is clear that the Court decided these questions separately and when the data is available as to how the Court voted on each question, they will be treated as distinct data entries.

These two conventions follow from the cybernetic requirement that the decision maker have a limited number of inputs. Requiring that the data set be composed only of named cases would force a number of extremely complicated cases into the data set which would be impossible to accurately code. An additional justification lies in the fact that the Court looks at these cases in this way. In reading the cases it becomes clear the Court and justices consider combined cases individually. They also look at separate searches and/or seizures within a single named case and base their final decision on the results of their decisions in each search or seizure.

Of the cases identified from the United States Supreme Court Judicial Data Base several are not included in this data set because the Court did not decide the question of reasonableness. In several of the identified cases (including Mapp) the Court disposed of the case on grounds other than the reasonableness of the search or seizure. Although

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the Court did dispose of these cases in which the Fourth Amendment was at issue, the decisions were based on other issue areas. Incorporating these additional issue areas into the decisional environment increases the number of relevant factors well beyond the cognitive limits of the judicial decision makers and destroys the stability of the decisional environment.

With these conventions in effect, the data set contains 204 observations. The specific cases and their citations are listed in Appendix A.

B. Operationalization

In the area of search and seizure, the basic decision made by the Court is whether the search or seizure was reasonable or unreasonable. Most of the cases in this area are brought by defendants challenging, on Fourth Amendment grounds, the admission into evidence of items obtained in a search or seizure. If the Court decides the search or seizure was reasonable the evidence will be admitted, if the search or seizure is considered unreasonable it will not. This decision is the dependent variable.

The dependent variable, DECISION, will be measured in a dichotomous 1/0 manner, with 1 indicating the Court found the search or seizure to be reasonable and 0 indicating unreasonable. The exception to this dichotomy occurs when the Court recognizes the search to be illegal but feels the goals of the exclusionary rule would not be violated by allowing the evidence to be admitted. This ruling has the same effect as

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a decision in favor of the reasonableness of the search or seizure and will be coded as such.

As noted in the Data section, each time the Court makes a decision regarding a search or seizure an observation is coded. Companion cases found under the name of a lead case are coded as separate observations. Multiple searches within one case are also coded as separate observations if it is clear the Court and Justices considered them separately. When it is not clear only one observation is coded based on the search or seizure which was of greater import according to the Court and Justices.

In addition to the above coding considerations there is a more important point which must be considered: who is the decision maker? Two possibilities exist, the Court and the individual Justices.

The cognitive-cybernetic theory of judicial decision making describes the decision making process of a judicial decision maker. In theories of decision making it is often assumed the decision maker is a single individual. The preceding discussion has referred to the United States Supreme Court as simply the "Court" as if it was some unitary judicial body when in fact it is composed of nine justices. Each of these justices is an individual decision maker. One approach is to examine the decisions of the individual justices to determine what factors influence their decisions. Another approach is to look at the Court as the decision maker.

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has a consciousness of its own in order to be considered a cybernetic decision maker (Ashby 1960), nor must we posit a utility function for a goal seeking organism (Simon 1957:261-273). Simon, following a point made by Marschak (1955), indicates that the theory of individual rationality and the theory of organizational rationality are not wholly distinct (1972:161). Simon continues his discussion of possible differences between the two theories thus,

> . . . One plausible distinction between them is that a theory of organizational rationality must treat the phenomena of goal conflict, while a theory of individual rationality need not. This is only partly correct, for goal conflict may be important in individual as in group behavior - it is a major theme of so-called "dissonance theory" in psychology. (See N. P. Chapanis and J. A. Chapanis (1964).) A theory of individual behavior microscopic enough to concern itself with the internal organization (neurological or functional) of the central nervous system will have a significant organizational component. A theory of organizational behavior macroscopic enough to treat the organization as a monolith will be a theory of an "individual." (1972:161)

In chapter six of their classic, A Behavioral Theory of the Firm, Cyert and March summarize the basic concepts in the behavioral theory of the firm. In the exposition of their theory, they identify four major relational concepts: 1) quasi resolution of conflict, 2) uncertainty avoidance, 3) problemistic search, and 4) organizational learning. It is clear from their discussion of each of these concepts that they apply just as well to the individual as to the firm. Goals as independent constraints, local rationality, acceptable-level decision rules, and sequential attention to goals

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are topics which parallel the discussion of human decision making and cognitive-decision making in this chapter. With regard to problemistic search Cyert and March make the following three assumptions:

> 1. Search is motivated. Whether the motivation exists on the buyer or seller side of the alternative market, problemistic search is stimulated by a problem, depressed by a problem solution.
> 2. Search is simple-minded. It proceeds on the basis of a simple model of causality until driven to a more complex one.
> 3. Search is biased. The way in which the environment is viewed and the communications about the environment that are processed through the organization reflect variations in training, experience, and goals of the participants in the organization. (1963:121)

The fact that a search is motivated, is essentially the same as Rohde and Spaeth's assumption that political actors (and judicial decision makers in particular) are goal oriented (1976:70). Just as it is assumed that there is a reason for judicial behavior, it is assumed that a problemistic search is conducted for a reason.

The simple-mindedness of the search relates directly to the simplicity principle of cognitive theory. Cognitive and organizational economy demand such simplicity. Simplicity and stability maintain the status quo until changes in the decisional environment become problematic. Driving a simple model of causality to one which is different or more complex indicates the organization or decision maker is in touch with the decisional environment. Under cognitive theory this is known as the reality principle.

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Finally, the fact that the search is biased is recognized by the stability principle of cognitive theory. This point is also made by Tversky and Kahneman in their discussion of adjustment and anchoring (1982:14-18).

Thus, whether we examine the decisions of the individual justices or those of the Court makes no difference in the theory of judicial decision making. The difference lies in how the system, and in particular the decision maker, is defined. If the Court is defined as the decision maker, one must keep in mind that the "decision maker" is in fact comprised of nine individual decision makers. It is unlikely that the decisions of any one of the justices will perfectly mirror those of the Court; thus, the particular emphasis on the specific factors and cues will be different.

The results obtained by examining the decisions of the Court will likely vary from an examination of the decisions of the individual justices. This is to be expected. Although the cues and factors available are quite limited, the emphasis placed on them by any decision maker can vary according to the goals and desires of the decision maker. This point is made by Tversky and Kahneman in their discussion of different anchor points (1982:14-18). The question is whether anything is lost by examining the Court's decisions.

Undoubtedly the maxim, the whole is greater than the sum of the parts, is true with respect to the United States Supreme Court. Despite assertions that the justices on the Court conduct their business as if they were nine separate

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law offices, anyone familiar with the workings of the Court knows that a great deal of interaction occurs among the justices before decisions are announced (e.g. Rodell 1955, Schwartz 1983, and Woodward and Armstrong 1979).

Such interactive small group effects may play more of a role in the drafting process than in the individual justice's initial decision. This initial decision is a secret vote held in conference within one to four days after oral argument. The assignment of the majority opinion is based on the membership of the majority at this original vote on the merits. The justices are free to change their vote up to the time the Court announces its decision publicly.

Most of the examples discussed in works such as that of Woodward and Armstrong highlight attempts to get justices to join particular opinions. The switching of votes occurs much less frequently. Brenner and Spaeth (1988) found that only one percent of a sample of nonminimum-winning decisions occurring during the Warren Court broke up (N = 226), and only 53 of the 260 minimum-winning decisions occurring during the entire Warren Court broke up (Brenner and Spaeth 1988:77). This research shows that very little vote switching occurs after the justice's initial decision. Additional research has focused on the factors associated with the defection of certain justices in minimum-winning original decisions on the merits (Brenner, Hagle, and Spaeth 1988).

This research focuses on the decisions of the Court as determined by the votes of the individual justices. For purposes of conflict resolution and determination of the law,

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it is the decision of the Court which is of paramount importance. Although this vote is the aggregation of the votes of the individual justices, their individual votes are not important in and of themselves. Even in a minimum-winning decision, where the change of one vote will change the outcome, each justice in the majority is only one of four or five justices.

Provided the requirements are met and the assumptions are not violated, the cognitive-cybernetic theory does not make a distinction between the individual justices or the Court as the decision maker of interest. Thus, both will be examined. When the individual justices are the decision maker of record, the decision of each justice who participates in one of the 204 identified searches or seizures will be counted as an observation.

When the individual justices are the judicial decision makers being examined, VOTE will be the dependent variable. VOTE is the vote of a justice in one of the Court's search and seizure decisions. If the justice found the search or seizure to be reasonable, VOTE is coded "1." If the justice found the search or seizure to be unreasonable, VOTE is coded "-1." This results in a data set containing 1775 observations. (When the Court is the decision maker of record and DECISION is the dependent variable, each of the Court's 204 decisions counts as an observation.)

The objective nature of the variables (as described below) results in nearly identical coding for both the individual justices and the Court. The only differences appear

when one of the individual justices specifically indicates disagreement with the Court's view of what the facts were (as opposed to the legal conclusion reached). In the few instances where such disagreements occur, the coding of the variables reflects the view of the disagreeing justice. For example, in California v. Carney (1985) the area searched was a motor home. Six of the justices felt a motor home was a car and considered the search to be reasonable, while the three remaining justices considered the vehicle to be a home and claimed the search to be unreasonable. For the Court (DECISION) and the six justices in the majority (VOTE) the search location is coded as a home (see HOME below). For the three dissenting justices (VOTE) the search location is coded as a car (see CAR below).

The variables drawn from the hypotheses are situational and case characteristic variables. These variables do not require technical legal definitions. Their existence is determined by referring to the factual circumstances surrounding a search or seizure. Occasionally, the Court will make specific mention of one of these variables. In such cases, the variable will be coded as indicated by the Court or individual justice.

Hypothesis 1 concerns the location of the search. As previously noted, the Fourth Amendment and the Court have identified a number of locations which are protected. The five protected areas and their descriptive variable names are HOME, BUSINESS, CAR, PERSON, and PROPERTY. These five variables form mutually exclusive categories.[2] Each is coded

1/0, with 1 indicating that variable to be the type of area searched and 0 not. Thus for any decision, no more than one of these variables may be coded 1. If they are all coded 0, the suspect has no property interest in the area searched. To some extent, this is a decision which must be indicated by the Court. The result of such a ruling will be similar to a finding that the exclusionary rule has not been violated in that the evidence in question will be admitted. The inclusion of "no property interest" as a sixth possibility makes the location choice set exhaustive.

The locations are not all protected to the same degree. As Hypothesis 1 indicates, the related factors, privacy and permanence, will determine the extent of protection afforded a given location. HOME is defined as a dwelling place. This may be a house, an apartment, or a cabin. The dwelling must have some degree of permanence with regard to its location. Thus, a motor home is not considered (by a majority of the Court, see note 3) to be a home. The importance placed on the privacy of the home by the drafters of the Constitution and the Fourth Amendment lead us to believe that this will be the most explanatory of the location variables.

BUSINESS is defined as a business establishment. Businesses are generally as permanent as homes. They may, however, be much less private. Certainly, executive offices would be considered private, but the floor area of a retail store would not. Despite this difference, it would not be justifiable to separate these types of businesses into two categories. Rather, it is understood that because of this

difference locations coded 1 for BUSINESS will not have the same degree of privacy as exhibited by HOME. Thus, BUSINESS will be explanatory, but to a lesser degree than HOME.

PROPERTY should be the next most explanatory location variable. PROPERTY is defined as personal property of the suspect which is not in the suspect's control at the time of the search or seizure. A typical example of when PROPERTY is coded 1 is when an item is sent through the public mail. Under federal laws the sender certainly expects the contents of the package to remain private, despite the public nature of its mode of transit. Such items are highly mobile, as one would expect of items sent through the mail. It would seem the lack of permanent location and relatively public nature of these items would weigh only slightly against reasonableness, if not in favor of it. What strengthens the explanatory power of this variable is the control factor of Hypothesis 2. When PROPERTY is coded as the location, the item, by definition, is not in the suspect's control. The possibility that the suspect may move or destroy the item or materials contained in the item is greatly reduced. In addition, the government usually does have control over the item. When the government has such control full compliance with the Fourth Amendment is usually required.

The remaining two location variables, CAR and PERSON, are not expected to have the same degree of explanatory power as the previous location variables. CAR is defined as some form of motorized transport such as cars, trucks, motorcycles, and motor homes. Cars are very mobile and quite public. The

Court tends to give the government more leeway when dealing with cars in order to give the government a better chance to obtain evidence contained in such mobile conveyances.

PERSON is defined as the person of the suspect along with anything within the suspect's immediate control. This would include a purse or backpack or something on a table within the suspect's reach. Assuming the person is not in a private place like a home (in which case the location variable would be HOME rather than PERSON) people tend to be considered relatively public, as well as quite mobile.

As a choice set, the location variables are expected to be quite important in their ability to explain the Court's decisions, but individually only HOME, BUSINESS, and PROPERTY are expected to exhibit a high degree of explanatory power.

Two variables are drawn from Hypothesis 2, CONTROL and CUSTODY. CONTROL is defined as a situation in which the government has control over the location of the search and/or the items seized. The government has control when the possibility that evidence can be removed or destroyed is minimized by the presence of government officials or, when PROPERTY is the location, they have possession of the item. When the government has such control they are not considered to be at a disadvantage vis-a-vis the citizen. The control factor thus augments the privacy and permanence factors of the location variables. When the government has control, the variable CONTROL is coded 1, and 0 if not.

CUSTODY is defined as a situation where the government has seized and/or otherwise has control over the suspect.

The suspect may or may not be under arrest (a term with a specific legal definition), but is definitely not going anywhere without the approval of the law enforcement officials. CUSTODY is related to CONTROL, but is specific to the suspect, regardless of the location of the search or whether the government has control over it.

CUSTODY is also related to the severity factor presented in Hypothesis 5. Even when government tactics and procedures are not outrageous, when a suspect is in government control his or her rights have been curtailed. This curtailment may prove to be quite justified under the circumstances, but the citizen is at a disadvantage and the courts will give the government less latitude in the fulfillment of Fourth Amendment requirements. The combination of the control and severity factors make CUSTODY an important explanatory variable. CUSTODY is coded 1 if the government has the suspect in its control, and 0 if not.

TIME is the variable drawn from Hypothesis 3. If the amount of time between when government suspicions are first aroused and when action is taken is quite short, it may be unreasonably difficult if not impossible for the government to satisfy Fourth Amendment requirements without a severe loss of efficiency. When this time period is quite short, the government is seen to be at a disadvantage. An example is when a police officer stops a car for a minor traffic violation and discovers information which leads him to believe it necessary to search the entire car. In such a situation, to require the officer to get a warrant prior to

the search would put the officer at a great disadvantage as far as obtaining the evidence is concerned. Thus, the balance swings to the government when time is short.

Whether the time is short is somewhat relative. The same period may be short in one case and not in another. Generally, if this time period is less than an hour or two it will be coded 1, if longer 0. The determination of this variable is based on a reading of the factual situation of the case. If the time period is short the Court may feel the government did not have enough time to seek a warrant without the possibility of the evidence being removed or destroyed, thus, in the interests of efficient law enforcement, the warrant requirement will be less strict. On the other hand, longer time periods generally correspond to situations where there was more reflection on the part of the government and a greater possibility that a warrant could have been obtained without a loss of effectiveness. In such cases the Court will more strictly enforce the requirements to ensure that they are more than mere bureaucratic technicalities.

The variable DRUG/GUN is drawn from Hypothesis 4. DRUG/GUN is coded 1 if the item seized was a firearm (rifle, handgun, etc.) or some form of illegal drug, and 0 otherwise. Like Hypothesis 5, it is a question of the severity of the situation. Hypothesis 5 relates to the severity of the government action, Hypothesis 4 relates to the severity of the suspect's behavior. The possession of drugs or guns is considered behavior which is quite likely to endanger other citizens making it imperative that the government take

protective action. The balance swings to the side of law enforcement. The same is not true when the item seized is not inherently dangerous to others (e.g., phone conversations, documents).

Hypothesis 5 concerns the severity of the government action with respect to the suspect and/or the suspect's property rights. SEVERITY is coded 1 if the government actions are severe, and 0 when they are not. To use the language of the Court, such conduct will not be tolerated when it "shocks the conscience" (Rochin v. California). In general, bodily intrusions for purposes of obtaining evidence are considered severe. Here, as with CUSTODY, the suspect is considered to be at a disadvantage and the balance swings to protect the citizen's rights.

US is the variable drawn from Hypothesis 6. US is coded 1 if the immediate lower court is a federal court, and 0 if it is a state court. There are no cases in the data set where the Court exercised original jurisdiction. As noted previously, the Court may find it necessary, for a number of reasons, to make more corrections and keep a tighter rein on state court decisions.

A final point needs to be made. From the discussion of the hypotheses and variables it would seem that the government could significantly increase its success rate by simply gathering sufficient information to establish probable cause and obtaining a warrant in every case. This would be the ideal situation. Unfortunately, governments, like people, have limitations. Enforcement agencies have a limited amount

of resources (money, personnel, equipment, and time) which they must allocate in such a way to provide the most protection possible. Strict adherence to the Fourth Amendment's requirements would require more of the government's resources than could be justified in most cases. The government must adopt a strategy to expend the minimum amount of resources necessary to obtain a favorable ruling by the courts. The Court has fashioned a number of exceptions to the probable cause and warrant requirements which aid the government in this task of resource allocation.

At the same time uncertainty is added to the equation. The government simply does not know how the Court will rule on combinations of factors that have not appeared previously. The government must gamble that it has expended sufficient resources to obtain a favorable ruling. Sometimes they will win the gamble, sometimes not. One result of this research will be to reduce the uncertainty regarding the importance of a number of factors, which in turn will enable the government to more efficiently allocate its resources to provide maximum protection for the citizenry.

C. Methodology

The model to be estimated and the statistical method employed must both satisfy the assumptions and requirements of the cognitive-cybernetic theory of decision making. The four basis characteristics to consider are simplification of the decision making process, a stable decisional environment, a focus on the important facts of the situation, and a

limited choice set.

The model drawn from the cognitive-cybernetic theory of decision making is of the form

$$D = F(\sum_{i=1}^{n} b_i X_i)$$

where D is the decision chosen from the limited choice set, the X_i are the important factors on which the decision maker focuses attention, the b_i are the weights the decision makers assigns to the factors, n is a relatively small number ("seven plus or minus two"), and F is the internal process of the factors and their weights which results in the decision. The linear nature of the function F reflect the serial nature of the cognitive processing of human decision makers (see Simon 1979:29-38).

The combination of the $b_i X_i$ is linear for a number of reasons. First, a mainstay of cognitive-cybernetic theory is the simplification of the decision making process. Complicated nonlinear equations would quite likely be unsolvable, and more importantly, would not represent a simplification of the decisional environment.

Second, the stability of the decisional environment refers not only to the rules imposed on the decision maker, but also the rules the decision maker imposes on himself. A linear model affords the decision maker with the stability (and simplicity) necessary for cognitive-cybernetic decision making.

Third, the linear model allows the decision maker to more easily focus on the important factors of the situation. The

presence and impact of individual factors can be easily monitored. In addition, changes in the decision due to changes in the factors can be calculated more easily.

Fourth, the linear model more accurately reflects the serial nature of cognitive processing. Despite the magical number seven, short term memory limitations force the human mind to process factors serially. The processing of more factors occurs on a time-sharing basis up to the cognitive limit. In the cognitive-cybernetic model, the decision maker considers each factor in turn resulting in a final decision.

The structure of the function F is a probabilistic one. The preference of one response over the other is dependent on the important factors being considered. The value of each important factor weighs either for or against one of the responses in the choice set. When the choice set is dichotomous, as it is for the judicial decision maker, this process is like a balance on which the important factors are placed on one side or the other. When all the factors are weighed the choice is made.

