The Decision Making Machine:

CAN COMMITTEES MAKE REASONED DECISIONS WHEN FACED WITH INCOMPLETE INFORMATION?

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THE DECISION MAKING MACHINE:

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Since its inception, theorists have pondered the stability of democracy. Attempting to determine if democracy can be a lasting and practicable government structure is a formidable task that has been broken into hundreds of sub-questions. It is necessary to learn about a democracy with respect to everything from voting and campaigning to its role in the international system of powers. Exploring decision making techniques is a vital component of the perpetuity of a democratic system. If a democracy is government run by its citizens, then by definition, democracies are subject to collective decision making. Therefore, in a struggle to confirm the vitality of democracy, one must study the collective decisions of committees. Is it possible for groups of decision makers with competing interests and varying levels of information to make reasoned choices? How does this process affect the continuity or the volatility of democracy as a government? If groups of decision makers can make reasoned choices when given a set of complete information about the consequences, costs, benefits, dangers and history of the decision before them, can they also make reasoned choices given incomplete information?

This thesis contributes to our understanding about how collective decision making with limited information affects democratic institutions. The research presented herein will present a theory of how committees collect information through various forms of communication to make decisions. Virtually all previous theories about committee decision making rely upon models of full information (see Condorcet, Arrow, Black,

etc.). However, people lack information. That is, rarely do people make decisions based on complete information about the subject at hand. Given these two premises, modern political scientists have redefined theories of rational choice by individual actors to include models of incomplete information (Popkin 1991; Simon 1985; Crawford and Sobel 1982, etc.). The purpose of this study is to apply similar theories to collectives, or committees, to determine if collectives can make reasoned choices. I assume that groups charged with making decisions who are faced with incomplete information attempt to gain more information before making a decision. This information gathering process involves various types of communication. As committees are made up of individuals, collective decision making is two-fold. A committee's decision is made up of the individual decisions of its members and the final collective outcome of the group. Therefore, I argue that committees attempt to gain two types of information. They want information about how their decisions will affect the outside world (this is external information), and they seek information about the preferences of their fellow committee members (this is internal information). It is necessary to determine how such communication and information affects the decision making process of committee members to determine if collectives are rational decision making bodies.

People lack complete information

The first premise upon which I base my argument is people lack complete information. This is a relatively general statement that is difficult to contradict. That is, we live in a complex world and no one is knowledgeable about every aspect of the world. Members of committees are expected to specialize and become familiar with the subject matter with which they may deal on a regular basis. However, it is impossible for people to be truly knowledgeable about every aspect of an issue or decision that comes before them. For example, we know that people make simple decisions everyday based on less than full-information about products or the world around them.

One does not need to understand the chemistry behind how aspirin affects the brain and nervous system to know that the small pill can safely relieve pain and fevers. We often purchase products without really knowing exactly what's inside of them, or where they came from, or where the money goes. But, we buy the products anyway because we have a belief about its worth and value to our welfare based on advertising and previous experiences. Also, the city council may decide to place a stop sign at an intersection without collecting information about who would do the minor construction, where the stop sign material originated, or how the sign affects the noise pollution to the adjacent homes. Therefore, we see that people and committees make decisions every day based on less than complete information.

Previous theories of collective decision making are full information models

In an attempt to determine how collective decision making affects democratic institutions, it is critical to examine how previous literature has approached this question. Shepsle and Weingast summarize former models of rational decision making into generations (1994, 149-79). Chapter two will discuss, in detail the specifics of their findings, however a common element of the generations is that of information. Those labeled first generation theorists, such as Condorcet, Arrow, and Black, propose models that assume decision makers have complete information. The Condorcet voting paradox or Arrow's theorem of cyclical outcomes in voting behavior make a strong assumption about information (Arrow 1963). Theories such as these are dependent upon the premise that decision makers have complete information about the consequences of their actions and the preferences of other decision makers.

The second generation model includes more contemporary theorists such as Fiorina. While the first generation concentrates on individual decision making, the second generation begins to examine the role information plays in group decision making. In the second generation theories, authors describe models of rational actors

who seek goals. In this model, decision makers attempt to reach an equilibrium through reciprocal decision making (Fiorina 1987). In other words, they do each other favors to maintain an equal balance as each actor attempts to accomplish their objectives. The idea that a rational actor is a goal seeking actor who attempts to maximize her personal utility has been widely accepted as the common definition of a reasoned decision maker. In this thesis, I adopt this view of reasoned decision making. In other words, a reasoned decision maker is one who attempts to obtain an objective that has the greatest perceived utility of all the alternatives. However the second generation models assume that actors have complete information about the consequences of their actions and the preferences of other decision makers. Common sense tells us that people frequently make decisions without such information, and these generational models do not factor this element into their theories (Shepsle and Weingast 1994).

The third generation of rational choice theorists began to describe individual decision makers as actors in institutions. Krehbiel presents his informational theory of decision making as an addition to the previous distributional (also known as the demand side theories, or the second generation model) theories of decision making (1991). In Krehbiel's model, decision makers are also goal seeking, however their actions are largely dependent upon the institutions in which they behave (such as parliamentary procedure, congressional committees, and leadership). In addition, Cox and McCubbins submit that congressional party organizations are another structuring element that greatly affect decision making (1994).

However, it is important to note that in all these previous models of decision making, information is either considered to be an absolute and complete element, or it is not adequately considered in a way that allows us to determine the reasoned decision making abilities of collectives. There are other authors who discuss incomplete information models of decision making (McKelvey and Ordeshook 1976, Downs 1957), however such models suggest that the only way to overcome incomplete information is

to find methods to allow decision makers to get back to "full-information-like" results. Therefore, while these authors present the idea of incomplete information in decision making, they suggest that decision makers must revert to full information models to make rational decisions. This study will divert from the previous theorists and posit that committees can make reasoned choices with less than complete information.

Collective decisions, incomplete information and communication

In its path to discovering the stability of collective decision making in democracies, the first premise put forth in this argument said that people have incomplete information. Then, after analyzing relevant literature, I propose that previous models of decision making, both individual and collective, did not adequately consider models with incomplete information. The next logical step to determining the rationality of collective decision making leads me to ask the question: Are collective decisions different when committee members have incomplete information? If so, how do these decisions differ?

I posit that committees make decisions differently when presented with full information versus incomplete information. However, it is unlikely one would find a fully informed committee. Thus, committee members gather information through communication. This study will examine this communication from an external perspective and an internal perspective.

Plan of the Book

Given democracy's dependence on collective decision making and the questions set forth above, it is easy to understand the relevance of this study to gaining a better understanding about the stability of democratic institutions. Clearly, there is a gap in previous research that does not examine how committees that lack information make rational decisions. Chapter two will discuss the theoretical concepts mentioned in the

literature contained in this chapter. I will examine the literature surrounding decision making and committees, and discuss its implications in this study. This chapter will provide a foundation upon the hypotheses of this study are based. Chapter two will also provide an explanation of Condorcet's paradox and how it can be overcome in a committee setting. Additionally, it will discuss communication and information in committees and relate these theories to the social and rational choice models.

Chapter three will delineate the argument of my thesis and outline the conditions for hypotheses testing. I will draw upon the theoretical basis outlined in chapter two and develop a model of communication in committees. Additionally, chapter three will briefly describe the experiments that I performed to test my hypotheses.

Chapters four and five describe the two rounds of experiments that test the hypotheses. In Chapter four I will describe the results from the experiments that tested the external aspects of committee information exchange. I will relate the committee environment of the experiment to the theories described in chapter two and describe how the theories are used and tested in the experiment. Additionally, the experimental design will be presented in detail. Finally, I will discuss the outcomes and analyze their significance. I will test the outcomes of the experiments against the hypothesize and analyze the potential drawbacks of such a method of drawing conclusions. Chapter five will do the same with internal committee information experiments. Between the experimental designs presented in chapters four and five, I can make observations and conclusions about how committees gather information from external sources and from within their bodies. Then I will determine if committees can in fact make reasoned choices in a similar manner to individuals.

Chapter six will connect these hypotheses to the modern political arena. I will hypothesize about the implications of these experimental results on how Congress and other committee-based institutions function. I will be able to suggest the possibility of institutionalizing methods of communication and information sharing that maximizes a

committee's ability to make rational choices. Such experiments and analysis are applicable from Congress to the PTA and may affect the way we think about information and incentives.

As we strive to answer ancient questions about the function of democracy and the strength of its foundations, we must analyze the components of democracy. Many theorists have proposed answers relating to the validity of collective decision making, however many have failed to analyze such behavior in the face of incomplete information — a critical and ubiquitous feature of society. Therefore, we must determine when limited information stops reasoned collective decision making. That, is the objective of my research.

CHAPTER 2

FROM COLLECTIVES TO COMMITTEES, AND WHAT ABOUT INFORMATION?

A THEORETICAL AND HISTORICAL BACKGROUND WITH LITERATURE REVIEW

The purpose of this chapter is to provide a historical and theoretical framework in which to place an understanding of collective decision making. I will examine the conditions under which democratic collective decision making that lacks complete information resembles decisions made with complete information. In what follows, I will simplify collective decision making in general to committee decision making, in an attempt to narrow the scope of the problem addressed here. So, before I review the theoretical literature, I will provide an historical framework in which to place the premises of my research. The main objective of this chapter is to explore previous literature about collective decision making and determine how other theorists have answered questions regarding information and decision making. Analysis of previous theories about committee decision making reveals that the prevailing work on committees have assumed that decision makers have complete information (Shepsle and Weingast 1994; Kingdon 1977). I will describe these models and elucidate the question they have left unanswered: can committees make reasoned choices with less than complete information? The study by Lupia and McCubbins (1997) is relevant to beginning to answer this question. Their model describes individual decision making with incomplete information. A look at these models helps us understand previous theories about committee decision behavior and helps identify the missing links that beg the question asked here: can committees make rational decisions when faced with incomplete information?

Definition of committee

Before discussing committees as deliberative bodies of rational and strategic decision makers, it is necessary to clarify the scope of this study by providing a definition of committees. Breaking a large group up into smaller parts has long been seen as the most efficient way of obtaining an objective. Often, large groups of people assigned to complete one or more tasks face difficulties because of competing incentives, personality conflicts, a variety of ideas, and a lack of direction and overall purpose. Most people would agree that it would be inefficient, if not absurd, to ask a group of 30 people to change one light bulb. Thus, large groups break themselves down into smaller groups, or committees, in an attempt to complete their task (Lees and Shaw 1979, 3- 5)

In their work about committees in legislatures, John D. Lees and Malcolm Shaw describe a committee as:

> a body to which some other body or person has referred or committed a task and to which the committee is in some sense subordinate. As such, the committee is one of the most ubiquitous institutions imaginable (1979, 3).

In this context, committees are useful in a variety of circumstances. Lees and Shaw portend that most major political decisions are made in committees. Democracies, by definition, have many people involved with decision making processes. While democratic leadership roles with specific responsibilities exist, democratic institutions (especially at the national level) must commit much of their work and many of their functions to committees. Congress in itself, is a type of committee of representative democracy (Lees and Shaw 1979, 3- 8).

Considering the above definition, many bodies could be considered committees. Families and social cliques would certainly fall under these specifications. Therefore, it is necessary to add certain characteristics to the definition. For the purposes of this study, and those studies upon which this research is based, a committee must also be formal and task oriented. That is, a formal committee may have sets of written rules

and procedures by which it must conduct itself. These committees are parts of institutions, or are institutions themselves. This study seeks to determine how such committees behave given certain obstacles (information acquisition) and incentives.

Historical Framework

As collective decision making seems to be a general and ubiquitous feature of democratic decision making, it is prudent to understand how committees formally evolved in democracy before we can begin to understand how such committees deal with incomplete information and decision making paradoxes. Gamm and Shepsle theorize about committee decision making behavior by describing the history and development of standing congressional committees and presenting two models (1989). The first model they present is "the rational theory of leadership." Their second model is termed the model of "pre-described organizational imperatives." Their rational theory of leadership contains the idea that leaders are strategic and act in such a way to maximize their utility *and* to benefit the organization as a whole. The alternative theory of pre-described organizational imperatives contends that individual decision makers are pawns of their organizations and simply follow the prescribed motions that the institution has set. These competing theories are analyzed in a historical context by describing the development of standing congressional committees (Gamm and Shepsle 1989, 40-63).

In support of the rational theory of leadership, Gamm and Shepsle describe the story of Henry Clay and how he came to use and rely upon standing congressional committees after the period following the War of 1812 (57-58). As an empirical example, Congress was not readily willing to accept the role of permanent congressional committees. However, Gamm and Shepsle contend that leaders, such as Henry Clay "have an interest in manipulating and utilizing institutional resources as a means to their own personal objectives" (1989, 57). In the beginning of his term, Clay

relied on political motives and homogeneous factions to create his system of standing committees. As cleavages changed, he had to be sure the system was institutionalized. He therefore, maintained the system that had served his interests so well, and adjusted it to a more heterogeneous politic (Gamm and Shepsle 1989, 57-58).

In this way the "Rational Theory of Institutional Development" is manifest in the story of Henry Clay and his experience with standing committees in the U.S. House of Representatives. Analysis of this period demonstrates two major concepts relative to this study. First, the rational theory of institutional development explains how leaders simultaneously act in the collective best interest of the institution as a whole and behave as rational actors in order to achieve their ends. Second, the history of how standing committees developed in Congress illustrates the utilization of committees in general and how they come to be the complex institutions that we know and analyze today (Gamm and Shepsle 1989, 57-58).