Turning now to the statistical method, much of the statistical modeling in political science uses regression analysis. However, there are a number of reasons why regression analysis is not appropriate for testing the cognitive-cybernetic theory of judicial decision making. A basic assumption of regression analysis is the interval level nature of the dependent variable. Nominal level data (a set of categories with no assumed ordering) or ordinal level data (where categories have order but no measurable distance, e.g.

social status) do not satisfy this assumption. In interval data the distances between the categories must make sense. It is not necessary that the variable be continuous or that measurements be made on some absolute scale, only that the several points on the measurement scale have meaning. When this is not the case, the implication is that "the OLS regression estimating procedure breaks down" (Aldrich and Cnudde 1975:579). In attempting to explain many types of decision making, and decisions of the United States Supreme Court in particular, we are faced with a dichotomous dependent variable (see note 48 to chapter 2); the Court must usually decide in favor of one of the litigants. This decision can be framed as an either/or question for the Court: in search and seizure cases either the search was reasonable or it was not. Because there are only two points on the measurement scale of the dependent variable, regression analysis cannot properly deal with the interval: the interval only implies a difference in the dependent variable, the magnitude of the difference is irrelevant.

At least three data points are necessary before intervals take on a meaning which can be used in the calculations necessary for regression analysis. Using regression techniques without the requisite type of data (interval level) can lead to ridiculous results. The basic goal of regression is to draw a line through the data points in the n-space which minimizes the variance, but there is no limitation on this line. It is quite possible for the estimated model to predict values of the dependent variable which lie outside the

measurement boundaries: it may predict more than a 100% or less than a 0% chance that the observation could have occurred.

Aside from this limitation, we simply do not care for any other gradations in the dependent variable. The structure of the judicial system in this country forces appellate courts into making dichotomous decisions (although with respect to the specific disposition of the case more options may be available). It does not matter how close the Court or individual justices come to a line which is drawn through the data points, only that one possible choice was made over the other.

This study will be concerned with explaining and classifying the decisions of the Court and individual justices in a specified set of cases. Given the inappropriateness of regression techniques another method of estimation must be found; the maximum-likelihood technique probit is appropriate.

In general, probit fits the characteristics of cognitive-cybernetic decision making very well. Cognitive-cybernetic decision making is an attempt to simplify the decision making process in a stable decisional environment in which the decision maker focuses on a limited number of inputs to select one of a limited number of responses. The judicial decision maker is in a very stable environment in which, due to human limitations, a small number of inputs are considered in order to choose one of a limited set of responses. The responses for the judicial decision maker, specifically at the

appellate level, are generally limited to affirm or reverse, which coincides with probit's requirement of a dichotomous dependent variable.

Probit is a maximum-likelihood estimation technique. Rather than trying to minimize the differences between the data and a line drawn through the n-space, the technique attempts to maximize the probability that the dependent variable takes on the value it does given the values of the independent variables. This probabilistic treatment of the independent variables is more in tune with cognitive-cybernetic decision making.

Linear regression techniques coincide more with the comprehensive rational choice model by attempting to find a best solution, or in the case of regression, to find the line which minimizes variance. Probit weighs each of the independent variables (factors or cues to the decision maker) to determine how much each contributes to the probability that the dependent variable (the decision) occurs given the values of the other independent variables. Similarly, the judicial decision maker examines a set of factors in a particular case, each of which contributes to the probability of choosing one response or the other.

Many of the assumptions in probit are similar to those in regression estimation, such as the assumption of a random sample and a data set which contains more cases than the number of independent variables used in the analysis (Aldrich and Nelson 1984:49). In addition, it is assumed that the dependent variable is strictly binary and the outcomes are

mutually exclusive and collectively exhaustive (Aldrich and Nelson 1984:48). Like regression analysis, probit assumes the dependent variable is associated with the cumulative normal probability function (Pindyck and Rubinfeld 1981:281). The error term is assumed to be normal which allows for the determination of the probability of having observed the particular observation value for the dependent variable given the values of the independent variables (Aldrich and Cnudde 1975:580). Based on these assumptions, the estimates have properties similar to those of OLS estimates, namely they are asymptotically unbiased, efficient, and normal (Aldrich and Nelson 1984:80).[3]

At this point one should ask what the implications are if these assumptions are violated. Aldrich and Nelson note that little work has been done if the Gauss-Markov assumptions are not met in probit estimation (1984:81). Nevertheless, the obvious problems with the OLS technique force a consideration of another estimation procedure which more accurately reflects the measurement of the dependent variable and the characteristics of the decisional theory.

Aldrich and Nelson also note that although the assumptions are similar to those of ordinary least squares regression direct analogies are difficult because of the nonlinearity of the estimation procedure (1984:81). Nevertheless, "Robinson (1982) has shown that, when the residuals are serially correlated, maximum likelihood estimates remain unbiased in large samples, but they are not efficient" (Aldrich and Nelson 1984:81). Aldrich and Nelson also note,

> . . . For the general case, exact (small sample) properties of the MLE (unbiasedness, efficiency, normality) cannot be established. But it can be shown that, under conditions typically encountered, those properties hold approximately, with the quality of the approximation improving as the sample size grows. That is, the MLE exhibits the asymptotic (large sample) properties of unbiasedness, efficiency and normality. (1984:53)

One violation which will certainly occur has to do with the randomness of the sample. This violation, however, will not cause a problem. Rather than merely looking at a sample, this research examines an entire population.

Heckman discusses sample selection with respect to models using limited dependent variables. He distinguishes between censored and truncated samples thus:

> In the case of a censored sample, we have access to the larger random sample, but we do not know [the value of the dependent variable] for censored observations. In a truncated sample, we do not have access to any observations from the larger random sample except those for which data on [the value of the dependent variable] is available. (1976:476)

In both types of samples, it is assumed that there is a larger random sample, from which the selected observations are chosen, for which we either do not have access or do not know the value of the dependent variable. Neither of these situations is the case for the search and seizure data. Certainly this population is limited in its scope, both as to subject matter and time period considered, but within the boundaries of the study the data comprise the complete population. Thus the randomness of the "sample" is not a relevant concern (although the completeness of the population

data as well as its generalizability to other areas and time periods will be).[4]

Another desirable property of probit is that the estimates lend themselves to classical hypothesis testing. In particular, t-statistics can be computed for the estimated coefficients to determine their significance. A number of hypotheses to be tested will be whether each of the independent variables contributes significantly to the prediction of the probability of the dependent variable taking on a particular value. The inferences to be drawn from these hypotheses will be that the presence of certain factors will increase or decrease the probability of the Court or individual justices making a particular decision. This is not to say that the presence of these factors causes the Court to make a specific decision. The cognitive-cybernetic model, in examining exceedingly complex probabilistic systems, can only examine the inputs and the outputs and determine if any statistical relationship exists between the two. Researchers may be able to chip away at the Black Box, but for those who may only have access to the inputs and outputs of the Court, this method fulfills the need for a way to classify and explain Supreme Court decision making.

As in regression analysis, the significance of individual independent variables will depend to some extent on the other independent variables included in the model. The reason is the possible collinearity between the independent variables. Having two highly collinear explanatory variables in the model will tend to lessen their statistical significance

because they will be competing to explain the same information.

The significance of the model as a whole will generally indicate whether the specification for the set of factors as a group is correct. This can be tested with the chi-square distribution using the log of the likelihood ratio determined initially and at convergence, with the number of degrees of freedom equal to the number of independent variables plus one for the constant.

Regression analysis also provides an indication of the amount of the variance in the dependent variable that is accounted for by the independent variables: R^2. The use of this statistic has recently been criticized (King 1986:666-687), but used properly it is an acceptable measure of the general goodness of fit of the model. However, the maximum-likelihood nature of probit makes the minimization of variance an inappropriate criterion for measuring goodness-of-fit (Aldrich and Nelson 1984:56).

Maddala (1986) notes R^2 may be computed directly, but the predicted value is a probability, whereas the dependent variable is either 0 or 1. The result is generally low R^2 values (1986:38).

There is, however, a method for estimating the R^2 statistic. This pseudo-R^2 is calculated by finding the value determined by the explained sum of squares, divided by the explained sum of squares plus the number of observations (Aldrich and Nelson 1984:58). The pseudo-R^2 is still an attempt to measure how much variance the model accounts for.

This makes sense when the dependent variable is measured intervally, because we want to know how close the estimated values are to the actual values. One assumption of probit estimation is that there is an underlying unobserved linear variable (Aldrich and Nelson 1984:35-37, 57-58; McKelvey and Zavoina 1975:105). We do not know how close the values of the unobserved theoretical variable are to the observed values of the dichotomous dependent variable, which makes calculation of a pseudo-R^2 of little value.

A more accurate and simpler measure of how close the estimates are to the actual is the correct classification (success) rate. One concern with such a measure is the baseline (Aldrich and Nelson 1984:57). Weisberg (1978) examines such a measure and the concern over the lack of a well-defined baseline. Weisberg indicates that the model on which the baseline is constructed should not be raised to the level of a theory (1978:563), but such baselines are clearly more realistic than those based on naive random models (1978:58-61).

It is also possible to test sets of coefficients using the likelihood values. Suppose the model to be estimated contains a set of dummy indicator variables such as variables to indicate the location where a search and seizure took place. These variables form an exhaustive set of possible locations for a search to take place. It is quite possible that not all of the estimated coefficients for these variables will be statistically significant, but that as a group they will be. To test the statistical significance of a

group of variables we need to calculate

$$c = -2*\log(L2/L1)$$

where L1 is the likelihood value at convergence of the complete and L2 is the likelihood value at convergence for a reestimated model which excludes the group of variables to be tested. The quantity c will follow a chi-square distribution with the number of degrees of freedom equal to the number of variables in the group tested (Aldrich and Nelson 1984:59).

Unfortunately, the interpretation of the estimated coefficients is not as straightforward as in regression estimation. How then are they to be interpreted? First recall that the goal of regression is to minimize the differences between a line and the data points, whereas in probit the procedure attempts to maximize the likelihood that a particular value of the dependent variable will be obtained from the corresponding values of the independent variables. The function which describes this process is called the likelihood function. To maximize this function is the same as maximizing the log of this function (Aldrich and Nelson 1984:52). Contained in this function are the K coefficients which we are trying to estimate. To solve for these coefficients we next take the derivative of the log likelihood functions with respect to each of these coefficients. We are left with a system of K equations and K unknowns. By setting each equation equal to zero we can solve the system, and the solution set is the set of maximum likelihood estimators (MLEs) (Aldrich and Nelson 1984:51-52).

In probit, the coefficients represent the change in the

cumulative normal probability function caused by a unit change in the independent variable. Thus, the probability distribution resulting from the model may be represented as

$$P = F(b_0 + b_iX_i) = F(Z_i)$$

where P is the probability distribution, F is a cumulative probability function, and X is stochastic (Pindyck and Rubinfeld 1981:280). It is thus difficult to determine how a unit change in a particular independent variable will affect the probability of observing a value of the dependent variable without knowing the values of all the other independent variables. However, by computing the predicted value of the estimation we may determine the cumulative probability of a "1" for the dependent variable by looking up this value for the predicted value in a cumulative normal probability table. Predictions of the values of the dependent variable can then be determined by setting the predicted value equal to the actual value if the probability of the actual value is greater than or equal to fifty per cent.

To interpret these estimated coefficients we must first have an idea of what the probability of the dependent variable taking on a particular value is. Suppose the estimated coefficient for the independent variable X1 (a dichotomous 0/1 variable) is equal to 1.00. Suppose also that the particular values of the other independent variables indicate that there is a .50 probability that the value of the dependent variable will be equal to 1. This .50 probability means that the sum of the other independent variables multiplied by their estimated coefficients is zero. We can see this from a

cumulative normal distribution table. If the z value is 0.00, the dependent variable has a .50 probability of assuming either of its two values (1 or 0). Since the coefficient of X1 is 1.00, if the variable measured by X1 is present, the probability of the dependent variable having a value of 1 increases by 1.00 standard deviation and the probability rises to .84, an increase of 68%. If the probability for finding the dependent variable to have a value of 1 had been .84 (z = 1.0), the increase would have been to .98, an increase of only 17%.

Two points should be made regarding this difference in the effect caused by the same variable. First, this clearly points out the fact that a determination of the effect a unit change in any given independent variable causes requires knowledge of the values of each of the other independent variables. Second, we see that the probabilities are indeed bounded between 0 and 1, which is one of the advantages probit and other maximum-likelihood estimation techniques have over regression estimation when a dichotomous dependent variable is present (see Pindyck and Rubinfeld 1981:277).

Chapter 4. Results and Analysis

This chapter presents and discusses the results of the probit estimation using the variables operationalized in Chapter 3. The dependent variable is the decision of the judicial decision maker. As previously noted, two judicial decision makers will be examined: the individual justices and the Court. The first section will present and discuss the results of the probit estimation when the votes of the individual justices are used as the dependent variable. The estimated votes of the justices will be aggregated to determine an estimated decision of the Court. The second section will estimate the decisions of the Court as the judicial decision maker.

A. The Individual Justices

The 204 searches or seizures ruled on by the Court resulted in 1775 votes cast for or against reasonableness by the individual justices.[1] Each vote cast by each justice in the 204 decisions is counted as an observation.

The model estimated contains eleven independent variables plus a constant term.[2] The results of the probit estimation are presented in Table 1. The dependent variable, the votes of the individual justices, is labeled VOTE. The distribution of VOTE is quite even (44.96% unreasonable, 55.04% reasonable). This is desirable because a large imbalance makes estimation more difficult. One adjustment which must be made when the distribution is not evenly split involves the log

Table 1

Probit estimation of individual justices' votes.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	0.61	0.11	5.53
HOME	-0.78	0.11	-7.21***
BUSINESS	-0.64	0.12	-5.20***
PROPERTY	-0.61	0.14	-4.37***
CAR	-0.17	0.12	-1.36
PERSON	-0.54	0.12	-4.58***
CONTROL	-0.20	0.07	-2.81**
CUSTODY	-0.34	0.08	-4.17***
TIME	0.25	0.07	3.66***
DRUG/GUN	0.24	0.07	3.31***
SEVERE	-0.41	0.20	-2.01*
US	0.23	0.07	3.52***

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-1156.97	-1230.34	-1221.30
N	1775		

CROSSTABLULATION OF VOTE BY CLASSIFICATION

		CLASSIFICATION		
VOTE	COUNT / ROW PCT	-1	1	ROW TOTAL
	-1	409	389	798
		51.3	48.7	45.0
	1	284	693	977
		29.1	70.9	55.0
	COLUMN TOTAL	693	1082	1775
		39.0	61.0	100.0

Percent Correctly Classified	62.08
Percent in Modal Category	55.04
ROE (%)	15.66
-2*LLR (chi-square w/12 d.f. (using adjusted value)	128.66***

*Significant at .025
**Significant at .005
***Significant at .001

likelihood values used to calculate the significance of the model.

The farther the distribution of the dependent variable moves from a 50/50 split, the better the constant, as the sole independent variable, does at classifying the dependent variable. It is necessary to account for this factor when testing the significance of the model. This is done by first estimating the dependent variable with the constant as the only independent variable. The log likelihood value at convergence for this estimation is then used instead of the log likelihood initial value in the formula

$$c = -2(llr0 - llr1)$$

where llr0 is the initial log likelihood value, llr1 is the log likelihood value at convergence, and c is a quantity which follows a chi-square distribution with the degrees of freedom equal to the number of constraints imposed (Aldrich and Nelson 1984:59). The log likelihood value obtained from estimation of the constant alone is called the adjusted log likelihood value. For this model,

$$c = -2((-1221.30) - (-1156.97)) = 128.66$$

From a chi-square distribution table, we find that for 12 degrees of freedom (11 independent variables plus the constant) this value is significant to the $p < .001$ level, indicating a very small likelihood that the results occurred by chance.

Three values follow each of the independent variables. The first is the estimated coefficient. Interpretation of these estimated coefficients is not as straightforward as

with regression analysis. The variable HOME has the coefficient with the largest absolute value. This means that it will have the largest influence on the estimated probability that the dependent variable takes on its highest value (=1). This influence is somewhat relative, however, and depends on the values of the other variables. The example provided in Chapter 3 bears repeating using the estimated coefficients of the model. Suppose the values of all the other variables in the model (including the constant) are each multiplied by their estimated coefficients and then added together. The sum is a Z-score for which the cumulative normal distribution table may be consulted to determine the estimated probability that the dependent variable will take on its highest value. If this sum is negative, it indicates that it is more likely the dependent variable will take on its lowest value (=-1). If the sum is positive, it is more likely the dependent variable will take on its highest value. If the sum is zero, there is a 50% chance the dependent variable will take on either of its two possible values. Suppose this sum is zero in our example, indicating a 50% probability VOTE takes on either of its two values. If the location of the search was the suspect's home the variable HOME is coded 1, and we would have

$$0.0 + 1*(-0.78) = -0.78$$

From the cumulative normal distribution table the Z-score -0.78 indicates p = .22 that VOTE = 1, or, alternatively, that there is a 78% probability that the search or seizure was unreasonable (VOTE = -1). Suppose, however, that the

sum of the other variable values multiplied by their estimated coefficients is 2.0, indicating a 98% probability that VOTE = 1, then

$$2.0 + 1*(-0.78) = 2.0 - 0.78 = 1.22$$

From the cumulative normal distribution table we see this Z-score indicates a 89% probability that the search or seizure was reasonable (VOTE = 1). The size of the estimated coefficient for the variable HOME is the same, but its impact changes relative to the values of the other variables.

All of the estimated coefficients are in the correct direction. HOME, BUSINESS, PROPERTY, CAR, PERSON, CONTROL CUSTODY, and SEVERE all have negative estimated coefficients indicating a decrease in the likelihood that the search or seizure will be considered reasonable. TIME, DRUG/GUN, and US all have positive coefficients indicating an increase in the probability that the search or seizure was deemed reasonable.

The three largest estimated coefficients (in absolute value) are for the variables HOME, BUSINESS, and PROPERTY. This is not surprising given the importance of location with respect to the goals and origins of the Fourth Amendment. Although PROPERTY does not share the same levels of permanence and privacy as HOME and BUSINESS, the control factor of Hypothesis 2 helps to increase the explanatory power of this variable.

The estimated coefficient for PERSON is slightly smaller than those of BUSINESS or PROPERTY. A lower coefficient for PERSON is expected given the highly mobile nature of people.

On the other hand, the social and legal customs of this country protect individuals from unsolicited invasions of their persons. Offensive touching may be the basis of civil and/or criminal sanctions (provided other legal requirements are satisfied). In the case of PERSON, the privacy factor weighs more heavily than the permanence factor and the balance favors greater protection of the accused.

The estimated coefficient for the final location variable, CAR, is much smaller (in absolute value) than any of the other location variables. Like people, cars are highly mobile. They can also move much more quickly, and can be moved by people other than the suspect. Unlike individuals, cars are not accorded special protection based on privacy concerns. There are two primary reasons for this. First, since cars were not in existence at the time the Constitution was drafted they do not enjoy the same amount of Constitutional concern that is afforded to homes and persons. Certainly the modes of transportation existing during the late 1700's were given some protection, which, by analogy, may be extended to modern automotive transportation. Nevertheless, fundamental differences exist. One of these differences is the second reason cars are considered less private, namely, the government already has its foot in the door (so to speak). Cars must be licensed by the state when they are purchased, drivers must also obtain a license to legally operate a car on public roads, many states also require the cars to be insured, and cars are generally operated on public roads. Operation of a car is seen as a privilege rather than

a right. Certainly one does not forfeit all privacy interests when operating a car, but they are certainly of lesser importance than in other locations, and the estimated coefficients provide empirical support for this point.

All the estimated coefficients for the location variables have standard errors of approximately the same size. Thus, the differences in the t-statistics are due primarily to the size of the estimated coefficients. HOME, BUSINESS, PROPERTY, and PERSON reach acceptable levels of significance, while CAR does not. Nevertheless, as a group the location variables reach the $p < .001$ level of significance. This is determined from the formula

$$c = -2*\log(L2/L1) = -2*(llr2 - llr1)$$

where llr1 is the log likelihood value at convergence of the model estimated with the group of variables to be tested, llr2 is the log likelihood value at convergence of the model without the group of variables, and c is a quantity which follows a chi-square distribution with the degrees of freedom equal to the number of variables in the group tested (Aldrich and Nelson 1984:59). For the location variables the values are

$$c = -2*((-1196.03) - (-1156.97)) = 78.12$$

with five degrees of freedom. Even though the estimated coefficient for CAR does not reach an acceptable level of significance it is part of a mutually exclusive and exhaustive choice set which does provide a high degree of explanatory power.

SEVERE has the largest estimated coefficient of the

nonlocation variables, fifth overall (-0.41). Government actions which "shock the conscience" tip the balance in favor of the individual's rights over one-half of a standard deviation on the cumulative normal distribution. Despite this large estimated coefficient, the impact of SEVERE on the data set is small since it was only coded as present in five of the search and seizure decisions. This is reflected in the size of the estimated coefficient's standard error (.20) which is the largest of all the variables, and the corresponding t-statistic (-2.01) which is smaller than the t-statistic for any of the other variables except CAR.

The sixth largest estimated coefficient is for the variable CUSTODY. CUSTODY relates to the control factor of Hypothesis 2 and the severity factor of Hypothesis 5. When the suspect is under government control it is less likely he or she will be able to remove or destroy evidence. This is also true with respect to the variable CONTROL which is also drawn from the control factor of Hypothesis 2. CONTROL is a separate measure of whether the government has control over the area of the search. Government curtailment of the suspect's personal freedom is seen as more severe, and thus more worthy of protection than the curtailment of property rights involved in the search location. This additional severity factor adds to the explanatory power of CUSTODY. Both the severity and control factors tip the balance toward requiring a stricter adherence to the probable cause and warrant requirements.

The three variables with positive estimated coefficients

(DRUG/GUN, TIME, and US) all have estimated coefficients of nearly the same magnitude. As with SEVERE, DRUG/GUN also relates to a form of severity, but from the point of view of the suspect's actions. Illegal drugs and guns are items considered dangerous not only to the suspect and government officials but to society as well. When these kinds of items are the fruit of the search, the balance moves toward the protection of society and Fourth Amendment requirements are loosened.

US and TIME are the two remaining variables with positive estimated coefficients. From a legal point of view neither of these two variables should be of any relevance to the decision. To say that the probable cause and warrant requirements are not as strict when time is short seems tantamount to saying the requirements are not as important if the government does not have an opportunity to meet them. However, the question is one of disadvantage. If strict adherence to the requirements puts the government at a serious disadvantage due to the time element involved, the balance will move toward effective law enforcement and a relaxation of the requirements. It should be noted that the Court will not allow this relaxation if the government, through its own actions, causes this disadvantage.

Similarly, whether the case comes from state or federal court is not a valid legal reason for reaching a decision. Nevertheless, conventional wisdom holds that the Court has a tendency to take cases it plans to reverse. A corollary to this bit of wisdom is that the Court is more likely to

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reverse state cases and affirm federal ones. There is a slight positive relationship between affirmance and federal cases, but it is not sufficient to support the conventional wisdom.

The conventional wisdom is not supported, but neither is it refuted. Alternative explanations to the conventional wisdom are noted in Chapter 2. In addition to noting the past history of civil rights infractions by states and the fact the Court is part of the federal government, federal law enforcement officials may be viewed as more professional than their state counterparts. This does not necessarily imply that state officials are incompetent; rather, that they may simply not have the training, expertise, and resources necessary to consistently meet the requirements of the Fourth Amendment. If federal officials are perceived as more professional, failure to meet the probable cause and warrant requirements may not be seen as the result of their own shortcomings, but rather, because they were put at a disadvantage. Thus, the balance swings in favor of law enforcement.

Of the 11 independent variables in the model, 10 reach acceptable levels of significance. Only the estimated coefficient for CAR did not reach an acceptable level of significance,[3] and this result is expected given the nature of this particular location with regard to the permanence and privacy factors important to the location choice set.

The estimated coefficient for SEVERE has the next smallest (in absolute value) t-statistic, due in part to the small

number of instances in which the variable appeared. Hypothesis 5, from which SEVERE is derived, is also supported by the significance and explanatory power of the variable CUSTODY which also indicates a level of severity in the government's actions. The choice set of location variables proves to be significant as a group, and the individual significance levels of HOME, BUSINESS, PROPERTY, and PERSON support the permanence and privacy factors of Hypothesis 1 and the control factor of Hypothesis 2. Thus, all of Hypotheses 1 through 6 find support in this model.

The model as a whole also proves to be highly significant. In addition to statistical significance we must see how well the model does at correctly classifying the dependent variable VOTE. This information is also found in Table 1. Overall, the model correctly classifies 62.1% of the Court's decisions (1102 of 1775). The reduction of error (ROE) for the model is 15.7%.[4]

The crosstabulation of VOTE by CLASSIFICATION (the classification of each justice's vote based on the estimation of the model) reveals that the model does very well in correctly classifying the votes where the justices found the search or seizure to be reasonable (VOTE = 1). The model correctly classifies 693 of the 977 (70.9%) votes in favor of reasonableness. The model does less well with the votes cast in favor of unreasonableness, correctly classifying 409 of 798 (51.3%) votes.

Examination of the misclassified decisions does not reveal any systematic characteristics which account for the

errors,[5] especially with respect to the searches or seizures considered unreasonable.[6] No large groups of decisions have the same estimated probability or lie near the decisional cutoff point of the classification rule.[7]

A run test and test for randomness (see Freund 1971:352-354; Hogg and Tanis 1983:397-400; Wald and Wolfowitz 1940; Freidman and Rafsky 1979) was applied to the results of the probit estimation. Using the estimated probabilities (PHAT values) of the correctly and incorrectly classified votes as the scale on which the two variables to be compared are ordered, the number of runs is 739. This number yields a z-score well outside the critical region for testing the assumption that the distributions of the correctly and incorrectly classified votes are equal (Hogg and Tanis 1983:399).

This result is due to the nature of the observations. The independent variables are measured objectively, i.e., with only a few exceptions the coding is not dependent on the assertions of the justices (see the Operationalization section of Chapter 3). In the vast majority of the Court's decisions the independent variables will be coded identically for all the voting justices. In nonunanimous decisions (160 of 204) this results in two runs per decision; one for successful classifications , one for unsuccessful classifications. Adding the unanimous decisions (44 of 204) and the exceptions in the coding (less than 20) brings the total to less than 400 runs where the approximated mean is over 800 (Hogg and Tanis 1983:399).

The additional number of runs observed, 739, is a product

of the ordering mechanism of the statistical package. The method of coding the independent variables and the dichotomous nature of the dependent variable produces many more tied ranks than would ordinarily be expected. To break these tied ranks additional variables must be examined. Unless otherwise specified, the next variable in the variable list is used to break tied ranks. If tied ranks remain, the next variable is examined, and so on, until no tied ranks remain. Of course, these variables can be specified, unfortunately, no other variable is appropriate for this purpose.[8]

Despite the apparent lack of randomness, this result does not indicate a systematic error. The result is an artifact of the decisional environment in which the justices operate.

As noted in the Operationalization section of Chapter 3, it is the decision of the Court which wields the Constitutional gavel. The next step must be to aggregate the estimated classifications of the votes of the individual justices into estimated classifications of the decisions of the Court. The aggregation of the votes of the individual justices is compared to the actual decisions of the Court in Table 2.

The percentage of correctly classified decisions based on the aggregation is larger for both reasonable (DECISION = 1) and unreasonable (DECISION = 0) searches and seizures. The increase is dramatic for the searches and seizures considered unreasonable by the Court, where the percent correctly classified rises by 14.0%. The correctly classified decisions where the Court found the search or seizure to be reasonable increased to 75.0%. The overall success rate of 71.6%

Table 2

Aggregation of estimated individual justices' votes.

CROSSTABLULATION OF DECISION BY CLASSIFICATION

DECISION	CLASSIFICATION		ROW TOTAL
COUNT / ROW PCT	0	1	
0	47	25	72
	65.3	34.7	35.3
1	33	99	132
	25.0	75.0	64.7
COLUMN TOTAL	80	124	204
	39.2	60.8	100.0

Percent Correctly Classified 71.57
Percent in Modal Category 64.71
ROE (%) 19.44

represents an increase of 9.5% over the votes of the individual justices. The increase of the overall success rate is tempered somewhat by the corresponding increase in the imbalance of the Court's decisions by 9.7%. Despite this increased imbalance ROE increases to 19.44%.[9]

An additional point needs to be mentioned with regard to the relationship between individual and aggregated results. In theory, it is possible to correctly classify 100% of the Court's decisions (either by examining the decisions directly as the next section will do, or in aggregating the estimated classifications of the votes of the individual justices). The same is not true for the votes of the individual justices. The independent variables are coded objectively.

With very few exceptions, the coding of the independent variables is the same for all the justices who participated in a particular decision. Thus, for any decision, the maximum number of correct classifications is equal to the number of justices in the majority. Of the 1775 individual votes cast in this data set, 437 were cast in dissent. Ignoring for the moment the 20 or so codings which were tailored to specific justices, this number of dissents limits the possible number of correct classifications to 1338 (75.38%).

There are two immediate implications to this result. First, in light of the maximum placed on the possible number of correct classifications of the votes of the individual justices, the correct classification rate of 62.08% reported in Table 1 appears more successful. On the other hand, it would be possible to incorrectly classify all of the Court's 5-4 decisions and still correctly classify 44.44% of the individual votes. Second, the limits on the number of correct classifications for the votes of the individual justices raises questions as to the appropriateness of using the individual votes as the dependent variable. This point will be discussed in greater detail in the next chapter.[10]

To summarize, the results support the estimated model. The estimated coefficients for the independent variables drawn from the hypotheses are all in the correct direction, and all but one reach acceptable levels of significance. The entire model as well as the location choice set also reach acceptable levels of significance. Attainment of these levels of significance indicate a very small probability that

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Aggregation of the estimated votes of the justices results in a reduction of error of 19.44% by correctly classifying 146 of 204 (71.6%) decisions by the Court. The next step is to compare these results with those obtained by using the model to estimate the decisions of the Court rather than the votes of the individual justices.

B. The Court

Turning now to an examination of the Court as the judicial decision maker, Table 3 presents the results of the multivariate probit estimation. The decision of the Court is the dependent variable. As can seen be from the table, DECISION is heavily weighted toward decisions of reasonableness. As previously noted, this imbalance in the distribution of the dependent variable makes estimation somewhat more difficult. The greater imbalance in the distribution of the Court's decisions results in a larger adjustment even though the log likelihood values are much smaller.

Using the adjusted log likelihood value in the formula to test the significance of the model we have,

$$c = -2((-132.45) - (-107.48)) = 49.94$$

From a chi-square distribution table, we find that for 12 degrees of freedom (11 independent variables plus the constant) this value is significant at the $p < .001$ level, indicating a very small likelihood that the results occurred by chance.

Once again, all of the estimated coefficients for the

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Table 3

Probit estimation of Court's decisions.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	1.22	0.43	2.84
HOME	-1.55	0.42	-3.68****
BUSINESS	-1.20	0.46	-2.62***
PROPERTY	-1.15	0.50	-2.30*
CAR	-0.30	0.46	-0.65
PERSON	-0.64	0.44	-1.46
CONTROL	-0.47	0.23	-2.00*
CUSTODY	-0.69	0.27	-2.54**
TIME	0.45	0.22	2.01*
DRUG/GUN	0.64	0.24	2.65***
SEVERE	-0.94	0.64	-1.47
US	0.60	0.22	2.79***

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-107.48	-141.40	-132.45
N	204		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

		CLASSIFICATION		
	COUNT / ROW PCT	0	1	ROW TOTAL
DECISION	0	33	39	72
		45.8	54.2	35.3
	1	17	115	132
		12.9	87.1	64.7
	COLUMN TOTAL	50	154	204
		24.5	75.5	100.0

Percent Correctly Classified	72.55
Percent in Modal Category	64.71
ROE (%)	22.21
-2*LLR (chi-square w/12 d.f. (using adjusted value)	49.94****

*Significant at .025
**Significant at .01
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independent variables are in the correct direction. A number of differences appear between the two estimations. In estimating the decisions of the Court, the estimated coefficients tend to be larger. The standard errors of these estimated coefficients are also larger owing to the smaller number of observations in the data set. The result is an overall decrease in the size of the t-statistics associated with these estimated coefficients.

As in the estimation of the votes of the justices, the three largest estimated coefficients (in absolute value) are for the variables HOME, BUSINESS, and PROPERTY. As expected, the estimated coefficients for these three variables all reach acceptable levels of significance. The estimated coefficient for CAR again fails to reach a minimally acceptable level of significance.

Unlike the previous estimation, the estimated coefficient for PERSON fails to reach a minimally acceptable level of significance ($p < .08$). The estimated coefficient for PERSON is much lower than those for HOME, BUSINESS, and PROPERTY. The explanation for this reduction lies in the difference between examining votes versus decisions. The increase in the imbalance of the dependent variable toward reasonableness is an indication that a higher percentage of the votes cast for the unreasonableness of a search or seizure are done so in dissent. Of the 798 votes cast for unreasonableness by the justices, 304 of them (38.1%) were in decisions in favor of reasonableness. By comparison, only 135 of 977 (13.8%) votes in favor of reasonableness were cast in decisions which

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found the search or seizure to be unreasonable. Unfortunately for the suspect whose person is searched, the justices who give greater protection to this location are being outvoted by those who do not.

Despite the failure of the estimated coefficients for CAR and PERSON to reach acceptable levels of significance, as a group the location variables reach the $p < .001$ level of significance.

$$c = -2*((-121.16) - (-107.48)) = 27.36$$

with five degrees of freedom. Even though CAR and PERSON do not reach acceptable levels of significance they are part of a mutually exclusive and exhaustive choice set which does prove to be important.

SEVERE has the fourth largest estimated coefficient (-0.94). Despite this large estimated coefficient, the impact of SEVERE on the data set is small since it was only coded as present in five of the observations. This is reflected in the size of the estimated coefficient's standard error (.64) which is the largest of all the variables, and the corresponding t-statistic (-1.47) which fails to reach an acceptable level of significance. SEVERE is the only variable, other than CAR and PERSON whose estimated coefficient fails to reach an acceptable level of significance in this estimation.

Of the three variables with positive estimated coefficients, DRUG/GUN's is the largest. The estimated coefficient for TIME decreases sharply relative to DRUG/GUN and US.

Of the 11 independent variables in the model, eight

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reach acceptable levels of significance. Two of the three which did not, CAR and PERSON, were not expected to have a high degree of explanatory power, but were included as part of the location choice set. Only the variable SEVERE failed to reach the expected level of significance, due in part to the small number of instances in which the variable appeared. Hypothesis 5, from which SEVERE is derived, is not left entirely unsupported due to the significance and explanatory power of the variable CUSTODY which also indicates a level of severity in the government's actions. The choice set of location variables proves to be significant as a group, but the individual significance levels of HOME, BUSINESS, and PROPERTY support the permanence and privacy factors of Hypothesis 1 and the control factor of Hypothesis 2. Thus, all of Hypotheses 1 through 6 again find support in this situational and case characteristic model.

The model as a whole also proves to be highly significant, even after adjusting for the imbalance in the dependent variable. In addition to statistical significance we must see how well the model does at correctly classifying the dependent variable DECISION. This information is found in Table 3. Overall, the model correctly classifies 72.5% of the Court's decisions (148 of 204).

The crosstabulation of DECISION by CLASSIFICATION (the classification of each decision based on the estimation of the model) reveals that the model does exceptionally well in correctly classifying the decisions where the Court found the search or seizure to be reasonable (DECISION = 1). The model

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correctly classifies 115 of the 132 (87.1%) reasonable searches or seizures. The model does less well with the unreasonable searches or seizures, correctly classifying 33 of 72 (45.8%) decisions.

The increased correct classification rate for reasonable searches and seizures and the decreased rate for unreasonable ones, to some extent, reflects the increased imbalance in the dependent variable. When the modal category has a very high percentage it generally becomes easier to classify observations into the modal category and more difficult to classify observations into the nonmodal category. Other factors may also affect the classification rate, such as the inclusion of irrelevant variables or failure to include important ones. As with the estimation of the votes of the justices, examination of the misclassified decisions does not reveal any systematic characteristics which account for the errors, especially with respect to the searches or seizures considered unreasonable. No large groups of decisions have the same estimated probability or lie near the decisional cutoff point of the classification rule.

A measure which aids in residual examination is the probability fit (PF). Like the runs test, PF can be used to compare two variables to see if they are from the same population. Unlike the runs test, PF is not dependent on a specific ordering of the variables, an important consideration when examining judicial decision making.

PF is based on the value PHAT, which is the estimated probability the dichotomous dependent variable takes on its

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high value. When, in fact, the dependent variable takes on the high value, PF = PHAT. When the dependent variable takes on the low value, PF = 1 -PHAT (i.e., the probability the observation takes on the low value). This formulation puts the estimated probabilities of both values of the dependent variable on one scale which allows an examination of how well the model does in classifying all the observations. Table 4 contains a summary of PF for this estimation.

The first line of Table 4 shows the PF information for the entire data set. For the combined scale (reasonable and unreasonable decisions), the PF value indicates the probability estimated by the model that the observation takes on its actual value. Values of .5 and above indicate a correct classification. The mean value of .646 for the entire data

Table 4

Probability fit for estimation of Court's decisions.

	N	Mean	Minimum	Maximum	Standard Deviation
PF	204	0.646	0.027	0.993	0.224
PF_s	148	0.755	0.501	0.993	0.142
PF_f	56	0.358	0.027	0.499	0.123

set shows the general success of the model. The minimum (.027) and maximum (.993) values indicate the PF values for the least and most successful classifications.[11] The standard deviation of the PF values gives an additional indication of

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the model's success. The greater the number of standard deviations the mean value is from the cutoff point (.5), the more successful the model is in accounting for the variance in the dependent variable. For this model, the mean of the PF value is less than one standard deviation from the cutoff point. The model is successful and all but three of the variables reach minimally acceptable levels of significance, but not all the variation in DECISION has been accounted for.

It is useful to examine the PF values while controlling for the correctness of the classification. We want correct classifications to be clear and unambiguous; i.e., we want the PF value to be as far from the cutoff point as possible. On the other hand, we want incorrect classifications to be as close to the cutoff point as possible, suggesting the possibility that these observations could be correctly classified if some as yet undiscovered factor could be identified and measured.[12]

The second line of Table 4 gives the PF information for the correctly classified observations (PF_s). As should be expected, the mean value of .755 is higher than the combined mean value.[13] When the model correctly classifies an observation it does so with a good deal of confidence. This is supported by the size of the standard deviation (.142). The mean PF_s value is 1.80 standard deviations from the cutoff point indicating the high degree of confidence in the correct classifications.

The third line of Table 4 shows the PF values for the incorrectly classified observations (PF_f). By definition,

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this value is less than .5 and here it is 1.15 standard deviations from the cutoff point, indicating that we should have somewhat less confidence in these classifications (in relation to the correct classifications). Although these misclassifications can be considered misses or failures, we may take solace in the fact that exactly half of the misses (28 of 56) have PF values within .10 of the cutoff point. If these "near misses" are considered minor aberrations in the rulings of the Court or measurement of the variables and are added to the correct classifications, the model's success rate rises to 86.3% (176 of 204) with a corresponding increase in ROE to 61.1%.