These two concepts about strategic leaders and the development of standing legislative committees, are evident in five facts about this period. First, Clay did not invent standing committees, they had previously been in existence for hundreds of years. Crediting the "invention" of such a tool to one person would not be consistent with the model. The model requires that individuals act rationally and deliberately to achieve their ends, but it does not require that a single individual manipulate the system for a single advantage. Remember the general definition of rational actors discussed earlier. Second, Clay did not have to understand "rational choice theory" as we do today in order to act in the strategic manner that he did. Again, he only had to have a perception of the future and how his actions would affect the final outcome of the organization and institution's final decision. Third, while the Senate experience does not support the rational theory, it is not contrary. The birth of standing committees in the Senate may have been more of a response to current trends than anything else however, it would not have occurred without the strong influence of individual Senators.

In this way, these leaders acted as rational actors that lead to the structural reorganization of their institution. Fourth, it is important to remember that the organizational method of strategic leadership in a rational theory of institutional development is not itself an end, but rather a means to and end. Fifth, institutional maneuvers were not Clay's only strategy. After the war, he had tried to reunite the old coalition through another issue. Clay was acting strategically because he had the Presidency in his foresight. Although he tried to reunite the old coalition of war hawks on other issues as failed, Clays institutional reforms persisted in Congress and forever changed its organizational development (Gamm and Shepsle 1989, 58-59).

The theory that Gamm and Shepsle present in opposition to the rational actors theory, is that of the pre-described organizational imperatives (59). In this theory, individuals are simply pawns of the institution. In this historical setting Clay would not have been a major influence in the development of standing committees. Under this model, standing committees were born as a response to organizational problems presented by the war. The War of 1812 was a catalyst for change in the organizational structure of Congress. Contrary to the rational actor theory, war brought coalitions together and showed the need to reorganize because of the increased work load, increased responsibilities, and increased independence of the legislative branch. This model would portend that the Senate had one standing committee that worked so well, they decided to expand the idea to fit the new demands of the institution. The House reacted in a similar way. Together, the House and Senate created standing committees; there was no great individual influence (Gamm and Shepsle 1989, 59-61).

While this model does not have the significant evidence of the rational actor model, it has its merits. In reality, it is most likely that the changes occurred because of the rational decisions of influential actors *and* the institutions' willingness to adapt to the needed changes in its new political environment. Therefore, Gamm and Shepsle

provide an excellent source of historical and theoretical basis upon which this study of rational actors in legislative committees can build.

Theoretical framework

Shepsle and Weingast's description of advances in committee theory Now that I have described the historical context in which this discussion of committee decision making falls, it is now pertinent to discuss the theoretical evolution of committee decision making. Shepsle and Weingast describe the evolution of legislative theory in the context of three generations (Shepsle and Weingast 1994, 149-79). Each generation of theories and models about committee decision making evolves and depends upon the previous generation. Thus, they are related and inter-linked. However, each generation also has independent and unique aspects that distinguish it from the prior theories. Examining committee decision making in this context provides a useful background upon which this study will expand.

The first generation of Political Scientists and statisticians who theorized about how committees make collective decisions include early rational choice theorists, such as Condorcet, Arrow, Black, etc. The Condorcet winner, or Condorcet paradox, is the most relevant to this study (an empirical example will be explained later). Ordeshook describes the idea behind a Condorcet winner:

> … looking more closely at the ability of agenda setters to manipulate outcomes, consider again the Condorcet cycle in which A defeats B, B defeats C, and C defeats A, so that the agenda (A, B, C) yields B, (C, A, B) yields A, and (B, C, A) yields C (1992, 80).

Ordeshook points out that in a two tiered voting environment (where voters choose between two alternatives, then the winner competes against the third alternative), there is a necessary element of asymmetry and each alternative is indistinguishable. However, if the preferences of voters are set up such that they already contain an element of asymmetry, then the agenda will contain a Condorcet winner, where:

> An outcome is a **Condorcet winner** if, under majority rule, it alone stands first on the social preference order, because it defeats every other alternative in a pairwise majority vote (Ordeshook 1992, 80).

Additionally, Ordeshook concludes:

> In a binary agenda voting process characterized by complete information and common knowledge, Condorcet winners necessarily emerge as the eventual outcome (1992, 81).

This is true, Ordeshook explains, because where A is a Condorcet winner, A must enter the voting cycle at some point. There will, of course, always be at least one path that results in A as the final winner. When A is placed against any of the other alternatives during the final vote, A will always win. This is true because for at least two of the voters, A is the strategic equivalent of at least one of the two initial branches of the agenda. So, a majority of voters will choose that branch over any other and A will always emerge as the final winner. Notice however, that this result supposes that all voters have complete information, common knowledge, and that each voter acts strategically (Ordeshook 1992, 80-81).

These type of voting paradoxes pose problems for general committee functions. Shepsle and Weingast suggest that there are four social choice anomalies of the first generation of rational choice functions. First, the majority rule cycles that were such a strong part of Condorcet's (and others') theorems, did not seem to play a large empirical role in Congress. This is true because of the assumptions necessary to the Condorcet winner cycle. In a majority rules cycle, there is no clear collective preference. The paradox that this suggests was not clearly evident in modern legislatures. Second, it seems that the first generation of rational choice theorists did not include such modern institutions as committee systems, bicameralism, and parliamentary procedures. The authors suggest that such institutions dramatically alter the foundation of the first rational choice theories. Third, the first generation of theorists also did not figure such informal structures as Congressional parties and institutional leaders into their

hypotheses. Fourth, early theorists emphasized distribution and institution rather than individual action. From the modern perspective, the classic theorists are lacking in empirical substance. They did not consider debate and deliberation and other such persuasion techniques that can alter the preferences of individuals (Shepsle and Weingast 1994, 151).

The second generation of rational choice theorists in legislatures added the idea of equilibrium to the classic model. The authors of this generation use an economic model to describe a demand-side theory. They contend that heterogeneous tastes make the exchange of support both a necessary and attractive part of the legislative game. Thus, enters the concept of reciprocity and alternative incentives that affect an individual's behavior. In this context, actors try to reach an equilibrium state where they exchange various types of support for one another while pursuing their personal goals. This second generation theory is noticeably different from the first. This model uses a different emphasis when describing individual actors with individual goals. Fiorina notes that committees are "the comprehensive logrolling arrangement" (Shepsle and Weingast 1994, 155-156). However, they can not reach equilibrium if there is not an enforcement mechanism that can assure that when one member of the committee scratches another's back, then they will receive a back scratch in return. The enforcement mechanism is inherent in the second generation model of a committee structure. These theories contend that the committee system, its structure and regulations, can be the enforcement mechanism necessary to keep the rational actors at equilibrium (Shepsle and Weingast 1994, 154-158).

This demand-side model denotes three necessary conditions for success. First, legislators must be able to change committees if they choose. There must be a freedom of movement and membership in order to keep the arrangements in balance. Second, each committee must be able to exert a fair amount of influence in its area of jurisdiction. Third, jurisdictions must be flexible, so that each committee always feels

important. For example, if Senator X needs to fulfill an agriculture favor for a Senator that assisted him in his military bill earlier, Senator X must be able to be a member of the agricultural committee. That agricultural committee, must be able to influence agriculture in the area that is necessary for its membership. Finally, if the national agriculture community is experiencing a problem with irrigation that they need their agricultural representatives to address, then the committee must be able to expand their jurisdiction to the point where they can satisfy their constituents. These necessary conditions in the second generation model are based on a demand side approach. In other words, the committee structure and point of view in the model is based upon what legislators demand and need from their committee system. It is also implicit in this model that legislative rights and enforcement are costless. That is, the model suggests that the Senator who must return a favor, or change committees, or expand a committees jurisdiction, can do so at an inconsequential cost to the committee member and the committee itself. These flaws in the second generation model lead to the development of the third generation model (Shepsle and Weingast 1994, 156-162).

The third generation model is summarized nicely by Krehbiel (1991). Krehbiel begins his argument by describing the distributional model of the second generation theorists. He posits that an informational, or supply-side model, is a more accurate way to view committee decision making. The informational approach that Krehbiel describes is based on two major premises. First, the supply side theory of committee organization asserts a majoritarian perspective. That is, organizational institutions, from procedures to Congressional parties and leadership positions, are decided by the majority. Thus, this model brings a third element into the second generation model. The informationalists contend that policy outcomes are dependent not only on individual choices, but also on organizational institutions. Thus, this model does not discount the equilibria and individual rational actors established by the previous models. In fact, this theory depends on the foundation set by its predecessors. Krehbiel's hypothesis simply

adds the element of structure and organization, and recognizes that outcomes are affected by the processes in which they are created (Krehbiel 1991, 23- 28).

The second premise upon which Krehbiel rests the third generation argument is a departure from the previous theories. He asserts that legislators do not always know or understand the difference between policy making and policy outcomes. He recognizes a distinct lack of cohesion and purpose between legislative processes and outcomes. Also included in this argument is that groups and individuals have more incentive to gain information than produce certain outcomes. This is a consideration not analyzed by the previous theorists. The idea that a strategic actor might care more about where, how, and who information comes from, rather than the specific policy result the information produces, is a departure from older generations. In this model, legislators are aware of outcomes that may exist in an out-of-balance environment (non-equilibrium), and this knowledge can affect their policy making. Essentially, institutional arrangements are the result of a need to acquire information rather than solve distributional issues, as the previous generation suggested (Krehbiel 1991, 61- 100).

An alternative model exists in the third generation of legislative theories that is widely credited to Cox and McCubbins. In *Legislative Leviathan*, Cox and McCubbins stress the power and influence that congressional party organizations hold in Congress (1993). They suggest that parties are the means by which the legislative organization can overcome such problems as externalities and collective dilemmas. They delineate that parties set Congressional rules and play a critical and strategic role in the formation of policy. This approach is an alternative supply side description, and is not incongruous with Krehbiel's model. In this view, the organization serves as the method to overcome collective and institutional problems (prisoners' dilemma, etc.), and the Party serves as the mode of helping individuals to obtain their goals. Thus, in most respects, this model is an addition to, rather than a substitute for, the Krehbiel model (Cox and McCubbins 1993).

In summary of the above stated generations of legislative committee theory, committees have been analyzed as gaming machines (first generation), experts and goal seekers (second generation), and finally as information seekers and party strategists (third generation). Shepsle and Weingast suggest that there are some inherent flaws in these break-downs. First, considering committees as simple agenda setters who are pawns in a political gaming model is a short-sided view for several reasons. Primarily, policy is heterogeneous and actors, or players as the classical theorists might say, have things to gain and trade from one another. It is thus important that we view committees as both a group of individuals with personal interests and as a collective with an overreaching goal. The problem with thinking of committee members only as goal seekers, is simply the other half of what the first generation lacked. That is, the first generation model seemed to make assumptions about the interests of decision makers they preferred to concentrate on the organization as a whole. While the second generation model expands upon the idea that decision makers have preferences which are related to their interests, this generation lacks the understanding of the overall institutional functions of a committee. The Cox and McCubbins portion of the third generation model simply views committee members as strategic party members and omits some important implications about committee behavior. Certainly, committee members are more than just party members. They have a complex structure of competing incentives with which they must deal, and all play a more or less critical role in how a committee functions. Thinking of committees as a chain of principal-agent activists, implies some simplistic misgivings about how a committee would function. However, it would be delusive to simply disregard generations of committee theory. That is why the most likely empirical examples of committee behavior demonstrates strong aspects of all of the pre-stated theories. Shepsle and Weingast suggest that all of these theories have great merit, yet they are under elaborated and may compliment each other more than is currently recognized (Shepsle and Weingast 1994).

The Shepsle and Weingast approach illustrates a comprehensive model of committee decision making, and concludes that an integrated model may be the most appropriate approach. Kingdon developed such a model.

The Kingdon integrated model of decision making

An additional theoretical perspective that elucidates previous models of collective decision making is Kingdon's integrated model about information in committees. Although his study was done prior to many of the third generation models described above, such models are consistent with Kingdon's approach. Kingdon outlines six main models of committee decision making. Each offers a different theory about how legislators make decisions and all are well known among the political science community (Kingdon 1977).

First, Kingdon recognizes the Matthews-Stimson model of cue-taking, which has been expanded upon in the last fifteen years. Basically, in this theory, legislators turn to their colleagues to obtain additional information, or cues, about how they might vote and why. Cues can come from individual legislators or groups, such as committees, parties, or the Congress as a whole (Popkin 1991). Matthews-Stimson demonstrate that much of cue-taking is integrated and institutionalized into the legislative system. They offer that most communication models are forms of exchanging cues so that decision-makers can gain information. Kingdon also cites David Kovenock, who describes that legislators seem to gain more information from their colleagues in Congress, rather than external sources. The issue of internal and external sources of information will become central to this study and will be expanded upon later (Kingdon 1977, 564-5).

The second model of legislative voting that Kingdon offers is that of policy dimensions. In this model,

> a Congressman starts with some notion of the policy content of the issue before him, and thinks of it in terms of a dimension (e.g., more or less government management of the economy). He places himself on that dimension, and

> compares his position to the position of the legislation, choosing the alternative presented which comes closest to his position (565).

This is a more or less personal reflection in which a legislator can decide her personal views and apply them to the relative options with which she is presented (Kingdon 1977, 565-6).