Two caveats must be noted in the use of PF. First, as Aldrich and Nelson (1984:57) suggest, one may be tempted to consider a PF value of .499 as "more correct" or "closer" than a PF value of .222 (both values would yield incorrect classifications). It should be remembered that the actual value of the theoretical variable is unobserved (Hanushek and Jackson 1977:204). Because the underlying values are unknown, accurate assertions about the "closeness" of an incorrect classification are inappropriate. However, observations close to the decisional cutoff point deserve careful examination to determine whether minor adjustments in the specification of the model will cause the observations to achieve the desired PF values.

Second, when examining PF_s and PF_f values one must remember that the distributions are truncated. Examination of these truncated distributions must proceed in conjunction

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Examination of the PF values from this estimation does not reveal any obvious errors which can be corrected to improve the classification rate of the model. We must look elsewhere for a means of improving the performance of the model.

One adjustment which can be made is a reduction in the location choice set. As indicated in Chapter 2, the variables HOME, BUSINESS, and PROPERTY are the best indicators of the privacy and permanence factors of Hypothesis 1 and the control factor of Hypothesis 2. This is borne out by the results presented in Table 3. The variables CAR and PERSON do not have a high degree of explanatory power with respect to the decisions of the Court. Elimination of these latter two variables from the model allows for a more accurate testing of the relevant factors, and provides a higher degree of parsimony in the model to be estimated. A reduced location choice set also adds to the simplicity of the model and lessens the cognitive demands on the decision maker. The resultant location choice set remains mutually exclusive and exhaustive. The absence of all of the three main location variables (HOME, BUSINESS, and PROPERTY) now indicates that the search or seizure took place in some "other" location or the Court declared the suspect had no property interest in the location. The results of the probit estimation for this reduced location choice set model are presented in Table 5.

Comparing the results of Table 3 with those of Table 5, we can see a general reduction in the size of the estimated

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Table 5

Probit estimation of reduced location choice set model.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	0.86	0.29	2.94
HOME	-1.17	0.25	-4.69****
BUSINESS	-0.84	0.32	-2.58***
PROPERTY	-0.78	0.36	-2.19**
CONTROL	-0.44	0.23	-1.93*
CUSTODY	-0.68	0.26	-2.58***
TIME	0.42	0.22	1.90*
DRUG/GUN	0.60	0.24	2.51**
SEVERE	-0.93	0.64	-1.45
US	0.59	0.21	2.79***

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-108.68	-141.40	-132.45
N	204		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

		CLASSIFICATION		
	COUNT / ROW PCT	0	1	ROW TOTAL
DECISION	0	35	37	72
		48.6	51.4	35.3
	1	14	118	132
		10.6	89.4	64.7
	COLUMN TOTAL	49	155	204
		24.0	76.0	100.0

Percent Correctly Classified	75.00
Percent in Modal Category	64.71
ROE (%)	29.16
-2*LLR (chi-square w/10 d.f.) (using adjusted value)	47.54****

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coefficients. The largest decreases are in the location variables (HOME, BUSINESS, and PROPERTY). These decreases are accompanied by decreases in the standard errors for their estimated coefficients, resulting in only minor changes in the t-statistics. The one exception is the t-statistic for the variable HOME which increases (in absolute value) by over one full point to -4.69.

The ordering of the location variables remains the same as in the larger model, with HOME having the largest estimated coefficient, BUSINESS a somewhat distant second, and PROPERTY a close third. A test of the significance of the smaller location choice set yields a chi-squared value of 24.96 with three degrees of freedom which maintains the level of the larger location choice set ($p < .001$).

The estimated coefficient for SEVERITY now has the second largest estimated coefficient for all the variables, but it still has the largest standard error, and thus, is the only variable in the model which does not reach a minimally acceptable level of significance.

The log likelihood value at convergence rises (in absolute value) slightly to -108.68, but the model remains highly significant ($p < .001$). Of more interest is the classification rate for this model. Five additional decisions are correctly classified by this reduced location choice set model. Three additional decisions are correctly classified where the Court found the search or seizure to be reasonable. This raises the percentage correctly classified in this category to 89.4% (118 of 132). Two additional decisions are

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correctly classified where the Court found the search or seizure to be unreasonable, increasing the percent correctly classified in this category to 48.6% (35 of 72), just one short of an even split. These five additional correct classifications raise the overall percent correctly classified to 75.0% (153 of 204), with a corresponding increase in ROE to 29.16%.

The PF values do not show any appreciable change in the reduced location choice set model.

A second adjustment of the model yields some interesting results. A new variable, LEDCITE, is added to create the third version of this model. LEDCITE is simply the citation of the Court's decision in the United States Supreme Court Reports, Lawyers' Edition, 2d. The values for LEDCITE are essentially continuous, with the volume number coded as a whole number and the page number as a four digit decimal. Thus, the citation to volume 46 page 209 is coded as the value 46.0209. LEDCITE ranges from a low of 6.1127 to a high of 97.0709. If the decision was of a secondary case, the citation is to the lead case. The results of this third model are presented in Table 6.

The estimated coefficient for LEDCITE is quite small, .02, which would have a maximum impact on the value PHAT of only .008 (when all the other variables multiplied by their estimated coefficients sum to zero). However, the cumulative impact of LEDCITE becomes quite large. The difference in its impact between the first and last decisions in the data set has a Z-score of 1.82, increasing the probability that the

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Table 6

Probit estimation of reduced location choice set model with LEDCITE.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	0.22	0.35	0.63
LEDCITE	0.02	0.005	3.64****
HOME	-1.19	0.26	-4.60****
BUSINESS	-0.99	0.34	-2.89***
PROPERTY	-1.21	0.39	-3.11****
CONTROL	-0.41	0.23	-1.80*
CUSTODY	-0.79	0.28	-2.86***
TIME	0.35	0.23	1.54
DRUG/GUN	0.48	0.25	1.96**
SEVERE	-1.51	0.66	-2.31**
US	0.71	0.23	3.14****

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-101.64	-141.40	-132.45
N	204		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

		CLASSIFICATION		
DECISION	COUNT / ROW PCT	0	1	ROW TOTAL
	0	42	30	72
		58.3	41.7	35.3
	1	14	118	132
		10.6	89.4	64.7
	COLUMN TOTAL	56 27.5	148 72.5	204 100.0

Percent Correctly Classified	78.43
Percent in Modal Category	64.71
ROE (%)	38.88
-2*LLR (chi-square w/11 d.f.) (using adjusted value)	47.54****

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last decision was in favor of reasonableness by as much as .46 (if the other variables multiplied by their estimated coefficients sum to zero). The standard error for LEDCITE is also very small (.005) which produces the second largest (in absolute value) t-statistic of this version of the model (3.64).[14]

With two exceptions, the estimated coefficients of the other variables remain essentially the same. The first exception is the increase (in absolute value) of the estimated coefficient of PROPERTY to -1.21, making it the largest for the location variables, though its standard error is still larger than that of HOME. The second exception is the sharp increase (in absolute value) in the estimated coefficient of SEVERE to -1.51, a 63.3% increase.

The standard error of SEVERE remains the same which pushes the size of the t-statistic to a minimally acceptable level of significance. Unfortunately, the estimated coefficient for TIME drops just enough to lower its t-statistic below a minimally acceptable level of significance ($p < .07$).

LEDCITE also has an impact on the classification rate of the model. Seven additional decisions are correctly classified, and all seven are decisions where the Court found the search or seizure to be unreasonable. The percent correctly classified rises to 58.3% for this category. Though still much lower than the other category, it is a substantial improvement. The overall percent correctly classified rises to 78.43% with a corresponding increase in ROE to 38.88%.

At first glance there does not seem to be any theoretical

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justification for the impact of LEDCITE since it is merely the citation of each decision. However, these citations also correspond to a time element, with the earliest decision occurring in 1961 and the latest in 1987.[15] Most theories of decision making (e.g., Rohde and Spaeth 1976:75-76, Spaeth 1979:119-120), including this one, make the assumption that attitudes are consistent over time. This is especially true in the area of judicial decision making where rulings and opinions must be consistent with previous decisions. The cognitive-cybernetic theory of judicial decision making also makes this assumption as to the consistency of attitudes and opinions, so another explanation must exist.

Of primary importance in modeling cognitive-cybernetic decision making is the existence of a stable decisional environment. Many aspects of judicial decision making meet this requirement of stability, both from an internal (consistency of opinions and attitudes) and an external (judicial rules of procedure) standpoint. In one respect, however, the decisions being estimated are not made in a stable decisional environment.

LEDCITE is measuring a change which occurs during the time period covered by the data set (1961-1987), but which is not being measured by the independent variables. Eight personnel changes occurred on the Court during this period. Table 7 presents evidence as to how LEDCITE may be measuring these personnel changes.

Table 7 is an adaptation of Tables 2 and 3 in Harold Spaeth's Supreme Court Policy Making (1979:133-137). Spaeth

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Table 7

Value systems of U.S. Supreme Court Justices since 1958.

0

1958-1961	F	E	ND
Douglas	+	+	+
Warren	+	+	+
Brennan	+	+	+
Black	+	-	+
Stewart	o	o	o
Clark	-	-	+
Whittaker	-	-	-
Frankfurter	-	-	-
Harlan	-	-	-

1

1962-1965	F	E	ND
Douglas	+	+	+
Warren	+	+	+
Goldberg	+	+	+
Brennan	+	+	+
Black	+	-	+
Stewart	o	o	o
White	o	o	o
Clark	-	-	+
Harlan	-	-	-

2

1965-1967	F	E	ND
Douglas	+	+	+
Warren	+	+	+
Fortas	+	+	+
Brennan	+	+	+
Black	+	-	+
Stewart	o	o	o
White	o	o	o
Clark	-	-	+
Harlan	-	-	-

3

1967-1969	F	E	ND
Douglas	+	+	+
Warren	+	+	+
Fortas	+	+	+
Brennan	+	+	+
Marshall	+	+	+
Black	+	-	+
Stewart	o	o	o
White	o	o	o
Harlan	-	-	-

4

1970-1971	F	E	ND
Douglas	+	+	+
Brennan	+	+	+
Marshall	+	+	+
Black(1970)	+	-	+
Stewart	o	o	o
White	o	o	o
Blackmun	-	-	-
Burger	-	-	-
Harlan(1970)	-	-	-

5

1972-1975	F	E	ND
Douglas	+	+	+
Brennan	+	+	+
Marshall	+	+	+
Stewart	o	o	o
White	o	o	o
Blackmun	-	-	-
Powell	-	-	-
Burger	-	-	-
Rehnquist	-	-	-

6

1975-1981	F	E	ND
Brennan	+	+	+
Marshall	+	+	+
Stevens	o	o	o
Stewart	o	o	o
White	o	o	o
Blackmun	-	-	-
Powell	-	-	-
Burger	-	-	-
Rehnquist	-	-	-

7

1981-1986	F	E	ND
Brennan	+	+	+
Marshall	+	+	+
Stevens	o	o	o
White	o	o	o
Blackmun	-	-	-
Powell	-	-	-
O'Connor	-	-	-
Burger	-	-	-
Rehnquist	-	-	-

8

1986-1987	F	E	ND
Brennan	+	+	+
Marshall	+	+	+
Stevens	o	o	o
White	o	o	o
Blackmun	-	-	-
Powell	-	-	-
O'Connor	-	-	-
Scalia	-	-	-
Rehnquist	-	-	-

Values: F = freedom, E = equality, ND = new dealism
+ = support of value, - = nonsupport of value, o = neutrality to value

Adapted from Harold Spaeth, Supreme Court Policy Making; W.H. Freeman and Company 1979, pages 133-135, Tables 2 and 3.

constructed scale scores for the justices on narrowly defined issues. The scales associated with each other sufficiently that three main values emerged: Freedom, Equality, and New Dealism. Based on his scale scores, each justice was identified as either supporting (+), nonsupporting (-), or neutral to (o) each value.[16] The particular combination of support, nonsupport, or neutrality identifies the value system of a justice. Table 7 lists the value systems of the justices from 1958 through 1987.[17] This information is divided into nine periods, identified by the period number, corresponding to the personnel on the Court at the beginning of the time period covered by the data set and at each subsequent change of personnel. The ordering of the justices in each list is based on the size of their average scale scores for the value Freedom, because the issue area search and seizure is part of this value.

In the initial time period (period = 0) there is an even split between supporters and nonsupporters of Freedom with the neutral Stewart the swing vote (4-1-4). With the first changes in the Court's personnel, nonsupporters Whittaker and Frankfurter are replaced by supporter Goldberg and neutral White giving the supporters an outright majority on Freedom issues (5-2-2). This majority continues after the second change where supporter Fortas replaces supporter Goldberg, and increases to 6-2-1 when nonsupporter Clark is replaced by supporter Marshall.

In the next period (4) this majority is lost when supporters Warren and Fortas are replaced by nonsupporters

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Burger and Blackmun (4-2-3). Further erosion of the supporter's strength occurs in period 5 when supporter Black and nonsupporter Harlan are replaced by nonsupporters Powell and Rehnquist (3-2-4), and in period 6 when supporter Douglas is replaced by neutral Stevens (2-3-4).

The nonsupporters gain a majority in period 7 with the departure of neutral Stewart and the arrival of nonsupporter O'Connor (2-2-5). This majority is maintained in the final period (8) when nonsupporter Scalia replaces nonsupporter Burger.

Except for the initial period (only two decisions in the data set come from this period), the general trend is from support of the value Freedom (periods 1, 2, and 3) to "control" by the neutrals (periods 4, 5, and 6) to nonsupport (periods 7 and 8). As the changes occur in the Court's personnel, the Court becomes less likely to support the value Freedom. In terms of this research, support of the value Freedom indicates a tendency to strike the balance in favor of the rights of the individual ceteris paribus. Nonsupport of the value Freedom indicates a tendency to strike the balance in favor of protection of the public and efficient law enforcement. The small estimated coefficient for LEDCITE and its large cumulative effect measure this change in support due to the changes in personnel on the Court.

Table 8 provides additional evidence these personnel changes on the Court affect the stability of the decisional environment. In the periods where the supporters have a

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Table 8

Comparison of DECISION by group controlling Court.

	CONTROLLING GROUP			
	Supporter Majority	Neutral "Control"	Nonsupporter Majority	
DECISION				
Unreasonable	26 (56.5)	35 (33.3)	11 (20.8)	
Reasonable	20 (43.5)	70 (66.7)	42 (79.2)	
N	46	105	53	= 204

majority (1, 2, and 3) decisions in favor of individual rights (i.e., the search or seizure was deemed unreasonable) outnumber decisions against by 26 to 20 (56.5%). In the periods where no outright majority exists (0, 4, 5, and 6) the percentage of decisions in favor of individual rights drops to 33.3% (35 of 105). In the final periods (7 and 8) where the nonsupporters have a majority, support for individual rights drops to only 20.8% (11 of 53). The fact that changes in the Court's personnel resulted in a somewhat orderly change in the support of the value Freedom is fortuitous in that it allowed LEDCITE to measure the differences.

The important point, however, is that changes in Court personnel change the decisional environment and the likelihood the Court will decide a search or seizure to be reasonable. This finding is inherent in the theory. The

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cognitive-cybernetic theory does not require all decision makers to make the same decision. In the area of search and seizure, the major factors considered by the justices are easily identified; however, numerous minor factors, of interest to only one or two justices, may influence an individual justice's decision, and in turn, the decision of the Court. When personnel changes occur these individual factors also change causing instability in the decisional environment. In addition, decision makers can simply make mistakes due to unknown consequences, limited information, false assumptions, or erroneous perceptions. In examining a large group of decision makers these minor fluctuations and aberrations will tend to even out (Lave and March 1975:135). The Court, however, is a small group with a maximum of only nine members at any one time and the composition of the Court at any point in time may influence its decisions.

The more stable the Court is during the period under observation, the less influence personnel changes will have on the Court's decisions. Tables 9, 10, 11, and 12 make this point clear. These tables present the results of probit estimation using the reduced location choice set model for different time periods.

The period from 1975 to 1985 is one of the most stable in the Court's history, with only one change of personnel occurring: the resignation of Justice Stewart and the appointment of Justice O'Connor in 1981. From Table 7 we can see that this was an important change since it gave the nonsupporters of the value Freedom an outright majority on the Court.

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Table 9

Probit estimation of reduced location choice set model for the period 1975 through 1987.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	1.33	0.50	2.65
HOME	-1.25	0.41	-3.08***
BUSINESS	-0.94	0.51	-1.84*
PROPERTY	-1.22	0.44	-2.76***
CONTROL	-0.57	0.33	-1.74*
CUSTODY	-0.92	0.41	-2.21*
TIME	0.45	0.35	1.30
DRUG/GUN	0.63	0.35	1.82*
SEVERE	-1.27	0.70	-1.80*
US	0.86	0.35	2.45**

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-49.62	-79.02	-66.71
N	114		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

DECISION	CLASSIFICATION 0	1	ROW TOTAL
0	16	15	31
	51.6	48.4	27.2
1	6	77	83
	7.2	92.8	72.8
COLUMN TOTAL	22	92	114
	19.3	80.7	100.0

Percent Correctly Classified	81.58
Percent in Modal Category	72.81
ROE (%)	32.23
-2*LLR (chi-square w/10 d.f.) (using adjusted value)	34.18****

*Significant at .05
**Significant at .01
***Significant at .005
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Chief Justice Burger's resignation in 1986, and the subsequent appointment of Justice Scalia did not have the same impact since both are considered nonsupporters of this value. Assuming that the change from Burger to Scalia was minimal in terms of the variables we are measuring (although the minor factors which influence these justices will undoubtedly vary), the period from 1975 to 1987 has only one significant personnel change. Table 9 presents the results of a probit estimation for this time period using the reduced location choice set model.

Roughly 56% (114 of 204) of the decisions in the data set occur during this period. All but one of the independent variable reach minimally acceptable levels of significance, but the levels are somewhat lower than for the full data set (see Table 5). The magnitude of the coefficients is generally larger for this estimation, but the standard errors are also larger. The larger standard errors are due in part to the smaller number of observations in this data set.

For this period, the model correctly classifies 16 of the 31 (51.6%) searches or seizures considered unreasonable. This represents a slight increase over the 48.6% of the full data set. An increase is also made in the classification of the reasonable searches or seizures where 77 of 83 (92.8%) are correctly classified, as opposed to 89.4% for the full data set. This represents a combined increase of 6.6% in the percentage of decisions correctly classified. It should also be noted that the percentage in the modal category increases

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by 8.1%. This increase in the modal category does not indicate that the model does not do as well for the 1975-1987 period. In this stable period, ROE is 32.23%, a 3.09% increase over the reduction of error for the full data set.

The gains made are small, but encouraging, and there is one major personnel change during this period. To see if this change (from Stewart to O'Connor) has an impact on the decisions of the Court the variable PERIOD is added to the independent variables. PERIOD is coded as "6" if Stewart is on the Court (1975-1981) (corresponding to period 6 on Table 7), and "7" during O'Connor's tenure (1981-1987) (corresponding to periods 7 and 8 on Table 7). The results of this probit estimation are contained in Table 10.

The large values for PERIOD, especially relative to the other independent variables, causes the size of the estimated coefficient for CONSTANT to become quite large. This is of no real importance. If PERIOD is recoded as a 0/1 variable, CONSTANT's estimated coefficient decreases to its former level.

The estimated coefficient for PERIOD reaches a high level of significance ($p < .001$) which supports the position that the change from Stewart to O'Connor was one of substance as well as form. The large positive value of PERIOD's estimated coefficient indicates the increased likelihood that a search or seizure will be considered reasonable during periods 7 and 8. This is supported by Table 7, where we see the nonsupporters (including O'Connor) have a majority in these periods, and from the fact that during these two periods (7 and

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Table 10

Probit estimation of reduced location choice set model with variable PERIOD for the period 1975 through 1987.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	-8.35	2.66	-3.13
PERIOD	1.57	0.43	3.67****
HOME	-1.99	0.51	-3.93****
BUSINESS	-1.18	0.58	-2.04**
PROPERTY	-1.80	0.55	-3.30****
CONTROL	-0.68	0.36	-1.91*
CUSTODY	-1.50	0.52	-2.92***
TIME	0.86	0.42	2.05**
DRUG/GUN	0.79	0.38	2.07**
SEVERE	-2.08	0.74	-2.81***
US	1.32	0.43	3.07****

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-41.09	-79.02	-66.71
N	114		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

		CLASSIFICATION		
	COUNT / ROW PCT	0	1	ROW TOTAL
DECISION	0	21	10	31
		67.7	32.3	27.2
	1	8	75	83
		9.6	90.4	72.8
	COLUMN TOTAL	29	85	114
		25.4	74.6	100.0

Percent Correctly Classified	84.21
Percent in Modal Category	72.81
ROE (%)	41.93
-2*LLR (chi-square w/11 d.f.) (using adjusted value)	51.24****

*Significant at .05
**Significant at .025
***Significant at .005
****Significant at .001

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Table 11

Probit estimation of reduced location choice set model for the period 1975 through 1981.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	1.23	0.91	1.35
HOME	-2.06	0.71	-2.90***
BUSINESS	-1.73	0.81	-2.14*
PROPERTY	-2.39	0.94	-2.55**
CONTROL	-0.18	0.52	-0.35
CUSTODY	-2.07	0.81	-2.57***
TIME	1.49	0.70	2.14*
DRUG/GUN	0.20	0.54	0.37
SEVERE	1.68	20.14	0.08
US	1.24	0.64	1.94*

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-22.51	-42.28	-38.59
N	61		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

		CLASSIFICATION		
	COUNT / ROW PCT	0	1	ROW TOTAL
DECISION	0	13	7	20
		65.0	35.0	32.8
	1	3	38	41
		7.3	92.7	67.2
	COLUMN TOTAL	16	45	61
		26.2	73.8	100.0

Percent Correctly Classified	83.61
Percent in Modal Category	67.21
ROE (%)	50.02
-2*LLR (chi-square w/10 d.f.) (using adjusted value)	32.16****

*Significant at .05
**Significant at .001
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8) 79.2% of the searches and seizures were considered reasonable compared to 67.2% during period 6.

The addition of the variable PERIOD increases the stability of the period being estimated by controlling for the major personnel change from Stewart to O'Connor. The significance of the model is also increased raising the log likelihood ratio to 54.24 ($p < .001$). In addition, ROE is increased by almost 10 percentage points to 41.93%.

Table 11 presents the results of the probit estimation for the period 1975 through 1981. During this period there were no changes in the personnel on the Court. The Court made 61 search and seizure decisions during this period; 41 were considered reasonable, 20 were considered unreasonable.

The estimated coefficients for CONTROL and DRUG/GUN decrease (in absolute value) sharply, while the standard error for the estimated coefficient of SEVERE increases even more sharply. These increases cause these variables to be the only ones which do not reach minimally acceptable levels of significance. Although the estimated coefficients for the variables HOME, BUSINESS, PROPERTY CUSTODY, TIME, and US do reach minimally acceptable levels of significance, these levels are generally lower than in previous estimations. This may be due in part to the preferences of the justices during this period, but it is also a problem associated with a small data set. In small data sets the standard errors of the estimated coefficients have a tendency to become large due to the less frequent presence of the variables which in

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turn increases the collinearity among the independent variables. A prime example of this is the standard error for SEVERE. SEVERE only occurs once in this period which forces the standard error to be exceptionally large.

The classification rates for this period are quite good. Of the 20 searches or seizures considered unreasonable 13 (65.0%) are correctly classified. This is just slightly lower than for the 1975-1987 period, but much better than for the entire data set. The model continues to do a very good job classifying the searches and seizures considered reasonable, correctly classifying 38 of the 41 decisions (92.7%). The overall success rate is 83.6% (51 of 61) which is slightly lower than the previous estimation in Table 10. The log likelihood ratio is also lower, (32.16) though still highly significant ($p < .001$). The percent in the modal category falls to 67.2% for this period. This decrease allows ROE to increase by over eight percent to 50.02%. despite the slight decrease in the overall success rate.

Table 12 presents the results of the probit estimation for the final period: 1981 through 1987. In this period the Court made 53 search and seizure decisions. Once again, the small number of observations has inflated the standard errors for the estimated coefficients. The three variables which failed to reach minimally acceptable levels of significance in Table 11 (CONTROL, DRUG/GUN, and SEVERE) all do so for this period. Two other variables (BUSINESS and TIME), however, do not.

It is interesting that not only does the estimated

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Table 12

Probit estimation of reduced location choice set model for the period 1981 through 1987.

Independent Variable	Estimated Coefficient	Standard Error	t-Statistic
CONSTANT	4.89	2.28	2.15
HOME	-4.36	2.29	-1.91*
BUSINESS	0.06	15.05	0.00
PROPERTY	-3.41	1.75	-1.96**
CONTROL	-2.97	1.73	-1.72*
CUSTODY	-1.73	1.03	-1.68*
TIME	0.39	0.69	0.53
DRUG/GUN	2.66	1.35	1.96**
SEVERE	-4.51	2.08	-2.18**
US	1.99	1.10	1.81*

Auxiliary Statistics

Log Likelihood	At Convergence	Initial	Adjusted
	-10.86	-36.74	-27.07
N	53		

CROSSTABLULATION OF DECISION BY CLASSIFICATION

		CLASSIFICATION		
	COUNT / ROW PCT	0	1	ROW TOTAL
DECISION	0	8	3	11
		72.7	27.3	20.8
	1	2	40	42
		4.8	95.2	79.2
	COLUMN TOTAL	10	43	53
		18.9	81.1	100.0

Percent Correctly Classified	90.57
Percent in Modal Category	79.25
ROE (%)	54.55
-2*LLR (chi-square w/10 d.f.) (using adjusted value)	32.42***

*Significant at .05
**Significant at .025
***Significant at .001

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coefficient for BUSINESS drastically decrease (in absolute value), it is now positive, indicating an increase (albeit a small one) in the likelihood that a search or seizure will be considered reasonable when the location is a business. A business is the location of six of the searches or seizures during this period; all six were deemed reasonable by the Court. Five of the six were not typical of searches of a business. Two involved illegal aliens working in a business, two were searches pursuant to a statute authorizing administrative searches, and the fifth involved a plane which flew over a factory and took pictures from the air.

These unusual cases explain the change in the estimated coefficient for BUSINESS for this period, but they also point to a potential problem. Quite often a great deal of interest will occur in a particular issue area, and the Court may make several decisions on that issue. Eventually, the cases on that issue appear less often and are replaced by some other issue which has sparked the interest of the Court and the legal community (see Schattschneider 1975:65). These changes in the cases decided by the Court could very well affect the results of multivariate modeling of judicial decision making.

One example of this occurs in the full data set. During the Warren Court there are numerous decisions involving wiretaps and listening devices, but very few involving vehicles. During the Burger Court this trend is reversed. Fortunately, this difference between the two Courts did not affect the results of the models used here, but it certainly

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could be a problem in other circumstances.

Returning to Table 12 we can see an improvement in the correct classification rate for both reasonable and unreasonable searches and seizures. Eight of 11 (72.7%) unreasonable and 40 of 42 (95.2%) reasonable searches or seizures are correctly classified. The overall success rate of 90.6% (48 of 53) is the best of any of the time periods, and ROE also reaches its highest value (54.55) despite an increase in the modal category to 79.25%.

Table 13

Comparison of classification rates for selected time periods based on probit estimation.

Period	N	Correct Classification Rates Unreasonable	Reasonable	Overall Success Rate	% in Modal Category [ROE]
1961 - 1987 (Table 5)	204	35/72 (48.6)	118/132 (89.4)	153/204 (75.0)	64.71 [29.16]
1975 - 1987 (Table 9)	114	16/31 (51.6)	77/83 (92.8)	93/114 (81.6)	72.81 [32.23]
1975 - 1987 w/ PERIOD (Table 10)	114	21/31 (67.7)	75/83 (90.4)	96/114 (84.2)	72.81 [41.93]
1975 - 1980 (Table 11)	61	13/20 (65.0)	38/41 (92.7)	51/61 (83.6)	67.21 [50.02]
1981 - 1987 (Table 12)	53	8/11 (72.7)	40/42 (95.2)	48/53 (90.6)	79.25 [54.55]

Table 13 summarizes the correct classification rates, modal category percentages, and ROE values of the models and periods estimated in Tables 5, and 9 through 12. In general,

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there is a trend toward better results as the periods examined become more stable, in terms of changes in the Court's personnel, and as the justices on the Court become more uniform in their outlook (e.g., the nonsupporter majority during the 1981-1987 period). With regard to a stable Court, the cumulative correct classification rates of the two halves of the 1975-1987 period exceed those of the estimation of the whole period even with the variable PERIOD representing the change from Stewart to O'Connor. Although this finding supports the position that stability is important, the number of observations for these periods requires that one be careful in drawing conclusions from these results.

One conclusion which can be drawn from these results is the importance of a stable decisional environment. Increasing stability in the internal (reducing the location choice set) and external (choosing more stable time periods for examination) decisional environments increased the ability of the model to estimate and correctly classify the decisions of the Court. Second, the decisions of the individual justices do make a difference. The Court is simply too small a group for differences between the justices to even out to the same extent as a larger group. When the Court experiences a period of stability in its personnel the effects of individual differences can be minimized. Unfortunately, it is a fact of life that changes in the personnel on the Court occur quite frequently.

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Chapter 5. Summary and Conclusions

United States Supreme Court decision making has its roots deep in American and English legal traditions. These traditions emphasize the importance of stability and consistency in the decisions handed down by courts. Stability is ensured partially through the use of previous decisions as a justification for present decisions. This reliance on past precedent, called stare decisis, lends continuity to the decisions of courts. This reliance on past decisions leads some to believe that the role of courts is simply to identify the appropriate rule of law and apply it accordingly. This is known as the declaratory theory of judicial decision making.

It does not require a very detailed examination of the actual decisions to realize that courts, and the judges who sit on them, do much more than merely discover heretofore unrevealed legal maxims. Certainly lower courts must follow the dictates of higher courts, but when no higher court instructions exist or when speaking of the United States Supreme Court, tradition is not binding. The judicial branch is the least subject to the vagaries of public opinion, but without the enforcement machinery held by the other two branches of government, courts must rely a great deal on respect for the judicial institution for their will to be carried out. Nevertheless, several traditionally acceptable devices exist for courts to distinguish or ignore precedents which are contrary to a court's desired position.

If the cult of the robe and the declaratory theory of

judicial decision making are mere straw men, on what basis do courts make decisions? We would hope that courts and judges can be considered rational decision makers, but rationality is one of those slippery concepts which everyone talks about but few define precisely.

Rationality involves normative considerations regarding the appropriateness of the actions chosen by a decision maker. Rational choices imply successful actions, irrationality implies bad choices, but choices regarding what? The underlying assumption is that behavior is goal directed. Therefore, choices which help to achieve goals are rational, and choices which do not are irrational.

Various scholars have attempted to define rationality with a great degree of precision. Generally, these definitions require some form of comprehensiveness or maximization on the part of the decision maker. Comprehensiveness or maximization is due in part to the method of representing decisions in terms of costs and benefits. Certainly, according to the theory, if decision X produces more net benefits than decision Y, X should be chosen over Y. Two major types of problems exist with this formulation of rational decision making.

First, decision makers may not always know what their goals are. Just as candidates for political office may be fuzzy on their policy positions, decision makers may be fuzzy or indeterminate about the specifics of their goals. Related to this is the problem of quantifying costs and benefits. To determine when benefits outweigh costs, both benefits and

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costs must be quantifiable. Unfortunately, some costs and benefits are very difficult to quantify (e.g., how much is a human life worth?).

The second major type of problem involves the scope of the search for the "best" choice or solution. If rationality requires the decision maker select the choice which maximizes benefits, even a relatively simple choice can become exceedingly costly in terms of time and expense. Thus, conforming to the comprehensiveness or maximization requirement of rationality often produces results which most people would consider irrational.

Bounded rationality and decision making under uncertainty are attempts to deal with these two major problems. Bounded rationality recognizes that there are limits on the search that can be undertaken by a decision maker. Decision making under uncertainty attempts to deal with the probabalistic nature of future states of the world. Neither of these two alternatives to comprehensive rationality rejects the requirement that the decision maker attempt to maximize benefits. Within the bounds of bounded rationality the decision maker is still expected to carry out a comprehensive search for the optimum solution. Despite uncertainty, the decision maker is expected to calculate the expected utilities of various courses of action and select the one with the highest expected utility.

A third major problem, which is not solved or avoided by bounded rationality or decision making under uncertainty, concerns human cognitive limitations. According to human

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learning and memory studies, short term memory is capable of processing only a limited amount of information at one time. The amount seems to lie somewhere in the range of seven chunks of information, plus or minus two.

Herbert Simon has developed his own version of bounded rationality which is commonly referred to as satisficing. Given the cognitive limitations inherent in human decision making extensive maximization is not possible. As an adaptive strategy, the decision maker will focus attention on a small number of factors important to the decision and adopt a course of action based on these factors. The decision maker does not maximize with respect to these factors. Focusing on only seven factors with only two values each still produces 128 possible combinations; a number well beyond the cognitive limits. Instead, the decision maker has certain limits or thresholds which must be passed before changes in behavior occur. The relevant factors are monitored and when their combined values reach a utility threshold the decision maker adopts a new course of action consistent with the different level of utility. This type of decision making fits the cybernetic theory of decision making.

Servomechanisms such as the Watt governor are often used to illustrate this type of behavior. Because the Watt governor only has to monitor one factor (the angle of the rotating arms) and because it does so continuously, the adjustments it makes in its "behavior" are also continuous. Human decision makers, whether individuals or groups, do not focus their entire attention continuously on the problem they are

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generally concerned with solving. This is why the utility of various combinations of the relevant factors must cross certain thresholds to elicit changes in behavior. A more appropriate model for this type of behavior is the automatic transmission in a car. The shift from lower to higher gears is made automatically when the relevant factor, speed of the vehicle, crosses specific thresholds. Between these thresholds exists a range of values of the factor which are compatible with that gear. The human decision maker maintains the same behavior for a range of utility values for the relevant factors. Perhaps more utility could be gained by adapting behavior to reflect smaller ranges, but cognitive limitations, as well as the time and effort involved, make it impossible to do so.

Human decision makers are not machines. They must make their choices in decisional environments much more complicated that those of the Watt governor or an automatic transmission. Cybernetic theorists often fail to account for human cognitive limitations or the fact that cognitive limitations are internally imposed. It is the human decision maker who must find adaptive strategies for operating in highly complex decisional environments. For the Watt governor, the automatic transmission, or even a supercomputer, the rules are externally determined.

Steinbruner identifies five elements of cognitive theory which supplement cybernetic theory: inferential memory, consistency, reality, simplicity, and stability (1974:95-103). These five elements recognize certain features of human

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memory and information processing which are concerned with the structure and processing of information rather than its content.

The result of incorporating these five elements of cognitive theory into cybernetic theory yields a cognitive-cybernetic theory of decision making. The essence of this theory is found in four basic principles. The first is simplification. Human decision makers, because the complexity of their decisional environments exceeds their cognitive limitations, attempt to simplify the decision making process.

Second, the decision maker relies on stable decision rules. The stability is internal due to the decision makers desire for consistency in his actions. For purposes of modeling the decision making process, the stability must also be external. A decision maker who is continually presented with vastly different decisional environments will not have the opportunity to develop stable decision rules.

The third principle is derived from the first two. A desire for simplification and a stable decisional environment (internal and external) allow the decision maker to focus on the "important" attributes of the situation. These important attributes or factors are the minimal pieces of information necessary for the decision maker to make a choice.

Fourth, the decision maker must have a limited choice set. A large choice set requires large amounts of information processing; amounts beyond the cognitive limitations of the decision maker. A limited choice set fits with the principles of simplification and a focus on the important factors

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Judicial decision making fits the cognitive-cybernetic theory of decision making very well. Lawyers and judges are trained in fact pattern analysis. They are trained to concentrate on the important factors in a given issue area. Once trained the stability of their learning and the desire of decision makers to find and use shortcuts reinforces the importance of these learned factors. When lawyers argue cases they do so based on the important facts of the case. They attempt to emphasize the facts which are consistent with other cases which were decided in their favor. Lawyers for the other side also try to emphasize the facts of the case which are consistent with other cases which favor their position. Both sides deemphasize the facts which detract from their preferred outcome. In an appellate case, it is then up to the court to determine which facts are indeed important, as a matter of law, in the resolution of the conflict.

Judges are also trained in the use of the same sets of important factors, usually because they were originally trained as lawyers. But even nonlawyers who become judges must quickly adapt to the decisional environment in which they find themselves. This means picking out the factors considered important by the legal community. How any individual decision maker makes use of these important factors is determined by that decision maker's personal preferences.

How is this determination made? Many argue that judicial decisions are based on the ideological orientation and personal policy preferences of the judges (e.g., Schubert 1965,

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1974; Rohde and Spaeth 1976). This position is derived from attitude theory as developed and applied by judicial behavioralists such as Schubert (1958, 1959), Eysenck (1954), Guttman (1950, 1954), and Rokeach (1968a, 1968b).

This approach helps to explain the general attitude of judges, and the justices of the Supreme Court in particular, but more is needed. With very few exceptions (e.g., Justices Black and Douglas in First Amendment cases (Woodward and Armstrong 1979:193, et seq.) and Justice Brennan in death penalty cases (PBS's "This Honorable Court," part II, 1987)) even the most ideologically oriented justice occasionally casts votes in opposition to his or her preferred position.

Von Neumann and Morgenstern point out that all measurement must ultimately based on sensation (1980:16). The sensations measured by judicial decision makers are the factors presented to them during the course of the litigation. Considering the Supreme Court in particular, the types of factors presented to the justices are limited in two main ways. First, the rules of judicial behavior and etiquette require that many potential factors not be considered. These include rules of standing and evidence and a general avoidance of influences outside the legal process (such as lobbyists).

Even with these limitations, inordinate amounts of information reach the justices. A number of the justices have recognized that to deal with the amount of material before them, they had to develop ways of quickly determining how to vote on a case or petition. They developed a system to quickly determine whether certain relevant factors are

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present and make their decision accordingly. In the area of search and seizure, the requirements of the Fourth Amendment and the general similarity of the fact patterns of the cases, force the Court to focus its attention on a small number of factors relevant to the conflict between the rights of the individual and protection of the public. The monitoring and use of specific factors for the purpose of determining how to cast a vote consistent with one's preferred ideological position is the basis of the cognitive-cybernetic theory of judicial decision making.

Cognitive-cybernetic theory assumes the justices are rational decision makers in that they are engaged in goal-directed behavior. Where cognitive-cybernetic theory differs from other theories of rationality is in the method used by the decision maker in determining which decision will bring the justice the greatest utility (i.e., is closest to the justice's preferred ideological position).

Before discussing the specific factors relevant to the area of search and seizure, we must address the question of who decides; the Court or the individual justices. Clearly, the Court is composed of the justices who sit on it, but is it more than that? Section 1 of Article III of the United States Constitution begins by stating, "The judicial Power of the United States, shall be vested in one supreme Court . . ." The Constitution does not give this power to the individual justices, it does not even specify the number of justices to be on the Court other than a Chief Justice. Decisions are made by the Court, and the size of the winning

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coalition is immaterial from a legal standpoint. Even in a minimum winning coalition, the winning side is composed of a majority of the justices who voted.