The third model is "predisposition-communication." In this theory, a congressman uses three factors to try to determine the strength of his disposition to a piece of legislation. He considers his own past behavior, the positions of his Congressional party, and the way in which the legislation would effect his constituency. This model suggests that these three factors might compel a legislator to vote a certain way. Additionally, if the decision-maker is not "predisposed," she will engage in a complex series of communications with other decision-makers to try to determine her position (Kingdon 1977, 566).

Fourth, the consensus model is primarily offered by Kingdon himself. In this model, the decision-maker first asks whether or not there is any controversy surrounding the issue at hand. If there is no controversy, the decision-maker simply follows with the consensus, like a sheep in a flock. If the decision-maker finds controversy, he should determine which constituencies and forces would be affected by his decision. If there is consensus among these groups, then the decision-maker should again follow the majority opinion. Even under circumstances of controversy in the decision-maker's constituency, she should still attempt to determine the majority opinion and act in such a way that would not disturb the group (Kingdon 1977, 566).

The fifth model, is Wildavsky's incremental change and "Past Behavior" model, as Kingdon refers to it. In this theory, legislators mostly determine their course of action based on previous courses of action. Thus, when writing an annual budget, they would refer to the previous year's budget and make the necessary and prudent changes. In a accordance with classic political theory, all change that occurs under this type of model

is incremental. Any major deviation from the norm is certain to be a political battleground and possible massacre. Thus, Wildavsky contends that legislators make decisions based on their past behavior and make changes in incremental steps (Kingdon 1977, 566- 7).

The final model illustrates a more modern explanation of legislative behavior that Shepsle and Weingast might refer to as second or even third generation. This is the model of goal seeking. Several well known scientists have expanded this view and modern political scientists label this theory as a rational actor's perspective. Morris Fiorina and David Mayhew emphasize that legislators seek re-election and that this primary goal motivates them to make decisions in accordance with that which will advantage them under electoral circumstances. Richard Fenno expands this view and adds a few elements to the motivational factors. He demonstrates that legislators seek three main goals: re-election, influence within the House, and good public policy. In any view, these models portray decision-makers as strategic actors who attempt to gain information as a method of obtaining a goal, be it personal or otherwise (Kingdon 1977, 567- 8).

Kingdon suggests, much as Shepsle and Weingast do, that the models are closest to empirical examples if they are integrated. He points out that legislative behavior is purposive, not reactionary. In his integrated model, Kingdon delineates three primary goals of legislators that have been reflected in numerous other political literature. These goals are to satisfy constituents, obtain intra-Washington influence, and promote good public policy. Then, Kingdon applies the consensus theory to the integrative model. He explains that in the absence of conflict, a decision-maker should go with the consensus. In the presence of conflict, a legislator must communicate. This communication takes place in the form of cue-taking and collecting information from colleagues to help predispose the legislator. Kingdon offers:

> Thus the essential driving logic of an integrative model — the legislator's search for some sort of agreement among a set of possible influences on the vote which predisposes him in a certain direction, and some further decisional process in the absence of that agreement — is a thread common to a number of the models of legislative voting previously described (571).

Kingdon concentrates on the cue-taking aspect of the integrative model more than other partial theories. He illustrates that cue taking has a dual role. It is a means to an end, not an end itself. That is, if legislators are goal seekers, then accepting cues from other legislators will help obtain information, and transform information into votes. This helps them to vote in a way that is most likely to satisfy constituents. Second, Kingdon proposes that when it is difficult to gauge the ideology, goals, or predispositions of other legislators, cue-taking is an acceptable alternative. In this way, communication can greatly enhance the legislative process and the relative success of a decision-maker who seeks certain goals. Finally, Kingdon describes a fairly complex, yet complete, model for legislative decision making. In a more basic form, his recipe dictates that legislators should always consider their constituency as their primary concern. This alone, may lead a legislator to know how to vote on a given item. If it does not, then the legislator should vote with her policy preference. The only exception to this rule is if the legislator is of the same party as the President and the President has placed an issue in a priority position on his agenda. If this is the case, the legislator should follow the President. Finally, if the constituency goal is involved, the legislator should weigh that consideration against the policy, her preferences, and inter-Washington influence (Kingdon 1977, 568-79).

Previous models of collective decision making, demonstrate thorough models of decisions under complete information. The question that remains after examining these literary works is, can committees make reasoned decisions given incomplete information?

What the previous models don't tell us

Kingdon integrates the six models of legislative voting in a complete and concise model that has varied applications. However, there are a few questions left unanswered in his model. For example, much of the model rests upon the attainment of information via communication. His many examples of collecting information (cue-taking, predispositions, goals, policy dimension, etc.) all involve a certain amount of communication between legislators. However, if each actor is attempting to be strategic, then how can a decision-maker know when to trust the information he receives? The second and third generation models, while more empirically founded than the original first generation of rational choice models, seem to have forgotten many of the complex communication and paradoxical problems that committees face. These questions bring this study to a more critical point. Prior to delineating my theory and hypotheses, it is necessary to further examine the modern literature that addresses, in part, these integrated models of legislative voting and their informational, voting paradox problems.

The Lupia and McCubbins model of individual rational decisions

In their studies of decision making, Lupia and McCubbins have described how individuals deal with their informational problems (1997) . The authors begin by examining the conditions under which individuals learn. This is a fundamental question to answer considering that individuals who communicate and gather information are essentially attempting to *learn* something that will assist them in their decision-making process. They suggest that the main problem individuals face is that modern democracies are organized such that they must rely on experts that are, usually, external to their organization. Committee members hear expert testimony and weigh evidence collective from outside agencies. How does a committee member weigh all this information? How can a Congressional committee delegate its responsibilities, especially that of regulation, without abdicating control of agencies? The authors

answer these questions by presenting a model of principals and agents (Lupia and McCubbins 1997).

In this model, the *principal* is analogous to the Congressional members of an oversight committee, and the *agent* is the agency which Congress must oversee. They describe this "game" as having four possible outcomes. The outcomes are dependent upon two conditions. First, the principal must know the difference between the consequences of accepting the agent's proposal or deferring to the status-quo. Second, the policy that has the most favorable consequences for the principal is also the best policy for the agent to propose. If one of these conditions is true, then the outcome can not be worse than the status-quo for the principal. If neither of these conditions are true, then the principal may regret the delegation (Lupia and McCubbins 1997, 56).

The principal can learn about the consequences of accepting the agent's proposal through the following three methods. First, the principal can obtain the expertise of an agent. Second, the principal can acquire information through the agent. Third, the principal can acquire information from a third party informant. Each of these poses problems for the principal. Obtaining information is clearly costly and unreliable. It is unlikely that the principal could obtain the expertise of the agent in a timely manner. Also, the principal can obtain information from the agent, but what does the principal know of the agent's incentives? The principal may question the reliability of the agent's suggestions. Finally, if the principal involves a third party, he again invites a question of reliability of information. Lupia and McCubbins demonstrate these collective problems, but do not diagnose a bleak outlook for democracy and delegation. They continue to outline the conditions under which learning and verification can be successful in a committee organization (Lupia and McCubbins 1997, 15-18).

The idea of trust and reliable information based on credible communication is the primary conflict that the previously described models did not consider to an acceptable extent. So, how does the principal know when to trust the agent? Lupia and

McCubbins suggest that if the principal is not certain of the truth, she will judge the truth of the agent's information based on her knowledge of the agent's incentives. Under this assumption, there are three sufficient conditions for learning. First, there must exist observable and costly actions by an informed player (either the agent or an informed third party). In this condition, the principal can be confident that if the informed party paid a cost to reveal information, the policy proposal must be worth at least the cost paid, or else it would not be worth it for the informer to pay the cost to reveal the information. Second, there must be a cost associated with making untrue statements. In this condition, it is worthwhile to lie if the benefit of lying is more than the cost of making the statement. Thus, when there is a cost associated with giving or receiving information, it lends a certain amount of credibility to the statement. In the least, the principal has a greater understanding of what the information is worth (or revealing the information) to the provider. However, a penalty for lying only works if it affects the information provider's cost-benefit calculations. Logically, the informer must understand that he is paying a cost and understand that if he does not receive his desired outcome by revealing the information, then it is not worth it to make the statement. This condition requires a simple cost-benefit analysis on behalf of the informer, and an incentive understanding on behalf of the principal. In general, a decision maker is in a better position to make a rational decision if she has knowledge of other actors' incentives. This is the critical element of *useful* communication. Under the same logic, if the principal knows her preferences to be different than the agent's, then any utterance by the agent is useless to the principal, regardless of whether it is actually true or false (Lupia and McCubbins 1997, 71-74).

Here, it is clear that there is a benefit to understanding the conditions under which individuals learn. Communication, as previous theorists have established, is a useful tool in the legislative process. Social scientists have pondered and explored the idea of information providers with competing incentives for centuries. Noted writers

such as Machiavelli and James Madison taught the benefits to competing information sources. Such benefits can be institutionalized into committee organizations such that actors can learn about each other's preferences. In summary, if a principal does not know the agents preferences, and can not determine them, she will not take his statement as credible, regardless of the true validity of the statement. In addition, if a principal knows the agent's incentives, yet there are no penalties for lying and/or the agent has not paid a cost to make her statement, then the principal will still not adhere to the utterance. Only when the principal has the same interests as the agent will their information be credible (Lupia and McCubbins 1997, 87-89).

Lupia and McCubbins demonstrate that there are many institutionalized examples of competing information sources that reveal actors' incentives. For example, in the United States government the President, House and Senate each have an incentive to control the legislative agenda. For this reason, they have formed competitive information sources. In this way, committees can also act as verifiers for information that comes from individual members of Congress or the Executive branch. Therefore, when delegation occurs, it does not imply abdication, the authors conclude. When delegation occurs, institutions are simultaneously created that promote learning and verification.

In summary, Shepsle and Weingast presented their study as a type of generation evolution, while Kingdon described the six models of legislative voting that he integrates into one cohesive theory. First we learned about the basic structure and foundation of rational actors, who are game players and are confronted with the possibility of voting paradoxes and circular quandaries. Then, we learned that individual actors are goal seekers. Next, we discovered that institutions play a role in legislative organizations and they in fact affect actor's individual decisions. Finally, we discovered that although committee members can communicate to try to overcome their information deficits, they often face barriers. Attempting to determine the truth and incentives of an actor's

communication can throw a wrench into a legislator's ultimate goals. Lupia and McCubbins offer a well founded solution to this legislative dilemma, however there are some questions left unanswered. Previously, the Kingdon study presented information about cue-taking and how committee members gather information. The study by David Kovenock suggested that individuals gain information more from internal sources (their colleagues) rather than external sources (agencies). However, the expansion of the American bureaucracy in the 1970's has made Congressional delegation to agencies a much more interesting and political question now than it was twenty years ago.

Though it is apparent that collective decisions can be made rationally, the cases where such decision makers lack complete information have not been considered. Clearly, through various forms of credible communication *individuals* can make rational choices (Lupia and McCubbins 1997). Now, it is prudent to determine if similar mechanisms pertain to collective decision making. Will committee members gather information through credible communication to make reasoned choices? How does this process affect the stability of democratic institutions? These questions are the subject of the following chapters. Chapter three will use the framework set forth in this chapter to develop a method of testing hypotheses about collective decision making.

CHAPTER 3

WHERE TO GO FROM HERE?

THE CONDITIONS FOR HYPOTHESIS TESTING

The purpose of this chapter is to outline the conditions for testing the hypotheses that collective decision makers faced with incomplete communication can make reasoned choices. Chapter two provided the historical and theoretical framework in which the remainder of my thesis will rest. Specifically, chapter two concluded that based on previous integrated models of committee decision making and modern models of rational individual choice, a window of question has been left open concerning collective reasoned decisions. Lupia and McCubbins found that communication is credible when the information provider is perceived to be knowledgeable and trustworthy. The decision maker will consider the information provider trustworthy when she believes that the provider has an incentive to make truthful statements. Under these conditions, Lupia and McCubbins argue, a decision maker can be confident with the information she has received and make rational choices (Lupia and McCubbins 1997). Additionally, Fiorina and Plott showed that in a majority rule collective setting, decision makers could make collective decisions (1978). However, they did not test such behavior when faced with certain voting paradoxes and definite competing incentives. The Fiorina and Plott (1978) experiments can be adjusted to test the internal information that committee members seek when making decisions where the outcomes are dependent on the preferences of other committee members. This chapter will take the study of individual decision making presented by Lupia and McCubbins and the collective decision making experiments presented by Fiorina and Plott, and combine them with the theories of committee decision making presented in Chapter two. In this way, this thesis proposes hypotheses about the rational decision making processes of collectives.

First, I have agreed that people lack information, and that committee members must make individual decisions that add up to a collective choice. Thus, the question remains, how do committee members make their decisions? There are two types of information the decision maker needs:

1. information about the consequences of the committee's action
2. information about the consequences of her individual action.

To understand the former a decision maker may listen to experts speak about the policy and its potential effects, or by learning about the cause and effect aspects of the policy through other methods. Essentially, the decision maker seeks information external to the committee. Although committee members are sometimes placed on committees because they are seen as experts, it is impossible for a person to be an "expert" on everything that comes before the committee. To figure out the latter, the consequences of the committee's action, a decision maker needs information about the preferences of other committee members.

As suggested by the previously described literature, committee members often base their decisions on cues gained from other committee members, and the preferences of other committee members may also have a significant impact on the decision of a committee member. As Lupia and McCubbins suggest, knowledge of an information provider's incentives is a necessary condition for credible information (1997). Thus, a decision maker may wish to obtain such information. Therefore, assuming that the decision maker is not interested in simply making an instinctual, or rash decision without obtaining an understanding about the consequences of her actions, she will attempt to obtain two types of information: external information about the effects of the policy *and* internal information about the preferences of fellow decision makers. These two types of information will provide sufficient information for a decision maker to make a rational decision. If committee members seek and discover such information, then the committee will be able to make rational decisions.

Hypotheses Testing

Based on previous studies of social choices, this study attempts to determine if collectives, as a group of individual rational decision makers, can make a collective rational decision. The null hypothesis, that collectives cannot use information to make reasoned choices, will be tested in a series of two experiments. First let me demonstrate why I have chosen to use these two forms of data collection.

Previous studies on rational choice theory and committee theory have suggested that individuals collect information from a variety of sources. Recent studies demonstrated that individuals often do not require very much information to make a decision that is in pursuit of an individual goal; a rational decision. Therefore, I put forth the idea that committees, as collectives, act as individuals do. A committee gathers information from a variety of sources and uses this information to make decisions. The committee, as a collective, will come to a group decision that is made up of individual decisions. If this collective decision is in the best interests of the group, then the committee has made a rational decision.

Thus, the experiments presented here break down the information that committees receive into two basic forms: that information that comes from sources external to the committee, and that information that comes from internal sources from within the committee. Since previous theorists had discussed the sources of information and rested their hypotheses on information itself, it seemed logical to break information down into two general categories of sources. All decisions in committee are based on information, and all information must come from either within or outside of the committee. This break down seemed to be a reasonable way to test the hypothesis at hand. Additionally, it will provide me with a foundation of data and information about the way in which committees deal with information. The experiments do not test the actual methods of communication within committees, but rather what a committee does with

the information that it receives as a result of the communication. For this reason, chapter three will discuss the external information committee experiments, and chapter four will describe the internal communication committee experiments.

As the internal communication experiments are based largely on experiments performed by Fiorina and Plott (1978), I also adopt their view of experimentation and the committee process. They explain that testing the "black box" of committee decision making in a laboratory setting allows scientists to examine the essence of the basic majority rule committee process. They recognize that such a method of experimentation may ignore competing influences on behavior, but that a carefully designed experiment that remains true to its theoretical model can exemplify what we want to learn about committee behavior. They also recognize the skepticism about experimental testing of sociological occurrences. They offer:

> What makes us believe, for example, that we can use college students to simulate the behavior of Congress members? Nothing. Our beliefs are much more modest. We intend to use the laboratory as a screen for basic ideas: if a given model does not predict well relative to others under a specified set of conditions in the controlled world of the laboratory, why should it receive preferential treatment as an explanation of non-laboratory behavior occurring under similar conditions? While laboratory success by no means implies field study success for a model, laboratory failure raises grave doubts about a model's applicability in field studies. Thus, while we reject the suggestion that the laboratory can replace creative field researchers, we do maintain that it can help them decide which ideas deserve further consideration (Fiorina and Plott 1978, 576)

Therefore, the experimental setting can be an appropriate method of testing hypotheses about committee decision making behavior.

The external information committee experiments examines how decision makers treat information gathered from various external sources. It rests upon the premises set forth by Lupia and McCubbins (1997) that in order for information to be persuasive, it must come to the decision maker via a reliable source. This means that if the information provider is known to have knowledge about the matter at hand and the information provider is known to have interests common with the decision makers, then

under these conditions, and these conditions only, will a decision maker use the information provided. Thus, the necessary conditions for useful information for a decision maker are:

Necessary Conditions for information to be persuasive to a decision maker:

1. *the information provider is believed to be knowledgeable about the matter at hand.*
2. *the information provider is believed to have common interests with the decision maker.*

The experiments described in chapter four will test this hypothesis and demonstrate its relation to committee decision making.

The internal communication committee experiments examine how committees use information gathered from within their own committee. In this case, committee members exchange information with one another and attempt to gain and provide cues and models to one another from which they can make decisions. This model suggests that committee members often do not have direct sources of information, such as reports with abundant data, testimony, and other informational evidence. Rather, committee members gain cues, as described earlier, from one another and base their decisions on rather arbitrary indicators they learn from their colleagues. For this reason, the internal communication committee experiments tests two main hypotheses. The first hypothesis is that communication is equivalent to full-information. That is, information gained from cues and other such forms of communication is equivalent to having sufficient information about the subject. This suggests that decision makers do not need to have libraries of knowledge about the subject matter, they simply need to hear reliable communication about the matter. This leads to the second hypothesis that the communication must be subject to a penalty for lying (as suggested by Lupia/McCubbins) in order for it to be deemed reliable by the decision maker. Only when information is reliable is it useful. Thus, a decision maker will only use the

information gained from communication if she knows it to be valid because the information provider would have been penalized if he lied about it. In this way, the decision maker can be confident about the information she receives. Therefore the hypothesis tested in the internal communication committee experiments are:

Necessary Conditions for reliable internal committee information:

1. *Communication is equivalent to sufficient information when the communication is credible.*
2. *The communication is credible when the information provider is subject to a penalty for lying.*

Under these necessary conditions, information gained from within a committee environment will be useful.

The above necessary conditions will be tested in the experiments described in the next two chapters.

Research Design

The experiment setting is an appropriate way to measure these committee elements. In addition to the argument set forth previously by Fiorina and Plott (see above) there are other justifications for testing these hypotheses in an experimental laboratory. There are numerous factors that can be controlled in a laboratory setting that can not be isolated in other methods of study. For example:

- observing committee behavior would not reveal how committee members think
- surveying decision makers would omit subtle influences on their behavior such as incentives
- a historical review of committee work could not account for the myriad of elements, such as a persuasive speaker or a decision based on untruthful testimony, that can affect a committee's decision

Therefore, in order to adequately test the hypotheses here, it is best to do so in a controlled setting where a scientist can account for many of the undetermined factors in the real world. Of course, it is impossible to account for all factors that could influence one's behavior. For example, I can not control the thoughts in one's mind and ask people to leave their prejudices outside the laboratory. I can however control for many factors that seem to be sociological determinants of behavior. The exact elements of the experimental design will be discussed at a later time. The benefits derived from controlling for many outside factors in an laboratory setting greatly outweigh its drawbacks. I can more confidently discuss my hypotheses and conclusions based on experiments that have controlled for outside influences than I could had I attempted to simply observe these behaviors in existing environments.

External information experiments

The first set of empirical experiments were based on previous experiments performed by Lupia and McCubbins. The experiments involved twelve UCSD undergraduates who participated in a series of decision making trials that included various combinations of knowledge and interest. The analogy used in this experiment is that of a group of decision makers who receive information about the external affects of the policy at hand. Since various given policies might have introduced a set of prior beliefs that would have complicated the experimental setting, the experiment was reduced to simple, binary decision making. Therefore, to represent a simplified decision making process, participants were asked to make a binary choice about a familiar event — flipping a coin. In each trial, a coin was tossed and participants were asked to make a prediction about the coin toss outcome. To represent the reception of external information, at least one participant was selected to be a reporter. In this way, the reporter(s) were given different information about the coin toss (or policy) and were

asked to send a signal, provide information, and communicate with the predictors, or decision makers. Thus, participants were given one of two jobs: reporter or predictor.

The first trials of each experiment were benchmark trials that represented a control setting. In these trials, participants were either given full information (in other words, they knew the coin toss outcome before they were asked to make a prediction), or they were given incomplete information (they were asked to make a prediction with out any knowledge of the coin toss. The other benchmark trials included one reporter. The participant who was the reporter rotated for each trial so that participants would not have any prior beliefs about the propensity for a reporter to give certain information. The trials represented the control trials. The experimental trials included the addition of a second reporter. In these trials, predictors received information from two reporters under various conditions.

Two conditions were varied in all trials with either one or two reporters — knowledge and interest. In some trials, one or both reporters knew the coin toss outcome, and it others, they had no knowledge of the true outcome. Additionally, in some trials, reporters and predictors had common interests and in other trials they had conflicting interests. Interests were represented by monetary incentive. Predictors always earned $.50 for making correct predictions about the true coin toss outcome. Reporters interests varied. When reporters had common interests, they earned $.50 for each predictor who made a correct prediction. When reporters had conflicting interests, they earned $.50 for each predictor who made an incorrect prediction. Therefore, the two main conditions that determine if a decision maker will find the information they receive credible, are knowledge and interest. These conditions are represented in this experiment. The results from the external information experiments will determine if committees can use such information in the same way that individuals do to make rational decisions.

Null Hypothesis for External Experiments:

When reporters send reports to predictors, where reporters do not have an incentive to tell the truth and where reporters are not known to have knowledge of the coin toss outcome, predictors will be able to make reasoned choices.

Alternative Hypothesis for External Experiments:

When reporters send reports to predictors, where reporters do not have an incentive to tell the truth and where reporters are not known to have knowledge of the coin toss outcome, predictor will not be able to make reasoned choices.

Internal communication experiments

The second set of experiments involved three UCSD undergraduate students in a controlled committee setting. These were the "communication" experiments. These experiments were based primarily on similar experiments performed by Fiorina and Plott. Here, there were four rounds of voting on various agendas that were previously determined. The subjects were asked to choose one alternative A, B, or C, and were given a varying monetary payoff for each alternative. Sometimes the participants had conflicting interests, and sometimes they had common interests. They voted in a series of two votes. First, they voted for A or B, then the winner contested alternative C. This voting set up is similar to those of Peleg and Ordeshook. Some of the scenarios had the possibility of Condorcet winners and others did not. The specifics of this experimental set up will be discussed in Chapter 3.

This experiment used four rounds to test for information and communication. Rounds One and Two were control settings and rounds three and four were experimental. The participants in the first round were given complete information. That is, they were each given information about what the other participants' payoffs were. I expected participants to assume that each player would act rationally, and try to achieve their maximum possible payoff. When players were given all this information it was a control setting. In the second round, players were not given any information about each

other's preferences. Here, I simply expected each player to vote for the alternative that gave them the highest payoff. They, of course, could not figure out which alternative might win, and could not strategize because they had no additional information.

Rounds three and four were experimental rounds. In round three, the participants were allowed to non-verbally communicate their preferences to one another. Here we expected participants to use this information and act (vote) in the same way they did when they had complete information in the first round. In this way, I can measure if communication provided an adequate replacement for information. An additional element in this round made it more credible: players were penalized $2 for communicating a false preference order. For example, if a player earned $2 for alternative A and $0.50 for alternative B, then they had to communicate that alternative A was preferable to alternative B. If they communicated otherwise, they were penalized. In this way, we could assure that participants would trust the communication they received. Players could act upon each other's incentives. Therefore, this round also provides information about how people use information about each other's preferences.

Round four was similar to round three, except that participants were not penalized for lying. Here participants could not rely on the communication they received from other participants and had no incentive to believe what they learned. In this round, I expected players to act in a similar way to that of round 2, where they had incomplete information. This round provided a useful way to determine how participants behave given different knowledge about each others' incentives.

In general, this set of experiments provided useful information about using communication as a strategy for gaining information. In this experiment, I can observe how people behave given certain conditions and under different incentives. I also expected players to tell the truth when a penalty for lying existed. These experiments

provided useful information about how committees use information gathered from internal communication in a committee.

Null Hypothesis for Internal Experiments:

Given incomplete knowledge (or non-credible communication) about each others' incentives, voters will be able to make reasoned choices.

Alternative Hypothesis for Internal Experiments:

Given incomplete knowledge (or non-credible communication) about each others' incentives, voters will not be able to make reasoned choices.

The next two chapters will outline these experiments in detail by describing the methods and results from each set of experiments. Finally, these experiments will put the aforementioned hypotheses to a test.

CHAPTER 4

EXTERNAL INFORMATION EXPERIMENTS:

METHODS AND RESULTS

Chapters two and three described the objective of this study and the theoretical and historical background upon which its premises are based. The purpose of this chapter is to explain the empirical methods used to test the hypothesis that committee members use information gathered from sources external to the collective to make reasoned choices. The model presented earlier demonstrated that collectives lack information in their decision making processes. When faced with such incomplete information, one method committee members use to gather information is to acquire it from experts, witnesses or other testimonial communication that may provide the information they need to make a reasoned collective decision. The problem such decision makers face is, how do you know what to believe? Under what circumstances should a committee member listen to and be persuaded by the communication they hear? This chapter explains a simple experiment that attempts to answer this question. Results will demonstrate how committee members use external information to supplement their knowledge and make reasoned choices.

The experiments described in this chapter will be called the external information experiments. These experiments are adapted from experiments performed by Lupia and McCubbins in 1998[1]. This chapter will proceed first by describing the experiments and how they were performed. Then, the theoretical and empirical analogies will be set forth that explain the relation of the experiments to the hypotheses presented previously. Finally, I will describe the results from the experiments[2].

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[1] For a complete description of the Lupia/McCubbins experiments, see *The Democratic Dilemma* (1998).

[2] Instructions, forms, results and lab notes can be found by accessing *The Democratic Dilemma* (1998) web page and clicking on *The Decision Making Machine* icon.

THE EXTERNAL EXPERIMENTS

The experiment centered around predicting the outcome of coin tosses. I ran different types of experiments so that I could vary the conditions and test different combinations of the variables. These are described below. The point of each was to vary the conditions of knowledge and interests that I have hypothesized are necessary to make reasoned choices. Thus, each decision maker in the experiment must perceive the information provider to be knowledgeable and have common interests with her. If these conditions are not satisfied, then the decision maker will not trust the information and not be able to make a reasoned choice. I also wanted to determine what the decision makers would do when faced with different types of information provided from informants that had various levels of knowledge and interests.