Quite often, theories of individual behavior are not applied to predict or classify individual behavior. Individual decision makers are just that; individuals. Factors which prove to have a certain level of explanatory power over a population, may take on greater or lesser importance when applied to individuals. No theory of rational decision making requires all decision makers to treat factors in the same way. It is generally assumed that each decision maker has his or her own personal utility scale on which the factors may score differently depending on the personal preferences of the individual decision maker. This is also true with respect to judicial decision making. Because of the constraints placed on the Court and the justices the major factors considered are often readily identifiable. However, various minor factors peculiar to specific justices will also influence their decision.

If these minor factors are consistent across a large number of the justices their continued exclusion from the model will result in systematic error which invalidates the results. When these minor factors are more localized, random error is the result. Random error also invalidates the results with respect to the individual, but when a group of decision makers is examined the assumption is that these random errors will even out.

Nevertheless, the cognitive-cybernetic theory does not

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differentiate between the two judicial decision makers with which we are concerned: the Court and the individual justices. This allows for a comparison of a reductionist approach to judicial decision making which concentrates on the individual justices and a method of aggregation and a systemic approach which emphasizes the Court as the decision making entity.

Returning to the area of search and seizure, the basic question facing the Court is the reasonableness of a search or seizure. The major factors considered fall into two groups: legal factors and situational and case characteristic factors. The consideration of the legal factors is mandated by the Fourth Amendment. The requirement of probable cause and a warrant, the existence of probable cause and a valid warrant, and the violation of the exclusionary rule are the five legal factors. These five factors are considered legal because their presence or absence is a legal determination made by the Court. It quickly becomes clear that these factors are merely an alternate measure for the Court's decision as to reasonableness.

The Fourth Amendment makes it clear that a search cannot be considered reasonable unless probable cause and a valid warrant are present when they are also required. This and other relationships among these legal factors provide evidence of severe collinearity, as well as their tautological nature.

The legal nature of these five factors precludes any other way of measuring them. Thus, none of these variables

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can be used in a model to estimate judicial decisions. In a previous examination of the search and seizure decisions of the Court, Segal (1984) used a number of legal variables as part of his model (warrant, probable cause, and three arrest variables). Certainly, the inclusion of these variables affected the results obtained. However, the purpose of Segal's study was to test the applicability of the statistical technique probit to the study of judicial decision making, not the formation of a theory and set of factors relevant to the area of search and seizure.

The situational and case characteristic factors and the variables drawn from them examine what underlies the question of reasonableness. In the area of search and seizure, as in many other areas of constitutional interpretation, the Court is faced with striking a balance between minority rights and majority rule. In search and seizure the balance must be struck between the rights of the suspect and the protection of the public. Certainly the rights of any criminal suspect are impinged to some extent, but it is the job of the Court to make sure they are not violated beyond constitutional reasonableness. On the other hand, the Court will not protect the individual's rights to an extent which makes effective law enforcement impossible.

The relevant factors include the permanence and privacy of the location searched, the amount of control the government officials exercised over the location or item seized, how much time was available for fulfilling the technical requirements of obtaining a valid warrant, the nature of the

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item seized, the severity of the search or seizure, and whether the case came from a state or federal court.

The estimated coefficients of the eleven variables drawn from these factors all prove to be in the hypothesized direction for both the decisions of the Court and the votes of the individual justices. The levels of significance reached for the estimated coefficients and the model as a whole support the rejection of the null hypothesis. Of the variables which were expected to have a high degree of explanatory power, only the estimated coefficient for the variable SEVERE failed to reach a minimally acceptable level of significance in the estimation of the Court's decisions. This was primarily due to the low number of instances in which SEVERE is coded as being present.

The levels of significance attained by the estimated coefficient and the model as a whole support the use of cognitive-cybernetic theory to explain the votes of the justices as well as the decisions of the Court.

In the examination of the decisions of the Court an opportunity exists to see how an increase in the stability of the decisional environment affects the ability of the model to estimate the those decisions. The stability of the decisional environment is increased both internally and externally. Internal stability is increased by reducing the information considered by the justices. Although the location choice set is drawn from a combination of the privacy and permanence factors, six possible search locations are identified. Reducing the location choice set reduces the

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amount of information which must be processed to reach a decision. External stability is increased by choosing increasingly stable time periods, in terms of the Court's personnel, for estimation.

The reduced location choice set model correctly classifies 75.0% of the Court's decisions for a reduction of error of 29.2%. These results are good, but there is room for improvement. An examination of the value systems of the justices reveals a steady shift in the ideological position of the justices on the Court.

In the early portions of the period covered by the data set, a majority of the sitting justices are more likely to consider searches or seizures unreasonable. After a number of personnel changes, no clear majority of the justices favored either position. During the latter stages of the period, justices who preferred to find searches or seizures to be reasonable held a majority on the Court. Although examination of the Court's decisions eliminates many of the differences of the individual justices, it appears that the model is not accounting for all the differences. Examination of selected portions of the entire time period reveals an increased accuracy of the model's classifications as the period examined becomes more stable in terms of the Court's personnel and ideological orientation.

The results of the aggregation of the estimation of the votes of the individual justices and those of the estimation of the Court's decisions were quite similar. At first, one might think this indicates a lack of any group effect being

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imposed on the decisions of the Court, but this is not the case. A group effect may very well exist, but comparing the decisions of the Court with the votes of the individual justices cannot identify it.

Group effects, if any exist, occur prior to the time the justices officially cast their votes in the opinions handed down. Once the votes are cast, the Court's decisions are nothing more than a simple aggregation of the justices' votes. To test for possible group effects, we must examine the behavior of the justices during earlier stage of the decision making process. We may want to examine the docket books of the justices to determine how they initially voted and if their votes changed (e.g., Brenner and Spaeth 1988; Brenner, Hagle, and Spaeth 1988). But even this approach does not identify all group effects. Arguably, even conference votes and votes on certiorari are influenced by previous interactions of the justices.

To conclude, support for the cognitive-cybernetic theory of judicial decision making is found in the results of estimating the search and seizure decisions of the United States Supreme Court. Several factors are identified and operationalized which prove to have a high degree of explanatory power. The model as a whole also reaches a high level of significance. Room for improvement still exists, either by identifying additional factors or improving the measures used for the factors already identified.

The value of this study lies in the development and application of a theoretical framework to the decision making

of the Court. The theory takes into consideration many of the problems and pitfalls of other theories of decision making and provides an alternative which fits the general and cognitive limitations which face human decision makers. From this theory, a number of hypotheses which identify relevant factors considered by the Court are derived and tested with respect to a specific area of the law. The support found for these hypotheses will be of value in the legal community because of the increased understanding of the Court's decisions and decision making process, but also as a means of identifying the factors present in a case which may make it an eventual winner or loser in the eyes of the Court.

Future research should concentrate on the identification of additional factors or alternative measures of the identified factors which do a better job of explaining the decisions in the Court's nonmodal category. A closer examination of the incorrectly classified decisions and further analysis of the decisions of the individual justices may help in this regard.

This theory and model should also be tested on courts other than the United States Supreme Court. The additional limitations imposed on other courts by the presence of a higher court is at least one additional consideration in estimating their decisions.

Several of the factors identified in this study are relevant to the constitutional conflicts which occur in other areas of the law (e.g., First Amendment free speech and Fifth Amendment involuntary confessions). Identification of proper

measures for these factors as applied to other areas of the law may allow us to peek into the black box of the judicial decision maker and gain a greater understanding of how and why courts and judges make their decisions.

NOTES

NOTES

Chapter 1

1. The importance of a majority decision by the Court versus the decisions of individual justices is evident in how tie votes are treated. When there is a tie vote (4-4 or 3-3) no opinion is written and no issues are resolved. The decision of the lower court stands until the questions presented in the case once again come before the Court. Chapter 2

Chapter 2

1. This basic assumption is evidenced in a number of works such as Simon's Models of Thought and Harris' America's Democracy, and is illustrated in Allison's The Essence of Decision.

2. It is unlikely that any potential alternative set could be exhaustive. Alternatives which appear random and unrelated to the decision could be chosen. For example, Kennedy could have decided to change the color of navy uniforms due to the mistaken belief that blue attracts missiles. Under Frohlich and Oppenheimer's definition this would have been a rational, though erroneous decision. They might attempt to rule out such an action as a violation of the nonperversity rule, but a preference for having the missiles removed does not necessarily rule out a change in wardrobe as a potential course of action. A "reasonable" person would probably not consider such an alternative, but it must be remembered that rational actors can make mistakes and preferences are not directly observable. (Consider the Hertz example in Chambers 1982:32-34.)

3. Browning and Browning refer to this type of analysis as "benefit-cost" but the order chosen to refer it is of no particular consequence.

4. A more complete description of Zero Base Budgeting can be found in Lyden and Lindenberg's Public Budgeting, Wildavsky's Politics of the Budgetary Process, and Hammond and Knott's A Zero-Base Look at Zero Base Budgeting.

5. There may not have been one definite preferred position for the group. It is possible that one preferred position could simply have been a return to the status quo. Another might have been action meant to clearly demonstrate United States supremacy. Given the particular situation, Kennedy's preferences were the preferred position since the final decision was his, but we must remember that his advisors might not have shared those preferences.

6. Von Neumann and Morgenstern do develop an axiomatic structure for the manipulation of utilities in an attempt to move beyond the most basic measurements and proceed to more sophisticated levels of analysis (1980:17-31). They do note, however, that the conditions on which these numerical utilities are achieved are an extension of the conditions under which indifference curves are based (1980:17). It will be shown below that in many situations, including judicial decision making, these conditions are unrealistic for practical applications.

7. This is often known as the law of diminishing returns. To illustrate, suppose the costs and benefits 2-1 are for a project to stop pollution. Initial expenditures yield minimal benefits (though the cost-benefit ratio may be large). Efficiency is reached at the point where the marginal costs equal the marginal benefits (the first derivatives of the cost and benefit curves respectively). Suppose 80 percent of the pollution would be eliminated with a project of this scale, but it may be politically advantageous to try for 90 percent and increase the scale of the project. The project is no longer efficient as defined by Browning and Browning but may still be acceptable. To try to clean up the remaining 10 percent would cost much more that it is worth. At this point the project may be running into technological inadequacies and budgetary limitations as well as greater opportunity costs associated with transferring funds to this project from other sources. Thus, efficiency requires the toleration of some pollution.

8. As indicated in note 7, by taking the first derivative of the cost and benefit curves with respect to the scale of the project, setting the resulting equations equal to each other and solving, will yield the point at which marginal costs equal marginal benefits. It is at this point that the scale of the project is considered efficient according to Browning and Browning (1983:18). This point is not where the two curves intersect.

9. Von Neumann and Morgenstern, Browning and Browning, and Frohlich and Oppenheimer all discuss the rational actor in terms of economic behavior. Economic behavior allows for a certain amount of quantification which makes motives easier to understand. This also allows for a

more rigid specification of the model. As will be shown below, certain characteristics of economic behavior may not be present in noneconomic decisional situations which in turn may invalidate certain assumptions and requirements of the rational actor model.

10. Consider the game of chess. There are twenty possible opening moves and twenty possible countermoves which allows for 400 possible combinations after only one round of play. Obviously, not all moves are equally likely, especially for players with some knowledge of the strategy of chess, and certain moves will prevent other possible moves. Nevertheless, even in a controlled situation with a specified number of actors (pieces) the possible variations are enormous.

11. Such advice for beginners can be found in books such as Chess by William R. Hartston, An Invitation to Chess by Irving Chernev & Kenneth Harkness, and other beginning chess books.

12. If we write xPy for the preference X is preferred to Y (Frohlich and Oppenheimer 1978:7), then xPy and yPz implies xPz by the rule of transitivity. If, however, we are not sure that X is preferred to Y and write the relation as x?y, we may still know that yPz, but we can only conclude that x?z. If in fact we can determine the specific preference relation between X and Y, from the rule of transitivity we can say something about their preference relation with Z. If not, we can only determine that one of three possibilities exists: xPz, or zPx, or xIz (where I stands for indifference). Since these three alternatives comprise the complete alternative set we have gained nothing without an initial nonprobabilistic preference.

13. "It is interesting to consider that psychologists have been using seven-point rating scales for a long time, on the intuitive basis that trying to rate into finer categories does not really add much to the usefulness of the ratings." (Miller 1956:84) The same may be said for political scientists. In addition, the magical number seven has found its way into popular reading (Newsweek 9/29/86:48-54).

14. Decision making is essentially problem solving. In decision making the actor has a goal to be reached and the problem is to decide on the course of action which brings the actor closest to that goal.

15. The Cult of the Robe is a phrase used to denote a number of symbols used by members of the judiciary to lend more dignity and authority to their position. These symbols include the wearing of black robes, being seated above the rest of the courtroom, having everyone rise when they

enter, addressing them as "Your Honor", and so on. Other manifestations of the Cult will be discussed later in the context of traditional judicial dogma.

16. Amicus curiae literally means "friend of the court" (Ehrlich 1985:42). When the Court hears cases of constitutional importance it is likely that a number of amicus briefs will be filed. The record seems to be held by Regents of the University of California v. Bakke, 438 U.S. 265 (1978) in which 58 amicus briefs were filed (Murphy and Pritchett 1986:193).

17. For example, in The Memory Book by Harry Lorayne and Jerry Lucas, the reader is shown methods of memorizing lists of words. To try the method the reader is asked to memorize the states in alphabetical order. The key to their "Peg" system is to form associations from one state to the next. Thus one may associate Alabama with "album." On the album is a picture of baked "Alaska" which is being eaten by someone in an "arid zone" (Arizona) and so on. For the beginner the method requires a great deal of practice. Continued use of the system improves the speed and ability to use the method, not the span of immediate memory.

18. What this knowledge might guarantee is an inability to find an opponent willing to put up with the excessive amounts of time required to trace the moves of the game through the diagram. Most computerized chess games can be set for a number of levels of difficulty with the computer examining more possible moves at the more difficult levels. In the higher levels of difficulty the computer may take an average of one (Radio Shack 1650) to four (Sargon II) hours between moves. I imagine very few players would have the determination and resolve to play such a lengthy game. In fact, in tournament chess strict time limits are placed on the players. If a player exceeds the time allotted he or she forfeits the match.

19. A basic problem with estimating the goals, costs, and benefits of another decision maker is the nature of the utilities generally used to provide some measure of comparison. Whether the units are utiles or dollars, the basic fact remains that utilities are personal and cannot be compared across individuals. With "adequate" information such utilities may be estimated with a fair degree of success but they will never be known with absolute certainty.

20. There are two types of uncertainty. Uncertainty may be present when there is simply a lack of any information. This may occur when a consumer is shopping for a new appliance and does not know about the reliability of a particular manufacturer's products. A driver in a new city may have a lack of information about local side

streets if he accidentally gets off at the wrong exit. In both situations the decision maker can seek out information. The consumer may ask a sales clerk for information and the driver may stop and ask someone for directions. It is also possible for both decision makers to fill in the gaps in their information with certain assumptions. If the consumer frequents the store on a regular basis he may assume that the store would not carry a product which was unreliable. He might also assume that if the product carries a strong warranty, it is more reliable. The driver may assume that if he backtracks he can get on at the same place again. He might also assume that the roads are laid out in a basically rectangular pattern and if he continues parallel to the expressway he will find the next onramp without undue difficulty. In both cases the decision maker is utilizing the pattern of past information to fill in the gaps with respect to current conditions. The second type of uncertainty occurs when the decision maker has a great deal of information but does not know what information represents the current state of the world. Kennedy had a great deal of information on Soviet motives and goals, but he did not know specifically what inspired them to place missiles in Cuba. Again, the strategy is to rely on previous experience and patterns to make a decision. Kennedy relied on trusted and knowledgeable advisors to help sort through the information which was being received by the group. Best estimates were made and the American response chosen.

21. Alexander's diagram seems to fail to account for the possibility of interrelations between the concepts, but this is not the case. The interrelationships manifest themselves at the top of the subpyramids. Effects of production on economics would not be considered until the three functional concepts are satisfied and then function and economics are considered jointly. If there is a conflict, it may be necessary work back down the paths, find a different solution, and work back up to function and economics again. This is not necessarily the most efficient method for problem solving, but it does allow all the requirements to be considered in turn. Cyert and March note that when a problem is thus divided and approached in a sequential fashion local rationality may result (1963:117). The goals and problems of the subunit handling production will be quite limited and may only be expanded when the solution is returned for revision.

22. What Simon refers to as his principle of bounded rationality is different from what economists and other adherents of copmrehensive rationality call bounded rationality. As used in Section A of this Chapter, bounded rationality merely means that certain limitations on the choice set or information available are recognized, but the decision maker must still maximize within those

limitations. As Simon uses the term, the decision maker not only constructs a simplified version of the problem, but is also not required to find the solution which provides maximum benefits, only one which is satisfactory. Hence, the term satisficing has come to be associated with Simon's conception of bounded rationality.

23. The behavior patterns of the Watt governor and the thermostat are well known and understood. Aside from breakdowns or extreme operating conditions they will operate precisely as planned. This certainty is a major distinguishing feature these machines have with human decision making. At present, we can never be sure how a decision will be made. One might adopt a reductionistic determinism point of view to eliminate this distinction, i.e., by knowing and being able to measure all the influences on the human brain, decisions would be as understandable as those of the servomechanism. This argument begins to enter the conflict between determinism and freewill; a topic beyond the scope of this work. But since such measurements are not presently available, we must rely on the notion of the Black Box which will be discussed below.

24. Steinbruner, paraphrasing Simon, tries to make this distinction by comparing the rational choice model with a "blueprint" and the cybernetics model with a "recipe" (1974:55). Although this analogy does point out the more flexible aspects of the cybernetic model it seems to require the conscious consideration of the problem which Ashby has deemed unnecessary.

25. At this point Beer states that the third characteristic of cybernetic systems has been revealed: exceedingly complex, probabilistic, and homeostatic. If this is true, why does Beer use less complex deterministic machines such as the Watt governor and the thermostat to illustrate the basic notions of cybernetics? I suspect the reason has to do with the ease of illustrating these concepts in a simpler environment before moving on to more complex examples where the notions may not be as easily isolated for discussion. Steinbruner accepts servomechanisms as being cybernetic machines (1974:51), but also moves on to more complex areas (1974:61). Beer does not flatly state that servomechanisms are not cybernetic machines, only that their operation has been adequately described by other fields and it is with the more complex probabilistic systems that cybernetics is of greatest value (1964:18).

26. Steinbruner states that the feedback loop is between the engine speed and the throttle opening (1974:52). Both Steinbruner and Beer agree that information inputs are feedback, thus, inputs to any element of a system can be considered feedback to that element. The key is in

choosing which element to be considered the starting and ending point of the information loop. Since the discussion is intended to illustrate the concepts of cybernetics via the workings of a servomechanism (in this case a Watt governor), this control device should logically be the focus of our attention. The feedback loop indicated by Steinbruner seems to ignore what should be the focal point of the system.

27. The reason the number of inputs is small has to do with the cognitive limitations of the human decision maker, although this is not explicitly stated by either Steinbruner or Beer.