Null Hypothesis for External Experiments:

When reporters send reports to predictors, where reporters do not have an incentive to tell the truth and where reporters are not known to have knowledge of the coin toss outcome, predictors will be able to make reasoned choices.

Alternative Hypothesis for External Experiments:

When reporters send reports to predictors, where reporters do not have an incentive to tell the truth and where reporters are not known to have knowledge of the coin toss outcome, predictor will not be able to make reasoned choices.

I was able to represent these hypotheses by allowing subjects to make simply binary decisions after hearing a report of information about the outcome of a coin toss. Each participant was either a "reporter" or "predictor," where reporters provided information to the predictors about the outcomes of coin tosses, and predictors predicted the outcomes of coin tosses. The predictors had incomplete information about their decision (predicting the coin toss outcome) and sought additional information from "experts," or reporters. Predictors were paid only for making correct predictions

($.50) and therefore had an incentive to try to determine what the coin toss outcome was. They could sometimes do this by listening to the report from a reporter who may have seen the coin and could potentially provide useful information to the decision makers, or predictors. In some cases, I showed predictors the coin toss outcomes before I asked them to make predictions. If they accurately predicted what they had been shown, I paid them. This helped to emphasize that they would always be paid for a correct toss prediction. In other cases, the predictors heard a report from one reporter. In other cases, the predictors heard information from two reporters. The reporters sometimes had knowledge (*e.g.*, they had seen the coin toss outcome), and sometimes they did not. Also, the reporters sometimes had common interests, where they were paid $.50 for each predictor who made a correct prediction. This gave the predictors a reason to trust the information the reporter provided. In other instances, the reporter had conflicting interests, or was paid $.50 for each predictor who made an incorrect prediction. In these cases, the predictors had no reason to use the additional information in making their predictions. Only when predictors received information from reporters who were both knowledgeable and had common interests, did I expect them to use the provided information to make their decision. Therefore, the point of these experiments is to show that when decision makers are given information by an informant they have reason to trust, they can use that credible communication to overcome their information shortfalls and make reasoned choices.

The Benchmark trials

The first four trials of every experimental session were used to establish two important benchmarks. The first benchmark was: <u>What choices would decision makers make if they knew the consequences of their actions?</u> The answer to this question allows me to make plausible claims about which experimental behaviors are equivalent to reasoned choices.

The expectation here is that if decision makers know the consequence of their actions, then they will choose the alternative that gives them the highest payoff. I tested this proposition by beginning each experiment with two complete information benchmark trials. In these trials, all subjects were predictors and I showed the coin toss outcome to everyone before asking them to make predictions. Since predictors earned money only if they made correct prediction (e.g., $.10 for each correct prediction and $0 for each incorrect prediction), I expected that they would make correct predictions. In fact, subjects in the complete information benchmark trials made correct predictions 137 of 140 times (97.9%). Therefore, these results seem to strongly support the proposition that decision makers who have complete information choose the highest valued alternative and such decision constitutes reasoned decision making.

Throughout all of the external experiments for this study, predictors were always given an additional incentive for predicting heads. That is, predictors were always paid $.50 for making correct predictions and either $.05 or $.15 for predicting heads[3]. This offered predictors an incentive for choosing a certain alternative when they were unsure of other elements. For example, in the second set of benchmarks, described below, predictors had to make predictions about the coin toss outcome without any information. I simply tossed a coin behind a partition and predictors were asked to predict its outcome. In this case, I expected them to choose heads. This is because the predictors have no information about the coin toss and know that they have an equally likely chance of predicting correctly as predicting incorrectly. Therefore, the extra incentive should have induced them to choose the alternative that would yield certain payoff. That is, the predictor knows that heads and tails are equally likely to be the outcome and can therefore not make an educated prediction that will yield a certain payoff. However, when offered an extra incentive for choosing one outcome over

[3] In the first two experiments principals were offered an additional $.05 for predicting heads. In the third through sixth experiments, principals were offered and additional $.15 for predicting heads.

another under conditions of uncertainty, I expect that predictors will choose the alternative that yields the certain payoff, or $.15 for choosing heads. Similarly, when predictors received conflicting information about coin toss outcomes (described later), I expected them to choose heads. In this way, I tested the hypothesis that under conditions of uncertainty, decision makers will follow and incentive structure and choose the alternative the yields a certain payoff. If a predictor chooses heads, she is demonstrating that the extra incentive, and the knowledge that she will receive a definite payoff is a convincing reason to choose one alternative over another. This premise is a fundamental part of the argument of this study and the analogies upon which these experiments are based.

The second benchmark was: What choices would a decision maker make if she lacked knowledge about the consequences of her actions and had no opportunity to learn from an information provider? The answer to this question allows me to make plausible claims about what subjects choose absent an information provider. Certain variations from this behavior in the presence of an information provider constitute evidence of persuasion. Therefore, in the third and fourth trials of all of these experiments, all subjects were still predictors. In these trials, I asked the predictors to make predictions without seeing the coin toss result in advance. Under these circumstances, I expected predictors to choose heads. This is because they are uncertain about the outcome, they know that either heads or tails is equally likely, and they receive a definite payment if they choose heads. Subjects chose heads in these trials 124 of 140 times (88.6%). I also expected that subjects would make accurate predictions 50 percent of the time, or the equivalent to correctly predicting the outcome of a coin toss. This was true in 78 or 140 trials (55.7%).

Experiments

I conducted six different external information committee experiments. The experiments tested different combinations of incentives and knowledge. Each began

with the four benchmark trials described above. These trials, in addition to demonstrating the above stated premises, also helped subjects become familiar with the procedures of the experiment. They were told that conditions for decision making would change throughout the experiment. Each experiment then continued with several trials that had one reporter, and several trials that had two reporters. The second reporter represents an additional source of information for decision makers[4]. In this way, I could test how decision makers would use simultaneous information from different sources that occurred under different conditions. Thus, in an analogy the reporter provides an external source of information to the decision makers who judge the information they have received and use it as a basis upon which to make decisions. The reporter, in this case, is like an executive agency who provides information to a Congressional committee, for example. The six experiments were conducted in sets of two. Thus, I used three different experimental designs to test various combinations of interests and knowledge. These are described below.

Each experimental session involved two to three experimenters and ten to twelve subjects. Each session consisted of two sets of benchmark trials and one to four different experimental conditions. During the experiment, participants were not allowed to speak to one another and were seated behind partitions. Each session began by the experimenters reading a set of instructions. Periodically, I quizzed the participants on the instructions, and paid them for correct quiz answers. I did this to try to ensure that participants would pay attention and to make sure they understood the instructions.

The first two experiments varied interest, but not knowledge. In trials 5 through 10, one subject was selected to be the reporter and was shown the coin toss outcome. The predictors never knew the coin toss outcome. In these trials, the reporter had common interests with the predictors. That is, the reporter was paid $.50 for each

[4] The addition of the second reporter was the main difference between my experiments and those performed by Lupia and McCubbins (1998).

predictor who made a correct prediction. The conditions under which predictors were paid was constant throughout all the experiments. A predictor was paid $.50 for making a correct prediction and $.15 for predicting heads. In these trials, I expected the predictors to believe the reporter's statement because their incentives were complimentary. The reporter had incentive for the predictors to make correct predictions and is therefore likely to tell the truth about the toss result. The predictors knew the incentives of the reporter and could therefore believe what she reported about the coin toss outcome. This represents common interests. Under these conditions, I expect the predictors to make correct predictions.

Trials 11 through 17 of the first two experiments represented conflicting interests. Again one subject was chosen to be the reporter for each trial, and the reporter knew the coin toss outcome. However, in these trials, the reporter earned $.50 for each predictor who made an incorrect prediction. The reporter was not penalized for lying. In these trials, the predictors were challenged by the knowledge that the reporter knew the outcome of the coin toss, however they knew that she might lie about the true outcome. In this case, the decision makers are presented with classic voting choice paradoxes such as those described by first generation theorists. The decision makers are presented with a possible circular logic pattern about whether or not the reporter is telling the truth about the coin toss outcome. Will the reporter assume that predictors will choose the opposite of what is reported and therefore report the true toss outcome in an attempt to have the predictors choose the wrong outcome? Or will the predictors understand that the reporter might believe this to be true and will the reporter therefore lie about the true outcome hoping that when he reports a false outcome the predictors will choose what he reports? Clearly, the logic on such conflicting interests is dizzying. For this reason, I expect predictors to choose heads under conditions of conflicting interests because they are offered an additional incentive to choose heads. Therefore,

an instance where conflicting interests exists is equivalent to the situation where the predictors had no information about the coin toss outcome.

At this point in the experiment, a second reporter is introduced. In this way, the decision makers, or predictors, receive information from two external sources. In the experiments, each reporter made a separate statement about the coin toss outcome. Predictors received information in the form of two reports. In an analogy, committee members receive information from various external sources and must weigh this competing information when making decisions. In the experiments I represent additional external information in the form of a second reporter. Thus, in trials 18 through 20, both reporters (called reporter A and reporter B) knew the true coin toss outcome. They are said to be knowledgeable. Also, the predictors had common interests with both reporters. Therefore, in this case, each reporter had incentive to tell the truth and the predictors had incentive to predict what the reporters said (assuming they made the same statement).

In trials 21 through 23, each reporter was knowledgeable and each had conflicting interests. That is, each reporter earned $.50 for each predictor who made an incorrect prediction. In this case, I expect predictors to choose heads because they can not be sure of the truth of the reporters' statements, just as in the conflicting interest trials with one reporter.

In the final ten trials, reporter A had common interests, and reporter B had conflicting interests. Both reporters knew the coin toss outcome. In these trials, reporter A had incentive to report the true coin toss outcome and reporter B earned $.50 for each predictor who made an incorrect prediction. I expected predictors in this case to believe reporter A's statement and make their decisions based on what reporter A said. I expected predictors to ignore reporter B. In this way, reporter A satisfies the two necessary conditions for decision making presented in this study. First, the information

provider was known to have knowledge about the matter, and second, she is known to have common interests with the decision makers.

The next set of two experiments was similar to the first two. The only differences were the combinations of interest and knowledge, since these are the two main conditions in which I am interested. After the benchmark trials, trials 5 through 17 had one reporter. In trials 5 and 6 the reporter was knowledgeable and had common interests. In trials 7 through 9 the reporter was knowledgeable and had conflicting interests. In trials 10 through 13 the reporter was not knowledgeable and had common interests. In trials 14 through 17, the single reporter was not knowledgeable and had conflicting interests. Trials 18 and 19 introduced the second reporter. In the remaining 14 trials, reporter A was always knowledgeable and Reporter B was never knowledgeable. In two of these trials, both reporters had common interests. In six trials both reporters had conflicting interests with the predictors. In the final six trials, reporter A had common interests, and reporter B had conflicting interests with the predictors.

The last set of two external information committee experiments was set up in the following manner. After the four benchmark trials, there were 9 trials with one reporter. Two of these had a knowledgeable reporter with common interests. Three trials had a knowledgeable reporter with conflicting interests. In two trials the reporter did not know the coin toss outcome and had common interests, and in the remaining two the reporter was not knowledgeable and had conflicting interests. The remaining 18 trials of these experiments had two reporters. I ran six trials where both reporters were not knowledgeable and had various interests. I ran eight trials where both reporters were knowledgeable and one had common, while the other had conflicting interests. And finally, I ran four trials where the knowledgeable reporter had conflicting interests, and the un-knowledgeable reporter had common interests.

I ran these various combinations of knowledge and interests in order to accurately present the hypotheses at hand. In short, only when the predictors, or

decision makers, received information from a reporter, or information provider, where the reporter was both knowledgeable and had common interests, was the information useful. In all other variations, the predictors should just pick heads, because that is the only behavior that was rational.

THE ANALOGIES

The leap between these experiments and committee decision making examples in the real world is not a great one. The reporter is analogous to the information provider (such as expert testimony at a Congressional committee, or a report from an executive agency). The predictor is analogous to the receptor of information, or the committee member. In this case, the information is coming from a source external to the committee itself. A few structural adaptations were made for this study however, in general the Lupia/McCubbins experiments and those performed for this study are nearly identical.

Several analogies are employed in the experimental design. The first, are constant across all the different types of experiments that I ran. The other variables tested different combinations of knowledge and interest with one and two reporters. The following describes these analogies in detail.

The Constants

In all the external experiments each subject was either a predictor or a reporter. Predictors are analogous to decision makers and reporters are analogous to information providers. Reporters make reports of information about the binary decision with which the predictors are faced. The predictors, or decision makers, listen to the information and make their predictions or decisions.

These experiments used the model of binary decision making because any more complex agenda structure would be too difficult to measure. For example, when faced with numerous decisions, if a decision maker chooses one, it would be difficult to

understand why she chose that one. However, as an experimenter, it is important to control for such complex situations that make accurate analysis nearly impossible, by allowing decision makers to only make binary decisions. Additionally, it is important that all participants understood that the binary choice was not a biased one. For this reason, predictors, or decision makers were asked to predict the outcome of coin tosses. Since the outcome of a fair coin toss is understood to be an equally probable event, predictors could make their decisions with the understanding that the experimenters were not fixing the outcomes in a way that might hinder their ability to earn money in the experiment. Had they believed that the experimenters were controlling the experiment in such a way, it might have changed their decision making process.