28. Steinbruner rejects the idea that a cybernetic machine can act with a purpose (1974:62-66). He accuses Ashby of letting the "critical values" and their monitoring become a purposeful action on the part of the decision maker even though his (Ashby's) model purports to reject outcome calculations and payoff scales. This attitude on the part of Steinbruner seems in conflict with the example he uses to illustrate the cybernetic model: the tennis player (1974:60). Clearly the tennis player has a purpose in mind when he advances to hit the ball, namely to return it to his opponent's side of the court. He rejects both optimization and satisficing for survival (1974:64-65). How can it be said that the tennis player is engaging in survival techniques? This inconsistency may be explained, I think, by two points. First, Steinbruner does not seem to be using the term "purposeful" in the same manner as Ashby and Beer. His reference to the calculation of outcomes (1974:63) is more consistent with the rational choice model which he had rejected. Ashby and Beer seem to allow purpose to be some goal of the machine. As with other concepts, it is difficult to believe that the Watt governor has a purpose, but it is not difficult to accept the statement with regard to human decision makers. This leads us to the second point. Both Ashby and Beer make use of the Black Box in their treatments of the cybernetic model. As will be noted later in the text, it is within this box that the extreme complexity of the human mind is contained, including such concepts as goals, values, and purposes. Ashby and Beer do not ask why the tennis player wants to hit the ball back into his opponent's court, but rather, given the desire, how does the machine accomplish the task. Steinbruner covers this material in the form of the cognitive paradigm, which attempts to discover the contents of the Black Box. The problem with Steinbruner's approach to the cybernetic paradigm is that by eliminating the notion of a Black Box, he has forced any consideration of human decision making out of the realm of cybernetics.

29. The use of a Black Box to indicate processes that cannot as yet be clearly defined may seem to be the easy way out of a sticky situation. Beer notes, however, that, "the black Box treatment of the system itself avoids the pitfalls of oversimplifying its nature through some wild and misleading analogy" (1964:70). In addition, the cybernetic model is not a perfectionist model, it allows for mistakes, breakdowns, and random occurrences. At some point these failures of the system may be explained by the model, but for present purposes it is better to put them into the Black Box than to fashion exceptions to an already strained analogy.

30. One can find many collections of optical illusions which illustrate this point. One such collection is Gyles Brandreth's The Great Book of Optical Illusions. The illusions presented on pages 6 and 7 are particularly appropriate to the discussion.

31. Much of the following material on the trappings of the cult of the robe will not be directly citeable to specific sources. Generally it is based on information contained in Murphy and Pritchett (1986), Rodell (1955), Rohde and Spaeth (1976), Spaeth (1979), and Woodward and Armstrong (1979), as well as personal experience at two law schools.

32. This does not count the thankfully brief period when President Richard Nixon had the White House staff wear outlandish uniforms.

33. For a more complete treatment of the origins of the English legal system see generally, A Constitutional and Legal History of Medieval England by Bryce Lyon.

34. Woden: "The West Germanic form of Odin" (Evans 1970:296). Odin is the All-Father of Northern mythology.

35. It is true that the jury, which is to be composed of one's peers, decides what the facts are in a case, but remember that the judge is still the controlling factor and decides what evidence the jury is allowed to hear and consider in making its decision.

36. This statement applies generally to all courts, especially the federal courts, and particularly the Supreme Court of the United States. State courts also must consider state constitutions as well as the federal constitution but the latter remains the ultimate authority.

37. The factual situation surrounding Marbury led to what was probably the most fortuitous political maneuvering in United States history. This is ironic and paradoxical given the arguments made by Marshall in claiming judicial review as the province of the judiciary. Nevertheless,

the facts are quite enlightening and are summarized in Murphy and Pritchett (1986) as follows:

> Before going out of office after their crushing defeat in 1800, the Federalists enacted the Judiciary Act of 1801. While this law made several needed reforms, its creation of many new judicial posts--to which Adams nominated and the lame-duck Senate confirmed deserving Federalists--made it vulnerable to a charge of court packing. In signing and delivering the commissions the night before Jefferson's inauguration, Adam's Secretary of State, John Marshall, neglected to deliver a number of appointments to justice-of-the-peace courts in the District of Columbia. The new Secretary of State, James Madison, refused to deliver some of these commissions. William Marbury, one of the disappointed appointees, brought suit in the Supreme Court under a provision of the Judiciary Act of 1789 that Marbury claimed gave the Court original jurisdiction in such cases. (1986:16)

Marshall's opinion did not give Marbury the commission, but the reasoning behind the decision left Jefferson with a difficult choice. Jefferson did not want Marbury to get the commission but in order to accept the Court's decision, he was forced to accept the Court's reasoning, which included the premise that the Supreme Court had the authority to determine if federal action was constitutional. To have challenged the decision would have meant more Federalists in office; not a desirable outcome to Jefferson. By essentially giving Jefferson what he wanted, Marshall managed to greatly expand the powers of the court. (For a more detailed account of the setting and the opinion see Nowak, Rotunda, and Young 1983:2-15.)

Marshall's ability to seize the moment was certainly brilliant. On the other hand, I would think Marshall no less brilliant--and I know of no evidence to support this--if he had purposefully withheld the commissions to force the situation into existence.

38. This was an incredible argument on Marshall's part given the fact many members of Congress had taken part in the drafting of the Constitution and Marshall had not.

39. This material quoted by Statsky and Wernet is footnoted and attributed to Swift, J., Gulliver's Travels and Other Writings, p. 203 (R. Quintana, editor), (Random House, The Modern Library, 1958).

40. This unwillingness on the part of the Court to make unnecessary decisions may be an overlap from the constitutional requirement of deciding only actual cases or

controversies (U.S. Constitution, Article III, Section 2). If some particular point was not necessary then it could be argued that it was not in controversy or part of the case.

41. The importance placed on factual analysis begins with the first year of law school where law students are taught to "brief" cases for later discussion and study. Briefing involves determining the facts of the case, the law applied, and the conclusions reached by the court. Ostensibly, the purpose of briefing is to improve the analytical skills of the student. It does improve these skills, but it also deeply reinforces the importance of the facts and the need to find precedent which duplicates the facts of the present case as closely as possible.

42. From this point on the discussion will focus primarily on the United States Supreme Court, referred to simply as the Court (capital "C"). One reason is that the data necessary to illustrate various points is more readily available for the Supreme Court than for other federal or state courts. For the most part any statements and arguments on caseloads, decision making, and the like, will apply to both the Supreme Court and other courts as well. Differences will be noted when this is not the case. A second reason for focusing on the Supreme Court at this point is the fact that the data set will be drawn from its decisions.

43. Woodward and Armstrong offer contradictory bits of evidence with respect to Burger's attitude on this point. Early in his tenure as Chief Justice, Burger issued a memo to his law clerks essentially telling them that although they occupied the same building as the clerks of the other justices, they were not to consider themselves part of one big law firm, but rather nine separate law firms (1979:34-35). Later, in an effort to lessen the workload of the justices, Burger proposed and implemented a cert pool. Rather than have a duplication of effort by having the clerks of each justice write summaries of certiorari petitions, the petitions would be divided among the clerks and the summaries copied for each justice; the proposal met with mixed reactions (Woodward and Armstrong 1979:272-273).

44. Spaeth notes that if a great deal of vote switching did take place it would disrupt the Court's decisional process since the majority opinion is originally assigned by the Chief Justice or the most senior Associate Justice (when the Chief is not in the majority) of the majority formed by the initial vote (1979:22). On the other hand, Woodward and Armstrong found evidence of a tendency on the part of Chief Justice Burger to switch his vote fairly regularly, much to the dismay of some of his brethren (1979:417-418).

45. The importance to the Court of the fact pattern of a case is made clear in O'Connor v. Ortega. In this search and seizure case eight of the nine justices who participated indicated that cases in this area must be decided on a case-by-case basis. Only Justice Scalia refused to accept this position, stating, ". . . I would object to the formulation of a standard so devoid of content that it produces rather than eliminates uncertainty in this field" (480 U.S. ___, ___; 94 L.Ed.2d 714, 731). (It should be noted that this case is not in the data set because the Court did not reach the merits of the case and remanded it for further review on procedural grounds.)

46. Segal notes the following: "Although some have modeled Supreme Court Justices as utility maximizers (e.g., Rohde, 1972; Teger, 1977), Niemi and Weisberg (1974) quite clearly point out that unidimensionality and single peakedness, in the sense used by formal theorists, can not be inferred from Guttman scaleability" (1983:56).

47. Technically speaking, every case that the Court chooses to hear is different from any other case they have heard. If this were not true the Court would be duplicating their efforts and wasting their time. Since, as has been argued, the Court is a policy making body, it is reasonable to assume that they want to make their policies as clear as possible, and general enough to give enforcement officials sufficient guidance in applying the policy. Thus, when the Court hears cases relating to a past precedent, these new cases generally explore some new aspect of the general problem which the Court was unwilling or unable to address in previous cases. These are the "additional problems" which must be handled by the Court.

48. In the codebook to his United States Supreme Court Judicial Data Base, Professor Spaeth lists eleven possibilities for the disposition of a case before the Supreme Court. These possibilities are as follows:

0 = stay, petition, or motion granted
1 = affirmed
2 = reversed
3 = reversed and remanded
4 = vacated and remanded
5 = affirmed in part and reversed in part
6 = affirmed in part and reversed in part and remanded
7 = vacated
8 = petition denied or appeal dismissed
9 = certification to a lower court
(blank) = a case arising under the Supreme Court's original jurisdiction, in which situation there is no lower court decision to review

The original jurisdiction of the Court is rarely invoked, and the remaining ten possibilities can be placed into three basic categories: affirm, reverse, and no decision. Since we are interested in decisions of the Court, cases where no formal decision was reached on the merits of the case are not considered, and we are left with the two basic possibilities of affirm or reverse.

49. The words "cues" and "cue theory" have taken on a special meaning in the discipline, namely a reference to the cue theory of certiorari. I prefer to use these terms in a more general sense. The preceding discussion has indicated that justices make their decision based on certain facts in a case. The presence of these facts signals the justice that a particular decision is in order, just as the fact that the rotating arms are swinging too far outward signals the Watt governor that the engine speed is too fast. Such signals are cues to particular behavior necessary to maintain the stability of the system. Thus the mention of "cue theory" refers to the assumptions that behavior is dependent on the presence of cues or signals in the decision maker's inputs. The "cue theory of certiorari" refers to the theory developed by Tanenhaus, et al.

50. The Fourth Amendment of the United States Constitution states:

> The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Chapter 3

1. The Exclusionary Rule was created to operate as a deterrent to unconstitutional police conduct. If police actions are considered constitutionally unreasonable, any evidence obtained cannot be used against the subject of the illegal search. The exclusion of such illegally obtained evidence is intended to give the police an incentive to operate within the law and punish them if they do not.

   It should be pointed out that Mapp v. Ohio is not part of the data set. In Mapp, the Court did not reach the question of the reasonableness of the search. They made the procedural decision regarding the applicability of the Exclusionary Rule to state law enforcement agencies

and sent the case back to the Ohio courts for further review.

2. A concern exists when there seems to be some combination of the location areas, such as when the suspect uses part of a residence as a business office (but the Court did not confront this question). A second questionable area concerns motor homes which are used as homes on wheels. The Court did face this issue in California v. Carney and took the position that the mobility of the vehicle required that it be treated as a car rather than a home (Brennan, Marshall, and Stevens disagreed). Although a motor home is neither strictly a home nor a vehicle, a majority of the Court decided to fit it into one of the established categories rather than fashion another, as the dissenters seemed willing to do.

3. An additional assumption is that the underlying probability function is logistic as opposed to normal in the case of logit. The difference between the two functions is minimal and occurs at the tails (Hanushek and Jackson 1977:204).

4. An additional problem associated with the use of a population rather than a sample involves the type of statistics used in analysis of the results. For the most part, both regression and probit analysis utilize the t-statistic as an indicator of the significance of the variables used in the model. The t-statistic, however, is intended for use with samples from a population whose underlying variance is unknown (Hanushek and Jackson 1977:122-124), and the normal distribution should properly be used. For purposes of statistical analysis, the population chosen for study may be considered a sample. This may seem to be playing fast and loose with the definitions and differences between samples and populations, but it is justified for two main reasons. First, by narrowly defining a particular data set as the population, e.g. Supreme Court search and seizure cases decided from 1961 through 1987, the ability to explain and draw conclusions beyond the scope of the population is severely limited. Nevertheless, this does not obviate the fact that this "population" is still part of a larger population of all search and seizure cases decided by the Burger Court, which is in turn part of the larger population of all search and seizure cases decided by both the Warren and Burger Courts, and so on. Defining a narrow population primarily affects the conclusions that can be drawn from the statistical analysis and not the analysis itself. Second, as noted by Kmenta (1971:143) as the sample size becomes large the t-distribution approaches the normal distribution. "Large" is sometimes understood to be over 30 observations, and at other times to be over 100 obser-

vations. The sample set for the research at hand contains over two hundred observations.

Chapter 4

1. Nine justices voting in each of the 204 decisions would yield 1836 individual votes. There were times, however, when the Court was forced to operate with less than a full compliment of justices due to vacancies, illness, or recusal of one of the justices.

2. Eleven independent variables would seem to be larger than the magical number seven (plus or minus two), however, five of these independent variables relate to the location of the search or seizure. Unlike the variables drawn from Hypotheses 2 through 6, the location of the search or seizure cannot be dichotomized as being present or not. Five categories of locations are identified (six if one includes the declaration by the Court that no search took place). The impact a particular location will have on the judicial decision maker can be logically derived to the extent that the locations can be ranked in order of their estimated importance in the model. However, the derived rankings are not specific enough to place them in one variable with a meaningful numerical value assigned to each location. Thus, each of the five locations is assigned a dichotomous variable. Viewing the location variables as one factor, the model estimates seven factors considered by the judicial decision maker.

3. In the interest of parsimony, the model was estimated a second time without the variable CAR with no appreciable change in the results. The inclusion in a model of irrelevant variables can produce suboptimal results. In this case, CAR is not irrelevant (it being part of the location choice set) and its deletion from the model only minimally affects the estimation results.

4. ROE measures the reduction in error over the modal category and is calculated as follows:

$$ROE(\%) = 100 \times \frac{\%\text{ correctly classified} - \%\text{ in modal category}}{100\% - \%\text{ in modal category}}$$

where % correctly classified is the percentage of observations which the model correctly classifies, and % in modal category is the percentage in the modal category of the dichotomous dependent variable. ROE is based on the idea of diminishing returns and cost-benefit curves (see Browning and Browning 1983:114-125) and offers a way of comparing the success of one or more models over data sets with differing distributions of the dependent variable.

ROE is too simple of a statistic not to believe that it has not been used before. In fact, I have found two previous uses. Freeman (1965) discusses Guttman's coefficient of predictability as a method of determining how the values of one variable can be used to predict the values of another (1965:71-78). Weisberg (1978) discusses Goodman and Kruskal's lambda which uses a similar formulation for a determination of a baseline in predicting roll-call vote in the House of Representatives. Both the Guttman and Goodman and Kruskal formulations are mathematically equivalent to the formulation of ROE. One difference lies in ROE's use of the modal category as the baseline. Use of the modal category provides a quick and easily ascertainable baseline against which the success of multivariate estimations may be compared. Weisberg indicates Goodman and Kruskal's lambda uses party identification as the baseline, or naive model. This is appropriate for roll-call voting, but would require a different standard when examining other areas. Thus, ROE is a more generic formulation.

5. The correctly and incorrectly classified votes were compared to each of the independent variables included in the model, as well as a number of alternative measures of the factors found in the hypotheses. None of these comparisons revealed systematic differences between correctly and incorrectly classified votes. In addition, an examination of the estimated probabilities and error terms for autocorrelation did not reveal any systematic pattern to the size or direction of the errors.

6. It did appear that a larger portion of the misclassified votes for unreasonableness are from the earlier part of the time period covered by the data set. This is simply because a greater portion of all the votes for the unreasonableness of a search or seizure occurred during the earlier part of the time period. This point will be discussed again later in the chapter.

7. In the course of estimation probit generates an estimated probability that each observation takes on the highest value of the dependent variable. This value is often referred to as PHAT. The classification rule utilizes PHAT to divide the observations into those classified as taking on the high value of the dependent variable and those which have the low value. The common decisional cutoff point is PHAT = .5, where values of PHAT greater than or equal to .5 are classified as taking on the high value of the dependent variable and those less than .5 are classified as taking on the low value. For any observation, VOTE is classified as 1 if the probability of the observation taking on the value 1 is greater than or equal to .5, and VOTE is classified as -1 if the probability of the observation taking on the value 1 is less

than .5.

8. The purpose of using a runs test is to see if there is systematic variation based on the ordering of the observations. The variable selected to order the observations is, therefore, of great importance. Quite often, the observations are collected in a time sequence, as is the case with the search and seizure data. However, the time sequence in which the observations were gathered is not directly related to the dependent variable, and only indirectly due to the sequence of personnel changes on the Court (which will be discussed in detail later in the text). In addition, such an ordering would still leave us with the problem of numerous tied ranks and a dependency on additional inappropriate variables to break them.

9. One method of differentiating among the justices in a given case is to create dummy variables which indicate the justice who is casting the vote in a particular observation. Nineteen justices cast votes in the period covered by the data set. Two of these justices (Frankfurter and Scalia) cast too few votes to make creation of a dummy variable for them feasible. Inclusion of the 17 variables representing the justices results in a dramatic increase in the percentage of votes correctly classified. The additional variables increase the correctly classified votes to 1368 of 1775 (77.1%). Examination of these results, however, reveals that the additional variables are forcing classification of the votes of a justice into the modal category of that justice's actual votes. The high percentage of votes in the modal category for many of the justices (Justices Black, Brennan, Burger, Douglas, Goldberg, Marshall, O'Connor, and Rehnquist are all over 80%) causes the increase in the correct classification rate. Aggregation of the estimated votes only increases the correct classification of the Court's decisions by two decisions to 148 of 204 (72.5%).

10. Despite the limitations placed on the estimation of the votes of the individual justices, the results on a justice-by-justice basis should be noted. No consistent patterns exist with respect to the number of votes correctly classified, the percentage of votes in a justice's modal category, and the percentage of agreement a justice has with the majority. The lowest correct classification rates are for Justices Marshall (50.0%), Douglas (51.2%), and Brennan (52.0%). These low rates can be explained by a combination of two factors. First, the modal category percentage for each of these justices is over 80%. Second, for all three of these justices the majority of their votes were cast against the reasonableness of the search or seizure. This results in very low percentages of agreement with the majority (less than 60%). On the other end of the ideological spectrum, Justices Burger,

O'Connor, and Rehnquist each have modal category percentages in excess of 80%, but have higher correct classification rates because more of their votes were cast with the majority. Justice Powell has the highest rate of agreement with the Court at 93.0%, but both Justices Rehnquist and Stewart have higher correct classification rates (77.3% and 70.7% respectively as compared with Powell's 69.7%). As indicated in the text, the number of votes a justice casts in dissent directly affects the number of votes which can be correctly classified.

11. To see how PF values are determined, let us examine the decision where PF_f = .027. In this case, Almeida-Sanchez v. U. S. the independent variables and their estimated coefficients are as follows:

CONSTANT	1.22	* 1 =	1.22
HOME	-1.55	* 0 =	0
BUSINESS	-1.20	* 0 =	0
PROPERTY	-1.15	* 0 =	0
CAR	-0.30	* 1 =	-0.30
PERSON	-0.64	* 0 =	0
CONTROL	-0.47	* 0 =	0
CUSTODY	-0.69	* 1 =	-0.69
TIME	0.45	* 1 =	0.45
DRUG/GUN	0.64	* 1 =	0.64
SEVERE	-0.94	* 0 =	0
US	0.60	* 1 =	0.60

Z-score (phat)			1.92

From the standard normal distribution table, a Z-score of 1.92 translates into a probability of .9726 that the dependent variable takes on its high value. By the classification rule, this decision would be classified as a reasonable search or seizure. Unfortunately the Court did not agree, and the dependent variable, DECISION, took on its low value. Thus, PF_f = 1 - phat = .0274, which makes this the most badly missed classification. One may wonder why the model missed so badly on this decision. An examination of the facts do provide some clues. The case involved a roving border patrol on the lookout for illegal aliens, but the circumstances of the search led a majority of the Court to decide the patrol exceeded its authority to search without a warrant. It is quite possible that if illegal aliens had been found instead of drugs, the lesser penalties involved would not have pushed the balance so far toward the protection of the individual and the search might have been allowed.