Participants earned money in different ways. Those participants who were predictors always earned money the same way: predictors earned $.50 for making correct predictions and $.15 for predicting heads. For example, if the coin toss outcome was heads and the predictor predicted heads, he earned $.65. If the predictor incorrectly predicted tails, then he earned nothing.

These and subsequent payment schemes were implemented to satisfy the requirements of induced value theory. Induced value theory describes the conditions that enable the experimenter to influence the subjects' incentives; this is done by linking the subjects' rewards to their actions (Smith 1976, 1982). Induced value theory requires that each subjects' reward depends on his or her actions, that the subjects prefer more reward (i.e., money) to less, that the subjects base their utility predominantly on the reward, and that each subject has private information about his or her reward.

Another constant analogy concerns the information provider's choices. Theoretically, the information provider signals "better" or "worse," and does not have to tell the truth. In the experiments, the reporter signaled "head" or "tails," and also did not have to tell the truth. Moreover, the experimental signals, "heads" or "tails," were good analogies of the theoretical signals "better" or 'worse." To see why, consider the case

where the coin toss outcome was tails. Since I paid the predictor for a correct prediction, the signal "tails" was akin to the signal "better," while the signal "heads" was analogous to the signal "worse."

The Variables

The general idea behind the variables was to establish one condition where the predictors were expected to ignore the reporters' statements because they did not satisfy either the knowledge or interest conditions for persuasion. These trials were the control conditions. The trials where the predictors were expected to be persuaded by the reporters (in other words, where the information should affect their decision making), were the treatment conditions. Therefore, both knowledge and interests were tested in this manner where there were control trials and treatments trials. Under all conditions, both reporters and predictors were aware of the conditions under which each player was acting. For example, if reporters did not know the coin toss outcome for a given trial, then predictors were aware that reporters did not know. The element of knowledge of each players' interests is an important element in testing these hypotheses.

The first variable concerns the knowledge condition. In some benchmark trials, all participants were predictors and were shown the coin toss outcome before they were asked to make predictions. In some trials, the were not shown the coin toss outcome and were asked to make predictions. These trials provided a basis upon which to compare results from trials where there were reporters with varying knowledge. Such trials also help participants become familiar with the proceedings of the experiment.

The second variable concerns the interest condition. In the control trials, the reporter was paid $.50 for each predictor who made an incorrect prediction. In these cases, the reporter(s) and predictors had conflicting interests. Here, I expected the predictors to ignore the messages of the reporters and choose their fixed value amount, or choose heads. In the treatment condition trials, reporters were paid $.50 for each

predictor who made a correct prediction. In these trials, the reporter(s) and predictors had common interests. Here the predictors should be persuaded by the reporters.

The third variable is reporter knowledge. In control trials, the reporters did not know the outcome of the coin toss when they made their reports to the predictors. In these trials, I expected the predictors to be unpersuaded by the reporters' statements. In the treatment trials, the reporters knew the outcome of coin tosses when they made their statements. In these trials, I expected predictors to listen to the reports and be affected by the information.

Remember that knowledge and common interests are both necessary conditions for persuasion, neither is sufficient. Thus, in trials where subjects had information about knowledge and interest that seemed contradictory, predictors were expected to choose the fixed sum. For example, if reporters knew the coin toss outcome but had conflicting interests, predictors were expected to ignore their statements. Both knowledge of the coin toss outcome and common interests must be present for predictors to be persuaded. Predictors were always given an extra incentive to choose heads. Therefore, under conditions where they were certain about the knowledge and common interests of the reporter, I expected them to follow the reporters' utterances. However, in cases where the reporter did not know the coin toss outcome, or where the reporter had conflicting interests, predictors were expected to choose heads, for which they earned a fixed amount.

RESULTS

First, let me explain how I used the data. For each predictor, I generated a *string* of observations for each condition. For example, over five trials within a condition, I observed a principal predicting the *string*: "heads, tails, tails, heads, heads." I used this string of results to evaluate the hypotheses. This tally of results from subject behavior allows me to analyze data in several ways. In the tables of this chapter, I report

expected results, and observed results. The first set of benchmark trials are straightforward in their presentation and are described below. In the trials with two reporters, I determined when the predictors should have been persuaded by the reporters based on the previously stated conditions (perceived knowledge and common interests). When the predictors should have listened to only one of the reporters, because only one reporter had the necessary conditions for persuasion, I report the aggregate data, and the results from trials where reporters gave "mixed reports." A mixed report is where each reporter reported a different coin toss outcome. This information allows me to accurately ascertain the nature of predictor behavior in these cases. However, when neither reporter satisfied the conditions for persuasion (or the predictors should have ignored both reports), I report the aggregate data and the "tails only trials." Tails only trials indicate trials where the reporter reported tails. These trials are more indicative of the hypothesis testing because the predictors had an incentive to choose heads. Thus, in trials where the predictors should have ignored the reporters, it is pertinent to examine trials where the reporters reported tails to see if the predictors were persuaded by their statements. In these cases, the predictors should not have been persuaded. The table below describes the theoretical expectations of the experimental results.

Theoretical Expected Results		
	Persuasive Reporter:	**Non-Persuasive Reporter:**
Aggregate:	**Expected Result**	**Expected Result**
Persuasion:	100%	NA
Reasoned Choice:	100%	NA
Veracious Reports:	100%	NA
Tails Only Trials:		
Persuasion:	100%	0

Reasoned Choice:	100%	NA
Veracious Reports:	100%	NA
Mixed Reports:		
Persuasion:	100%	0
Reasoned Choice:	100%	NA
Veracious Reports:	100%	NA

To report the results of the many conditions described above, I describe the data in two forms. First, I have made a written description of the data. Below each written description is a table which graphically summarizes the results. This information will allow me to reject or not reject my null-hypotheses about committee decision making.

Recall that the information provider must be perceived as knowledgeable *and* have common interests with the decision maker. Both of these conditions are necessary for persuasion to occur. It is the combination of these conditions that is under examination in these experiments. In the following combination of conditions, only when the reporter is knowledgeable and has common interests do I expect the predictors to be persuaded by the reports. Also recall that knowledge is represented in the experiment by whether or not the reporter saw the coin toss outcome. The reporters' common or conflicting interests with the predictors was dependent upon whether the reporter was paid for predictors' accurate or inaccurate coin toss outcome predictions, respectively.

Each of the three forms of experiments had some trials that were common to each form. These included the "one reporter" trials. This is where predictors received a message from only one external reporter. The one reporter trials were run with various combinations of knowledge and interest. The first of these were the one complete knowledge and common interest trials. Here, the reporter received money for each

predictor who made a correct prediction. An analysis of the tails trials under these conditions shows that predictors appeared to be persuaded in 94 of 108 trials (87%). If you look at the aggregate data, it shows that predictors appeared to be persuaded in 198 of 216 trials (91.7%). Therefore, it seems these subjects made reasoned choices 87 times or 80.1%. Additionally, in these trials the reporter gave a veracious report 90% of the time.

• One reporter • 100% knowledge • common interests	Aggregate persuasion	Tails only persuasion	% reasoned choice	% veracious reports
Observed:	91.7% (198/216)	87% (94/108)	80.1%	90%
Expected:	100%	100%	100%	100%

Similarly, in the one reporter, complete knowledge and conflicting interest trials, I expected the predictors to make accurate predictions only half the time because they had no incentive to listen to the reporter's report. In fact, the predictors appeared to be persuaded in 44 of 119 (37%) the tails only trials. The aggregate data shows evidence of persuasion in 170 of 280 (60.7%) trials. In these trials, they made reasoned choices 40% of the time and reporters were truthful 81.8% of the time[5].

• One reporter • 100% knowledge • conflicting interests	Aggregate persuasion	Tails only persuasion	% reasoned choice	% veracious reports
Observed:	60.7% (170/280)	37% (44/119)	40%	81.8%
Expected:	NA	0	NA	NA

[5] In a fair coin toss, the predictors would have been expected to make correct predictions 50% of the time. This is because the probability of predicting an accurate coin toss outcome is 50-50. However, under the experimental setting, we varied conditions and predetermined coin toss outcomes. The coin tosses in the experiment were therefore not fair. Thus, the expected results for persuasion were not 50%, rather they are "not available."

The one reporter, no knowledge trials were when the reporter did not see the coin toss outcome. First, I will explain the common interest results of this condition. The tails trials show persuasion in 10 of 42 (23.8%) trials. The aggregate data shows persuasion in 82 of 124 (66%) trials. This condition showed reasoned choice in 23% of the trials and reporters never lied.

• One reporter • No knowledge • common interests	Aggregate persuasion	Tails only persuasion	% reasoned choice	% veracious reports
Observed:	66% (82/124)	23.8% (10/42)	23%	100%
Expected:	NA	0	NA	NA

Next, the one reporter, no knowledge, conflicting interest trials, were the last of the single reporter trials. Here I found that in tails trials, predictors were persuaded in 5 of 29 (17.2%) of the trials. In the aggregate, they were persuaded in 86 of 124 (69.3%) trials. Under these conditions, subjects seemed to make reasoned choices 65.5% of the time and reporters told the truth one third of the time.

• One reporter • No knowledge • conflicting interests	Aggregate persuasion	Tails only persuasion	% reasoned choice	% veracious reports
Observed:	69.3% (86/124)	17.2% (5/29)	65.5%	33%
Expected:	NA	0	NA	NA

The trials with two reporters are more pertinent to the external communication portion of this study. Again, I ran several trials with various combinations of knowledge and interest. When I had two reporters who were both knowledgeable and both had common interests with the predictors, predictors were persuaded equally by each

reporter. In tails trials, persuasion occurred in 28 of 30 (93.3%) trials. The aggregate data shows persuasion in 48 of 50 (96%) trials. Predictors seemed to made reasoned choices in 93.3% of the trials. Additionally, each reporter gave veracious reports 100% of the time.

	Reporter A **• 100% knowledge** **• common interests**		**Reporter B** **•100% knowledge** **• common interests**	
	Observed	Expected	Observed	Expected
Aggregate persuasion	96% (48/50)	100%	96% (48/50)	100%
Tails only persuasion	93.3% (28/30)	100%	93.3% (28/30)	100%
% reasoned choice	93.3%	100%	93.3%	100%
% veracious reports	100%	100%	100%	100%

The next condition I tested was where each reporter had knowledge, and each had conflicting interests. Here, predictors seemed to have been persuaded in 9 of 40 (22.5%) tails trials, and in 52 of 90 (57.8%) total trials. This showed reasoned choice in 62.5% of the trials. Reporter A gave veracious reports 50% of the time, while reporter B gave veracious reports 100% of the time.

	Reporter A **• 100% knowledge** **• conflicting interests**		**Reporter B** **•100% knowledge** **• conflicting interests**	
	Observed	Expected	Observed	Expected
Aggregate persuasion	57.8% (52/90)	NA	57.8% (52/90)	NA
Tails only persuasion	22.5% (9/40)	0	22.5% (9/40)	0
% reasoned choice	62.5%	NA	62.5%	NA

% veracious reports	50%	NA	100%	NA

I also tested variations of mixed interests. In this case, both reporters had knowledge of the coin toss, however, reporter A had common interests, and reporter B had conflicting interests. In the aggregate, for reporter A persuasion occurred in 306 of 320 (95.6%) trials; reasoned choice occurred 92.5% of the time and the reports were veracious 96.7% of the time. The aggregate for reporter B has 214 of 320 (66.9%) persuasive trials with 65.6% of the reports being veracious. If you only look at the tails trials, reporter A was persuasive in 178 of 190 (93.7%) of the time; reasoned choice occurred in 93.7% of the trials and the reports were veracious 100% of the time. The tails trials for reporter B has 142 of 190 (74.7%) persuasive trials and 80% of the reports were truthful. Additionally, it is pertinent to analyze the trials where the reporters gave mixed reports (*i.e.*, reporter A reports tails and reporters B reports heads). These trials best reveal predictor behavior when predictors should only be persuaded by one reporter. If you look at trials where the reporters gave different reports, then reporter A was persuasive in 77 of 80 (96.3%) of the trials; where 96.3% of predictors decisions were reasoned choices and the reports were always truthful. Conversely, in these trials reporter B was persuasive in only 3 of 80 (3.8%) trials and no reports were veracious.

	Reporter A **• 100% knowledge** **• common interests**		**Reporter B** **•100% knowledge** **• conflicting interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	95.6% (306/320)	100%	66.9% (214/320)	50%
-reasoned choice	92.5%	100%	-	NA
-veracious reports	96.7%	100%	65.6%	NA

Mixed Reports	Observed	Expected	Observed	Expected
-persuasion	96.3% (77/80)	100%	3.8% (3/80)	0%
-reasoned choice	96.3%	100%	-	NA
-veracious reports	100%	100%	0%	NA

When there were two reporters where each was *not* knowledgeable and both had common interests with the predictors, reporter A never reported tails and reporter B did so only once. Therefore, in the aggregate, reporter A was persuasive 37 or 40 (92.5%) of the time. Subjects seemed to make reasoned choices 42.5% of the time when reporter A's reports were 50% veracious. Reporter B was persuasive in 29 of 40 (72.5%) total trials, where 25% of the reports were truthful. In the tails only trial, reporter B was persuasive in 1 of 10 (10%) trials where the report was not truthful.

	Reporter A **• No knowledge** **• common interests**		**Reporter B** **• No knowledge** **• common interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	92.5% (37/40)	50%	72.5% (29/40)	50%
-reasoned choice	42.5%	NA	-	NA
-veracious reports	50%	NA	25%	NA
Tails Only	Observed	Expected	Observed	Expected
-persuasion	-	NA	10% (1/10)	0%
-reasoned choice	-	NA	-	NA
-veracious reports	-	NA	0%	NA

When there were two non-knowledgeable reporters, each with conflicting interests, reporter A was persuasive in the aggregate in 19 of 40 (47.5%) trials. In these trials, predictors made reasoned choices 47.5% of the time, where 100% of the reports were veracious. In the aggregate, reporter B was persuasive in 9 of 40 (22.5%) trials where reporter B was truthful 75% of the time. When reporter A reporter tails, predictors were persuaded in 1 of 20 (5%) trials. This amounted to 5% reasoned choice while the reports were always truthful. When reporter B reported tails, he was persuasive in 1 of 30 (3.3%) trials, where the report was veracious 66.7% of the time. When the reporters made different statements (this happened once under this condition), reporter A was persuasive in 10 of 10 (100%) trials. This meant reasoned choice was also 100% and the report was true. Reporter B, on the other hand, was persuasive in 0 of 10 trials, where the report was no veracious.

	Reporter A **• No knowledge** **• conflicting interests**		**Reporter B** **• No knowledge** **• conflicting interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	47.5% (19/40)	50%	22.5% (9/40)	50%
-reasoned choice	47.5%	NA	-	NA
-veracious reports	100%	NA	75%	NA
Tails Only	Observed	Expected	Observed	Expected
-persuasion	5% (1/20)	0%	3.3% (1/30)	0%
-reasoned choice	5%	NA	-	NA
-veracious reports	100%	NA	66.7%	NA

Where both reporters were not knowledgeable and reporter A had common interests and reporter B had conflicting interests, reporter A never reported tails, and

reporter B did so only twice. In the aggregate, reporter A was persuasive in 37 of 40 trials (92.5%). Predictors showed reasoned choice 52.5% of the time, and the reports were 50% veracious. Reporter B was persuasive in 19 of 40 (47.5%) trials and the reports were never true. In the two instances where reporter B reported tails, she was persuasive in 1 of 20 (5%) trials. When neither of the reports were veracious.

	Reporter A **• No knowledge** **• common interests**		**Reporter B** **• No knowledge** **• conflicting interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	92.5% (37/40)	50%	47.5% (19/40)	50%
-reasoned choice	52.5%	NA	-	NA
-veracious reports	50%	NA	0%	NA
Tails Only	Observed	Expected	Observed	Expected
-persuasion	-	NA	5% (1/20)	0%
-reasoned choice	-	NA	-	NA
-veracious reports	-	NA	0%	NA

Some trials had knowledge as the variable. When reporter A was knowledgeable and reporter B was not knowledgeable, but both had common interests, reporter A reported tails twice and reporter B never reported tails. In the aggregate, reporter A was persuasive in 36 of 36 (100%) trials; reasoned choice was at 100% and all the reports were veracious. In the aggregate, reporter B was persuasive 18 of 36 (50%) of the time when 50% of the reports were veracious. When reporter A reported tails, 18 of 18 (100%) of predictors were persuaded. This amounts to 100% reasoned choice with 100% of the reports being truthful. Reporter B was persuasive in 0 of 18 (0%) trials, where she lied in each.

	Reporter A **• 100% knowledge** **• common interests**		**Reporter B** **• No knowledge** **• common interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	100% (36/36)	100%	50% (18/36)	50%
-reasoned choice	100%	100%	-	NA
-veracious reports	100%	100%	50%	NA
Tails Only	Observed	Expected	Observed	Expected
-persuasion	100% (18/18)	100%	0% (0/18)	0%
-reasoned choice	100%	100%	-	NA
-veracious reports	100%	100%	0%	NA

The next set of trials had reporter A knowledgeable and reporter B not knowledgeable. Both reporters had conflicting interests. In the aggregate, reporter A was persuasive in 45 of 108 (41.7%) trials. These trials included 45.4% reasoned choices and 58.3% veracious reports. Reporter B was persuasive in 61 of 108 (56.5%) trials. The reports were 58.3% veracious. When reporter A reported tails he was persuasive in 14 of 64 (21%) of the time. These trials included 43.4% reasoned choices and 71.4% veracious reports. When reporter B reported tails, she was persuasive in 13 of 46 (28.3%) trials, where 80% of the reports were veracious. In trials where the reporters sent mixed reports, reporter A was persuasive in 11 of 38 (29%) trials, where 44.7% were reasoned choices and 50% had veracious reports. Under these conditions, reporter B was persuasive in 27 of 38 (71%) trials and gave veracious reports 50% of the time.

	Reporter A **• 100% knowledge** **• conflicting interests**		**Reporter B** **• No knowledge** **• conflicting interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	41.7% (45/108)	50%	56.5% (61/108)	50%
-reasoned choice	45.4%	NA	-	NA
-veracious reports	58.3%	NA	58.3%	NA
Tails Only	Observed	Expected	Observed	Expected
-persuasion	21.9% (14/64)	0%	28.2% (13/46)	0%
-reasoned choice	43.4%	NA	-	NA
-veracious reports	71.4%	NA	80%	NA

The final two sets of trials had mixed knowledge and interests. In some trials, reporter A had knowledge and common interests, while reporter B did not have knowledge and had conflicting interests. In the aggregate of these trials, reporter A was persuasive in 107 of 100 (97.3%) trials. These trials had 97.3% reasoned choices and 100% veracious reporting. Reporter B was persuasive in 83 of 110 (75%) trials, where 75% of the reports were veracious. When reporter A reported tails, he was persuasive in 81 of 84 (96.4%) trials, with 96.4% reasoned choices and 100% veracious reporting. When the reporters gave mixed signals to the predictors under these conditions, reporter A was persuasive in 24 of 24 (100%) trials, with 100% reasoned choice and 100% veracious reporting. Conversely, reporter B was persuasive in 0 of 24 (0%) trials, and lied in every instance.

	Reporter A **• 100% knowledge** **• common interests**		**Reporter B** **• No knowledge** **• conflicting interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	97.3% (107/110)	100%	75% (83/110)	50%
-reasoned choice	97.3%	100%	-	NA
-veracious reports	100%	100%	75%	NA
Mixed Reports	Observed	Expected	Observed	Expected
-persuasion	100% (24/24)	100%	0% (0/24)	0%
-reasoned choice	100%	100%	-	NA
-veracious reports	100%	100%	0%	NA

The final trials has reporter A without knowledge and with common interests, while reporter B was knowledgeable and had conflicting interests. In the aggregate of these trials, reporter A was persuasive in 55 of 80 (68.8%) trials, with 46.3% reasoned

choices by the predictors and 37.5% veracious reporting. Reporter B was persuasive in 51 of 80 (63.8%) trials, with 62.5% veracious reports. When reporter A reported tails, he was persuasive in 3 of 10 (30%) trials, which amounted to 30% reasoned choices and 100% veracious reporting. Reporter B was persuasive in 11 of 30 (36.7%) trials with 100% veracious reporting. When the reporters made mixed reports, reporter A was persuasive in 22 of 40 (55%) trials, with 35% reasoned choice and 25% veracious reporting. Reporter B was persuasive in 18 of 40 (45%) trials and gave veracious reports 75% of the time.

	Reporter A **• No knowledge** **• common interests**		**Reporter B** **• 100% knowledge** **• conflicting interests**	
Aggregate	Observed	Expected	Observed	Expected
-persuasion	68.8% (55/80)	50%	63.8% (51/80)	50%
-reasoned choice	46.3%	NA	-	NA
-veracious reports	37.1%	NA	62.5%	NA
Tails Only	Observed	Expected	Observed	Expected
-persuasion	30% (3/10)	0%	36.7% (11/30)	0%
-reasoned choice	30%	NA	36.7%	NA
-veracious reports	100%	NA	100%	NA

The conclusions drawn from these results will be discussed in detail in chapter six. However, a quick glance at the expected percentages and the observed behaviors of subjects demonstrates that decision makers who seek the additional information they lack, seem to only be persuaded by information providers who are knowledgeable and have common interests. This is consistent with the Lupia/McCubbins hypothesis that trust and knowledge are necessary conditions for persuasion. In this way, we see that

when faced with incomplete information problems, committee members can obtain information from external sources and use what they learn to make reasoned collective decisions.

CHAPTER 5

INTERNAL COMMUNICATION EXPERIMENTS:

METHODS AND RESULTS

The purpose of this chapter is to use empirical research to test the hypothesis that when in the face of incomplete information, committee members seek and use information about the preferences of their peers to make reasoned collective decisions. The internal communication committee experiments described in this chapter were adopted from similar experiments from Fiorina and Plott (1978). In their experiments, subjects with competing interests worked in groups to arrive at a collective decision by majority rule. The analogy that Fiorina and Plott use is one that can be easily adapted to test my hypothesis about internal committee communication. However, Fiorina and Plott did not induce incentives to create competing interests in their subjects. Therefore, the main difference between their experiments and mine, is a monetary incentive. Using induced value theory and offering a monetary incentive to decision makers, I controlled the preferences of committee members. In this way, as committee members exchange information about their preferences through simple controlled communication, I tested the hypothesis that such information allows the committee to make reasoned choices.

The analogy of the internal communication experiments is simple. The experiment consisted of three subjects who were to vote on three alternatives. Throughout the experiment I varied the conditions of knowledge and interests. Unlike Fiorina and Plott however, I induced incentives by paying subjects a specified amount if a certain alternative won the election. Also, in some trials, subjects had complete knowledge of the other subjects' preferences, and in other trials, subjects only knew their own preferences. Then, committee members were allowed to communicate. In this way, I could vary and control levels of knowledge and interests to determine how

the committee would come to collective decisions. This experiment is analogous to "real world" committee decision making in that members of committees often have varying levels of information and conflicting interests with other committee members. Such committee members can learn about each others' preferences, however they face a dilemma of credible information. Like in the external experiments, how is a committee to know what information to trust? Committee members gain information about each others' preferences and use this information to supplement their knowledge. When is such information useful? When will such communication be an effective substitute for credible information? Can communications from other committee member's about their preferences act as an equivalent information source as straight-out knowledge of preferences? This experiment will demonstrate how decision makers learn about each others' preferences and use the information to make reasoned choices.

The internal experiments involve several aspects of committee behavior theory. These experiments were performed with University of California, San Diego (UCSD) undergraduate students. These subjects were recruited by flyers posted in general areas around campus. When subjects arrived, I paid them $2 just for showing up. I then requested that they read and sign a general consent form which indicated that they would be participating in an experiment on decision making. They were told that they had the right to leave at any time (and receive pay for their time), although none opted to do so. In the internal experiments, we tested three subjects at a time. They sat behind partitions so that they could not see or communicate with other participants. They were instructed that if they attempted to communicate beyond their instructions, they would be asked to leave. This also never occurred.

These experiments tested voting behavior in four series. Each round consisted of three alternatives upon which the subjects were to vote upon. The subjects were called "player one," "player two" and "player three." The alternatives were called "A," "B" and "C." Subjects were instructed to think of the alternatives an inconsequential

objects, like apples, bananas, and coconuts. The experiment was designed this way so that subjects would not have a pre-conceived preference for one alternative over another based upon its substance. Although it is possible that a subject may prefer bananas to coconuts, we attempted to structure their preferences in a monetary fashion. Each player was told that they would earn a specific amount (either $5.00, $2.50 or $0.00) for each alternative. That is, they were given payoff schedules that looked similar to the following example:

	Player 1	**Player 2**	**Player 3**
$5.00	**A**	**B**	**C**
$2.50	**B**	**C**	**A**
$0.00	**C**	**A**	**B**

In this chart, which is an identical example of one that subjects received, players earned money based on the final winner of a two round vote. In the first round, subjects voted on A versus B. Then the winner of round one contested C in round two. All elections in the experiment were conducted in this two step process. Subjects were based on the final winner, or the winner of the second round. That is, if the above chart were applicable to a trial in which A won the first round, while C won the second round, then player 1 would earn $0.00, player 2 would earn $2.50 and player 3 would earn $5.00.

This voting set up is similar to those described by Peleg (1984) and Ordeshook (1992). While the schedule of payments varied throughout the experiment, those that resembled the one above, represent a voting paradox. In this situation, one can clearly see the voting cycles described by classic, first generation social choice theorists. In this example, if each player votes for the alternative that will seemingly give them their highest payoff, player 1 will find himself in a disadvantaged position. For example, using the above payoff schedule, in round one where the players are to vote between A and B, player one will likely vote for alternative A, player two will vote for B and player C will vote for A. A wins round one. In round two, where A would contest C, player one

would vote for A, player two would vote for C and player three would vote for C. In this case, C is the final winner. Player one earns nothing, player two earns $2.50 and player 3 earns $5.00.

This outcome assumes that each player is acting to maximize their payoff. This is a reasonable assumption to make and an appropriate way to design an analogous experiment since the subjects are UCSD undergraduates, and most subjects volunteered with the expectation that they would earn a certain amount of money. Thus, as experimenters, we are able to induce their preferences by giving them various payoffs for their choices. This ranking of preferences might be similar to a Congressional committee whose members have preferences based on the desires of their constituencies, or the wishes of the President/party leadership, or other methods of preferences ordering. In this way, we make an assumption about the preferences of each subject.