This suggests a reverse logic. The roving border patrol's actions were somewhat questionable. If they had found illegal aliens, the penalties for the suspects would not be particularly severe, at least in relation to the penalties for drug smuggling. Thus, the higher

penalties involved in drug charges caused the Court to view the actions of the patrol more carefully. The result is the suspect goes free, despite the model's estimate that the presence of drugs increases the likelihood the search or seizure will be considered reasonable.

12. In a general sense, we do want PF_f values to be close to the cutoff point. This indicates the possibility that these observations may be correctly classified if the specification of the model is slightly altered or other minor adjustments are made. However, when the PF_f values are close to the cutoff point it may not be obvious what alterations are needed. If the PF_f values are very low, closer examination of the observations may reveal similarities which account for their misclassification. If no such similarities exist or can be found, the observations may be considered outliers and treated accordingly.

13. The decisional cutoff point for classification, and thus for success, is .5. Therefore, by definition, when examining the PF values of correctly classified observations (PF_s) the minimum value must be greater than or equal to .5. For this model, the minimum PF_s value is .501. Similarly, the maximum PF value for misclassified observations (PF_f) must be less than .5. For this model the maximum PF_f value is .499.

14. Clearly, an estimated coefficient of .02 and a standard error of .005 should yield a t-statistic of 4.00. This and all other discrepancies in the Tables are due to roundoff errors.

15. Two other possible measures could have been used to capture this time element. Segal (1984) used a variable called CHANGE to indicate personnnel changes on the Court. A second alternative is a variable, TERM, which indicates the year of the term in which the search or seizure was decided. LEDCITE is used simply because it is readily available; LEDCITE is coded for every observation for identification purposes. CHANGE, TIME, or any other similar variable could have been used to make the point.

16. "The statement that a . . . Justice does not support the values of freedom, equality, or New Deal economics is not meant to be pejorative. Support or nonsupport is a matter of degree--a measure of <u>comparative</u> support or nonsupport. . . . Moreover, a Justice may well believe that other considerations outweigh support for such values as freedom and equality. He may strongly believe that individuals must bear full responsibility for their won actions and that the government must not engage in social engineering regardless of "humanitarian" considerations. Such a Justice would likely appear hostile to equality as it has been described . . . . Similarly, a

Justice who was strongly supportive of states' rights and who thus believed that primary responsibility for enforcement of the criminal laws rested with the states. Such a Justice would likely be tolerant of state efforts to cope with crime, with the result that he would appear to be antifreedom" (Spaeth 1979:134).

17. The data Spaeth used to construct the value systems and underlying scale scores covers the period from 1958 through 1977. Since that time minor fluctuations in the scores and/or the ordering of the justices may have occurred. Since the terms of Justices O'Connor and Scalia postdate the original data period, their placement is based on informal educated guesses of Professor Spaeth. Justices Black and Harlan served through the 1970 term.

    For a more complete explanation of the construction of scales values, and value systems, see Spaeth (1979:109-139).

APPENDICES

APPENDIX A. Cases Contained in the Data Set

Listed below are the 204 cases contained in the data set. They are listed in decending order based on their citation in the United States Supreme Court Reports, Lawyers' Edition, 2d.

Case Name (Date)	U.S.	L.Ed 2d
Griffin v. Wisconsin (1987)	483/____ *	097/0709
New York v. Burger (1987)	482/____	096/0601
Illinois v. Krull (1987)	480/____	094/0364
Arizona v. Wicks (1987)	480/____	094/0347
U. S. v. Dunn (1987)	480/____	094/0326
Maryland v. Garrison (1987)	480/0079	094/0072
Colorado v. Bertine (1987)	479/0367	093/0739
Dow Chemical Co. v. U. S. (1986)	476/0227	090/0226
California v. Ciraolo (1986)	476/0207	090/0210
New York v. Class (1986)	475/0106	089/0081
U. S. v. Montoya De Hernandez (1985)	473/0531	087/0381
Maryland v. Macon (1985)	472/0463	086/0370
California v. Carney (1985)	471/0386	085/0406
Tennessee v. Garner (1985)	471/0001	085/0001
Tennessee v. Garner (1985)[1]	471/0001	085/0001
Hayes v. Florida (1985)	470/0811	084/0705
Winston v. Lee (1985)	470/0753	084/0662
U. S. v. Sharpe (1985)	470/0675	084/0605
U. S. v. Johns (1985)	469/0478	083/0890
New Jersey v. T. L. O. (1985)	469/0325	083/0720
U. S. v. Hensley (1985)	469/0221	083/0604
Thompson v. Louisiana (1984)	469/0017	083/0246
Florida v. Rodriguez (1984)	469/0001	083/0165
I. N. S. v. Lopez-Mendoza (1984)	468/1032	082/0778
Massachusetts v. Sheppard (1984)	468/0981	082/0737
U. S. v. Leon (1984)	468/0897	082/0677
Segura v. U. S. (1984)[2]	468/0796	082/0599
Segura v. U. S. (1984)	468/0796	082/0599
U. S. v. Karo (1984)	468/0705	082/0530
Hudson v. Palmer (1984)	468/0517	082/0393
Welsh v. Wisconsin (1984)	466/0740	080/0732
Massachusetts v. Upton (1984)	466/0727	080/0721
Florida v. Meyers (1984)	466/0380	080/0381
I. N. S. v. Delgado (1984)	466/0210	080/0247
Oliver v. U. S. 1984)	466/0170	080/0214
Oliver v. U. S. 1984)[3]	466/0170	080/0214
U. S. v. Jacobsen (1984)	466/0109	080/0085

Donovan v. Lone Steer, Inc. (1984)	464/0408	078/0567
Michigan v. Clifford (1984)[4]	464/0287	078/0477
Michigan v. Clifford (1984)	464/0287	078/0477
Michigan v. Long (1983)	463/1032	077/1201
Illinois v. Andreas (1983)	463/0765	077/1003
U. S. v. Place 1983)	462/0696	077/0110
Illinois v. Lafayette (1983)	462/0640	077/0065
U. S. v. Villamonte-Marquez (1983)	462/0579	077/0022
Illinois v. Gates (1983)	462/0213	076/0527
Texas v. Brown (1983)	460/0730	075/0502
Florida v. Royer (1983)[5]	460/0491	075/0229
Florida v. Royer (1983)	460/0491	075/0229
U. S. v. Knotts (1983)	460/0276	075/0055
Michigan v. Thomas (1982)	458/0259	073/0750
U. S. v. Ross (1982)	456/0798	072/0572
Washington v. Chrisman (1982)	455/0001	070/0778
New York v. Belton (1981)	453/0454	069/0768
Robbins v. California (1981)	453/0420	069/0744
Michigan v. Summers (1981)[6]	452/0692	069/0340
Michigan v. Summers (1981)	452/0692	069/0340
Donovan v. Dewey (1981)	452/0594	069/0262
Steagald v. U. S. (1981)	451/0204	068/0038
U. S. v. Cortez (1981)	449/0411	066/0621
Colorado v. Bannister (1980)	449/0001	066/0001
Reid v. Georgia (1980)	448/0438	065/0890
Rawlings v. Kentucky (1980)[7]	448/0098	065/0633
Rawlings v. Kentucky (1980)	448/0098	065/0633
U. S. v. Payner (1980)	447/0727	065/0468
Walter v. U. S. (1980)	447/0649	065/0410
Walter v. U. S. (1980)[8]	447/0649	065/0410
U. S. v. Mendenhall (1980)[9]	446/0544	064/0497
U. S. v. Mendenhall (1980)	446/0544	064/0497
Payton v. New York (1980)	445/0573	063/0639
Payton v. New York (1980)[10]	445/0573	063/0639
Ybarra v. Illinois (1979)	444/0085	062/0238
Brown v. Texas (1979)	443/0047	061/0357
Michigan v. DeFillippo (1979)	443/0031	061/0343
Arkansas v. Sanders (1979)	442/0753	061/0235
Smith v. Maryland (1979)	442/0735	061/0220
Torres v. Puerto Rico (1979)	442/0465	061/0001
Lo-Ji Sales, Inc. v. New York (1979)	442/0319	060/0920
Dunaway v. New York (1979)	442/0200	060/0824
Bell v. Wolfish (1979)[11]	441/0520	060/0447
Bell v. Wolfish (1979)	441/0520	060/0447
Dalia v. U. S. (1979)	441/0238	060/0177
U. S. v. Caceres (1979)	440/0741	059/0733
Delaware b. Prouse (1979)	440/0648	059/0660
Michigan v. Doran (1978)	439/0282	058/0521
Rakas b. Illinois (1978)	439/0128	058/0387
Franks v. Delaware (1978)	438/0154	057/0667
Mincey v. Arizona (1978)	437/0385	057/0290
Zurcher v. Stanford Daily (1978)	436/0547	056/0525
Zurcher v. Stanford Daily (1978)[12]	436/0547	056/0525
Michigan v. Tyler (1978)[13]	436/0499	056/0486
Michigan v. Tyler (1978)	436/0499	056/0486

Marshall v. Barlow's, Inc. (1978)	436/0307	056/0305
Scott v. U. S. (1978)	436/0128	056/0168
U. S. v. Ceccolini (1978)	435/0268	055/0268
U. S. v. New York Telephone Co. (1977)	434/0159	054/0376
Pennsylvania v. Mimms (1977)	434/0106	054/0331
Nixon v. Administrator of General Services (1977)	433/0425	053/0867
U. S. v. Chadwick (1977)	433/0001	053/0538
U. S. v. Ramsey (1977)	431/0606	052/0617
U. S. v. Donovan (1977)	429/0413	050/0652
G. M. Leasing Corp. v. U. S. (1977)[14]	429/0338	050/0530
G. M. Leasing Corp. v. U. S. (1977)	429/0338	050/0530
U. S. v. Martinez-Fuerte (1976)	428/0543	049/1116
U. S. v. Martinez-Fuerte (1976)[15]	428/0543	049/1116
U. S. v. Janis (1976)	428/0433	049/1046
South Dakota v. Opperman (1976)	428/0364	049/1000
Andersen v. Maryland (1976)	427/0463	049/0627
U. S. v. Santana (1976)[16]	427/0038	049/0300
U. S. v. Santana (1976)	427/0038	049/0300
U. S. v. Miller (1976)	425/0435	048/0071
U. S. v. Watson (1976)[17]	423/0411	046/0598
U. S. v. Watson (1976)	423/0411	046/0598
State of Texas v. White (1975)	423/0067	046/0209
U. S. v. Ortiz (1975)	422/0891	045/0623
U. S. v. Brignoni-Ponce (1975)	422/0873	045/0607
Gerstein v. Pugh (1975)	420/0103	043/0054
Cardwell v. Lewis (1974)	417/0583	041/0325
Air Pollution Variance Board v. Western Alfalfa Corp. (1974)	416/0861	040/0607
U. S. v. Chavez (1974)[18]	416/0562	040/0380
U. S. v. Chavez (1974)	416/0562	040/0380
U. S. v. Giordano (1974)	416/0505	040/0341
Gooding v. U. S. (1974)	416/0430	040/0250
California Bankers Assn. v. Shultz (1974)	416/0021	039/0812
California Bankers Assn. v. Shultz (1974)[19]	416/0021	039/0812
U. S. v. Edwards (1974)	415/0800	039/0771
U. S. v. Calandra (1974)	414/0338	039/0561
U. S. v. Matlock (1974)	415/0164	039/0242
Gustafson v. Florida (1973)	414/0260	038/0456
U. S. v. Robinson (1973)	414/0218	038/0427
Roaden v. Kentucky (1973)	413/0498	037/0757
Cady v. Dombrowski (1973)	413/0433	037/0706
Almeida-Sanchez v. U. S. (1973)	413/0266	037/0596
Cupp v. Murphy (1973)	412/0291	036/0900
Schneckloth v. Bustamonte (1973)	412/0218	036/0854
Brown v. U. S. (1973)	411/0223	036/0208
U. S. v. Mara (1973)	410/0019	035/0099
U. S. v. Dionisio (1973)	410/0001	035/0067
Gelbard v. U. S. (1972)	408/0041	033/0179
Gelbard v. U. S. (1972)[20]	408/0041	033/0179
Shadwick v. City of Tampa (1972)	407/0345	032/0783
U. S. v. U. S. District Court (1972)	407/0297	032/0752
Adams v. Williams (1972)[21]	407/0143	032/0612

Adams v. Williams (1972)	407/0143	032/0612
U. S. v. Biswell (1972)	406/0311	032/0087
U. S. v. Harris (1971)	403/0573	029/0723
Coolidge v. New Hampshire (1971)[22]	403/0443	029/0564
Coolidge v. New Hampshire (1971)	403/0443	029/0564
Hill v. California (1971)	401/0797	028/0484
U. S. v. White (1971)	401/0745	028/0453
Whiteley v. Warden of Wyoming State Penitentiary (1971)	401/0560	028/0306
Wyman v. James (1971)	400/0309	027/0408
Chambers v. Maroney (1970)	399/0042	026/0419
Vale v. Louisana (1970)	399/0030	026/0409
U. S. v. Leeuwen (1970)	397/0249	025/0282
Colonnade Catering Corp v. U. S. (1970)	397/0072	025/0060
Shiplly v. California (1969)	395/0818	023/0732
Von Cleef v. New Jersey (1969)	395/0814	023/0728
Chimel v. California (1969)	395/0752	023/0685
Frazier v. Cupp (1969)	394/0731	022/0684
Davis v. Mississippi (1969)	394/0721	022/0676
Kaiser v. New York (1969)	394/0280	022/0274
Desist v. U. S. (1969)	394/0244	022/0248
Spinelli v. U. S. (1969)	393/0410	021/0637
Recznik v. City of Lorain (1968)	393/0166	021/0317
Lee v. State of Florida (1968)	392/0378	020/1166
Mancusi v. DeForte (1968)	392/0364	020/1154
Sibron v. New York (1968)	392/0040	020/0917
Sibron v. New York (1968)[23]	392/0040	020/0917
Terry v. Ohio (1968)	392/0001	020/0889
Sabbath v. U. S. (1968)	391/0585	020/0828
Bumper v. North Carolina (1968)	391/0543	020/0797
Dyke v. Taylor Implement Mfg Co. (1968)	391/0216	020/0538
Harris v. U. S. (1968)	390/0234	019/1067
Katz v. U. S. (1967)	389/0347	019/0576
Berger v. New York (1967)	388/0041	018/1040
See v. City of Seattle (1967)	387/0541	018/0943
Camara v. Municipal Court (1967)	387/0523	018/0930
Warden, Maryland Penitentiary v. Hayden (1967)	387/0294	018/0782
McCray v. Illinois (1967)	386/0300	018/0062
Cooper v. California (1967)	386/0058	017/0730
Osborn v. U. S. (1966)	385/0323	017/0394
Hoffa v. U. S. (1966)	385/0293	017/0374
Hoffa v. U. S. (1966)[24]	385/0293	017/0374
Hoffa v. U. S. (1966)[25]	385/0293	017/0374
Hoffa v. U. S. (1966)[26]	385/0293	017/0374
Lewis v. U. S. (1966)	385/0206	017/0312
Schmerber v. California (1966)	384/0757	016/0908
Riggan v. Virginia (1966)	384/0152	016/0431
James v. Louisana (1965)	382/0036	015/0030
U. S. v. Ventresca (1965)	380/0102	013/0684
Stanford v. Texas (1965)	379/0476	013/0431
Beck v. Ohio (1964)	379/0089	013/0142
Aguilar v. Texas (1964)	378/0108	012/0723
Clinton v. Virginia (1964)	377/0158	012/0213
Rugendorf v. U. S. (1964)	376/0528	011/0887

Stoner v. California (1964)	376/0483	011/0856
Preston v. U. S. (1964)	376/0364	011/0777
Ker v. California (1963)	374/0023	010/0726
Lopez v. U. S. (1963)	373/0427	010/0462
Sun v. U. S. (1963)[27]	371/0471	009/0441
Sun v. U. S. (1963)	371/0471	009/0441
Lanza v. New York (1962)	370/0139	008/0384
Marcus v. Search Warrant (1961)	367/0717	006/1127

* Blanks indicate volume and/or page numbers have not yet been assigned.

1. A second case Memphis Police Department v. Garner, docket number 83-1070, combined with the lead case.
2. There are two separate searches in this case. The first deals with the search prior to securing a warrant, and the second after the warrant was obtained.
3. A second case Maine v. Thornton, docket number 82-1273, combined with the lead case.
4. There are two separate searches in this case. The first deals with the search at the time of the fire, and the second concerns a search which took place several hours later.
5. There are two separate incidents in this case. The first deals with the search, and the second with the seizure.
6. There are two separate searches in this case. The first deals with the search of defendant's person, and the second concerns the search of the home.
7. There are two separate searches in this case. The first deals with the third party search, and the second with the search of defendant's person.
8. A second case Sanders v. U. S., docket number 79-148, combined with the lead case.
9. There are two separate searches in this case. The first deals with the search of suspect's person, and the second concerns the initial stop.
10. A second case, Riddick v. New York, docket number 78-5421, combined with the lead case.
11. There are two separate searches in this case. The first deals with the searching of prison cells, and the second with the searching of body cavities.
12. A second case, Bergna v. Stanford Daily, docket number 76-1600, combined with the lead case.
13. There are two separate searches in this case. The first deals with the searches conducted days after the fire, the second concerns the searches which took place at the time of the fire and immediately thereafter.
14. There are two separate searches in this case. The first deals with the search of the business premises, and the second of a car located on a public street.
15. A second case, Sifuentes v. U. S., docket number 75-5387, combined with the lead case.
16. There are two separate incidents in this case. The first deals with the search, and the second concerns the seizure.

17. There are two separate incidents in this case. The first deals with the search, and the second concerns the seizure.
18. There are two separate wiretaps in this case. The first observation deals with the first wiretap and the second observation with the second wiretap.
19. A second case, Stark v. Shultz, docket number 72-1196, combined with the lead case.
20. A second case, U. S. v. Egan, docket number 71-263, combined with the lead case.
21. There are two separate searchs in this case. The first is the search of the car incident to the arrest and the second is the search of the person.
22. There are two separate incidents in this case. The first concerns the evidence provided by the wife and the second the search of the car.
23. A second case, Peters v. New York, docket number 74, combined with the lead case.
24. A second case, Parks v. U. S., docket number 33, combined with the lead case.
25. A third case, U. S. v. Campbell, docket number 34, combined with the lead case.
26. A fourth case, King v. U. S., docket number 35, combined with the lead case.
27. There are two separate defendants in this case. The first observation concerns defendant Sun and the second observation concerns defendant Toy.

APPENDIX B. Cases Cited in Text and Notes

The following table is an alphabetic list of the cases cited in the text and notes. Cases preceded by an asterisk (*) belong to the data set.

Case name (date)	Citation
*Almeida-Sanchez v. U.S. (1973)	413 U.S. 0266
Brown v. Board of Education (1954)	347 U.S. 0483
*California v. Carney (1985)	471 U.S. 0386
Flast v. Cohen (1968)	392 U.S. 0083
*Florida v. Royer (1983)	460 U.S. 0491
Frothingham v. Mellon (1923)	262 U.S. 0447
Mapp v. Ohio (1961)	367 U.S. 0643
Marbury v. Madison (1803)	1 Cranch 0137
O'Connor v. Ortega (1987)	480 U.S. ____
Plessy v. Ferguson (1896)	163 U.S. 0537
Regents of the University of California v. Bakke (1978)	438 U.S. 0265
Rochin v. California (1952)	342 U.S. 0165
Roe v. Wade (1973)	410 U.S. 0113
*Segura v. U.S. (1984)	468 U.S. 0796

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