In an alternative outcome based on the same example above, player one might foresee that the other players will also try to maximize their profit and attempt to determine how they might vote. In this case, player one might foresee that she would earn nothing in the end if she votes based on her preferences as dictated by the payoff chart. That is, where A is the most preferable outcome for player one because it pays $5.00, B is the second most preferable outcome because it pays $2.50, and C is the least preferable outcome for player one because it pays nothing. If player one votes for A in the first round because it is the most preferable alternative, and then votes for A in the second round, the final outcome is likely to be C (as described in the example above), where player one would earn nothing. Alternatively, if player one decides to vote for B (his second most preferable outcome) in the first round, so that B, rather than A, moves on the second round to contest C, then B is more likely to be the final outcome. This scenario would work like the following. In round one, if player A strategically votes for B, player two votes for B, and player 3 votes for A, then B wins

round one. In round two (B v. C), player one would vote for B, player two would vote for B and player three would vote for C. In this case, B is the final winner. Player one earns $2.50, player two earns $5.00 and player three earns nothing.

This outcome is dependent upon three assumptions. First, player one must foresee the likely outcome that he will receive nothing if he votes for his highest preference in each round. He must then change his voting strategy accordingly, so that he will earn $2.50 instead of nothing. If he makes this strategic move, he will have received a more preferable outcome. Second, the other players must always choose their highest preference. This is the classic rational choice assumption. In these experiments, I assume that each individual actor is a rational, or goal seeking, actor. Such an assumption comes from the second generation of rational choice scientists. The objective of this study, is to see how such individuals make collective decisions. Third, all players must have complete information about each other's preferences. Player one can only strategize if she has full information about the voting schedules. Without this information, players would not be able to make strategic moves. In later rounds of the experiment, described below, subjects were not given complete information, but were allowed to communicate in ways that allowed them to exchange information. The objective of these experiments is to determine the conditions under which such communication is equivalent to full information.

The experiment itself consists of four series of trials. In the first set of trials, all players had complete information about each other's preferences. That is, each player received a hand out similar to the chart above. Subjects were given scratch paper and told that they could make notes an write on anything they choose. A few subjects took advantage of this. They also understood that each the payoff schedules would change each trial. In some trials, one player's payoff may be exactly the same as another player's. In other trials (as in the one above), all players have different payoff schedules. This represents common and conflicting interests in the various series

throughout the experiment. The second set of trials was the "incomplete information" series. In these trials, players were only given their own payoff schedules, but not those of the other players. In the third set of trials, subjects were given the opportunity to non verbally communicate with one another. Each subject was given their own payoff schedule (but not those of the other players), and they were given a form that had six different options they could choose to communicate. They could choose one of these options:

A is better than B, and B is better than C
A is better than C, and C is better than B
B is better than A, and A is better than C
B is better than C, and C is better than A
C is better than A, and A is better than B
C is better than B, and B is better than A

After the subjects had circled one of these options for communication, I collected the forms and announced the results. Additionally, in this third series of trials, subjects were told that if they communicated a false preference order from what their payoff schedule proposed, from highest payoff to lowest payoff, then they would be penalized $2. Therefore, this series of trials represents incomplete information with communication and penalties for lying. The final series of trials was similar to the third. The only difference was that the players were not subjected to a penalty if they chose to indicate a false preference ranking in the communication round. Thus, the fourth series was incomplete information with communication and no penalties for lying. The chart below graphically describes the layout of the experiment:

Round	Condition	Description
Round One	Complete Information	Subjects had full knowledge of each others' preferences

Round Two	Incomplete Information	Subjects only knew their own preference schedules
Round Three	Communication with penalties for lying	Subjects only had their own preference schedules, but could communicate their preferences to the other subjects. They were penalized ($2) for indicating a false preference
Round Four	Communication with no penalty for lying	Subjects only had their own preference schedules and were allowed to communicate their preferences to other players. They were not penalized for indicating false preferences.

This experimental model represents several aspects of the three generations of committee decision making described in chapter two (Shepsle and Weingast, 1995). First, it illustrates a Condorcet paradox as described by first generation theorists. In those trials where all three players had conflicting interests, that is their payoff schedules were all different as in the above example, there was the opportunity for a voting cycle to occur. Of course, the voting constraints of the experiment (*e.g.*, voting on A and B, then placing the winner against C), disallow a continuous cycle. However, the outcome described above demonstrates how player one could foresee such a paradox, and strategically vote to avoid receiving a lesser payoff than the other players. Thus, the model presents an aspect of first generation, or supply side, social choice theorists. However, as discussed earlier, voting patterns such as these are often empirically sparse in Congress.

This experiment also demonstrates aspects of the second generation of theorists previously described. In this experiment, I assume that each subject is rational and goal seeking, just as second generation theorists proposed. I use monetary incentives to induce the players to act and contend that their actions are based upon their desire to

maximize their payoffs. This assumption is inherent in this experimental model and does not require giant leaps in inductive faith. All subjects volunteered for the experiments based on advertisements that described their monetary payoffs. Every subject who signed up was told about the monetary aspects of the experiment and every subject had expectations about a range of money they were told they could earn. Thus, it is reasonable to assume that players would act in a goal seeking manner and attempt to maximize their payoffs. If this assumption holds true in the experimental results, then the second generation, or demand side of the rational choice theories, will have been satisfied. In other words, the actors are rational and strategic and attempting to make decisions that will help them earn money.

Elements of the third generation model are also present in this experimental design. First, Krehbiel describes that decision makers are aware of where and who their information comes from, and may not find such information credible. This is a complimentary theory to that presented by Lupia and McCubbins in which a decision makers decides whether or not she can trust information based on her knowledge of the information provider's incentives.

These theories are presented in various forms. First, the idea, credited to Krehbiel, which suggests that an organizational structure can affect the way a body makes decisions is represented in the repetitive format of the experiment. Subjects learn the pattern in each series of trials after the first few trials. In this way, the players become familiar with the organization and set up of the experiment and learn how their decisions are accepted. Thus, Krehbiel's organizational theory is empirically present in this model.

Second, the aspect of communication, or information exchange, is present in the communication rounds where players have the opportunity to send messages to the other subjects via the forms that we distributed[6]. Krehbiel and Lupia/McCubbins

[6] Subjects were limited to the options on their forms, this is necessary to maintain control over the experiment. Had subjects been able to freely communicate there would many factors involved and it

theorized about this information exchange. Krehbiel suggests that decision makers consider the source of their information and may pay more attention to where the information came from than its content. Lupia and McCubbins make a similar contribution when they describe that decision makers decide whether or not to believe the information they received based on their knowledge of the provider's incentives. In other words, their model explains that if a decision maker knows a provider to have conflicting interests to his own, then he will not use the information, regardless of its actual value or truth. In this experiment, these theories exist in the communication round. In the third series of trials, where players are presented with penalties for lying, players can believe with relative certainty that the information they are receiving is truthful. In this way, the credible information they receive in round three should provide them with the same amount of information they had in round one (the complete information round). Thus, when information is credible and when communication is trustworthy, communication is equivalent to full information.

Finally, these experiments represent the internal committee experiments. Subjects understand that their decisions are somewhat dependent upon on the group. The first series of trials demonstrates that there is a relationship between the payoff schedules for each player. While they understand that the schedules change each trial, so they have no predetermined ideas about what the schedules might be for any given trial, they know that in some instances they compete with the other players, and in other instances, they have common interests with the other players. Therefore, these experiments test the hypotheses presented earlier. First, we learn if communication is

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would have been impossible to determine how players made their decisions. The experiment would have lost its integrity had I been forced to consider such uncontrollable elements as persuasive speech or players who communicated in more sophisticated ways than others. Essentially, there are a myriad of ways players could have influenced each other and attempted to persuade each other. Using standardized communication forms disallowed for such elements to enter the decision making process. While the drawback to this approach is that we don't observe the alternative means of communication and persuasion, these are elements that we could not measure even if observed. Thus, the drawbacks of a limited model do not outweigh the scientific integrity gained by using a model that can be observed, controlled and measured.

equivalent to full information. Included in this is whether players foresee such things are the Condorcet voting paradox. Analysis of these trials will reveal if such problems are evident to the decision makers, and if so, how it influences their decision making. Secondly, we learn if the penalties for lying have an affect on one's willingness to provide accurate information, and on a decision makers' propensity to use the information provided. Therefore, these experiments will demonstrate if committee members can gain enough credible information about each others' voting preferences to merit a reasoned collective decision.

Null Hypothesis for Internal Experiments:

Given incomplete knowledge (or non-credible communication) about each others' incentives, voters will be able to make reasoned choices.

Alternative Hypothesis for Internal Experiments:

Given incomplete knowledge (or non-credible communication) about each others' incentives, voters will not be able to make reasoned choices.

RESULTS

To analyze the previously stated hypotheses, it is necessary to look at the data with respect to a series of questions. Initially, it seemed prudent to ask four main questions. First, did subjects seem to act in a manner that maximized their profit? It is necessary to determine if actors were goal seeking in order to make a judgment about their overall behavior. Second, when given the opportunity, did subjects seem to strategize? That is, given a Condorcet paradox, did decision makers foresee the inevitable outcome and change their voting strategy? Third, did subjects lie when presented with a penalty for lying? This question is important to determine the credibility of the communication. Fourth, and most importantly, did communication substitute for information? This complex question was answered by looking at the results from a variety of perspectives that will be described later.

To determine if actors seemed to maximize their profit, I looked to see if their individual voting behavior reflected voting for alternatives that appeared to yield the highest outcome. Subjects were seen as goal seeking regardless of whether they perceived the Condorcet paradox. In other words, in the agenda schedule described above player one was seen as a profit maximizer if he voted for either A or B. This is because if he voted for A, he may not have noticed the voting paradox and was attempting to maximize his profit. However, he may have seen the voting paradox and voted for alternative B in attempt to maximize his profit in the final round. Since the question at hand is about profit maximization, not strategy, it is logical to assume that either behavior could be a move to maximize profit. In all other cases, where a player could not strategize to increase her payoff, if she chose the alternative that paid the most each time, then she was seen as a profit maximizer. Therefore, in the above example, player two would have to vote for B and player three would have to vote for A, in the first round, to be counted as a goal seeking, profit maximizing behavior. I ran ten trials of this experiment. As described above, each experiment involved three subjects who voted in twenty four trials that were split into four distinct rounds. In each round of six trials, three of the agendas contained a Condorcet winner. I avoided repeating the same agendas throughout the experiment so subjects could not learn or guess a potential agenda structure. Therefore, there were a total of 1434 individual decisions made in the 10 experiments. Of these, subjects appeared to make decisions that were profit maximizing 1333 times or, 93 percent of the total decisions made. This seems to significantly reflect that subjects were goal seeking and attempting to maximize their profit.

Question:	**Observed:**	**Expected:**

Did subjects attempt to maximize their profit?	96% (1333/1434)	100%

The second question attempts to determine if subjects strategized in their voting behavior. As stated earlier, half of the 24 trials had a Condorcet winner built into the agenda. Only during these trials could subjects effectively strategize to affect their final payoff, and only one player (those with the A B C agenda structure) had the Condorcet paradox before them in each Condorcet trial. Therefore, one can determine if such players strategized by determining if the player with the A B C agenda structure voted for B in the first round. When subjects with this opportunity voted for B in the first round, it appears that they may have been attempting to overcome the Condorcet paradox and prevent themselves from receiving $0 in the final round of voting.

In the complete information round, players took this opportunity 5 out of 30 times, or 16.7 percent. In the incomplete information round, only 2 of 30 individual decisions seemed to make what are possibly strategy moves (6.7 percent). However, in this round, recall that subjects only have their own pay off schedule and are therefore not expected to attempt to strategize because they have limited information. In the complete information round when subjects had a penalty for lying, they seemed to strategize 11 of 30 times (35.7 percent). In the final round with communication and no penalty for lying, only one observation out of thirty seemed to be a possible strategy move (3.3 percent). Therefore, it seems that subjects attempted to strategize most often in the round with communication and penalties for lying. The data also suggests that subjects appeared to learn about how to vote as the experiment progressed[7].

[7] This is because round three had more than twice the observations of strategizing as round one. However, the experiment was not designed to determine if subjects would increasingly strategize as they voted more times. This is an interesting question that could be answered given the opportunity to make slight adjustments in the experimental design, a few more months of performing experiments, and a few more hundred dollars.

Question	Round One	Round Two	Round Three	Round Four
Did subjects strategize? Observed:	16.7% (5/30)	6.7% (2/30)	35.7% (11/30)	3.3% (1/30)
Expected:	100%	0%	100%	0%
Did subjects lie? Observed:	NA	NA	0% (0/60)	80% (48/60)
Expected:	-	-	0%	NA

Whether or not subjects lied during the communication rounds with and without penalties allows me to test the hypothesis about credible communication. Lying, in this case, is defined as communicating a false preference structure based on the subjects' given agenda structure. In the third round, when subjects were faced with a penalty for lying, they never lied. In round four, when subjects were faced with a penalty for lying, they lied in 48 of 60 communications (80 percent). It seems that subjects were attempting to deceive each other, however this behavior did not seem to affect the final outcome. I compared the outcomes of the round three elections with the outcomes of the round four elections to determine if lying affected the final outcomes of all elections. The election outcomes were the same in 29 of 30 elections compared from round three to round four. Therefore, is seems that lying did not affect the final outcome of the elections. More importantly however, it seems that the penalty for lying was an effective deterrent from indicating false preference structures. Next, I tried to determine how this credible communication affected their voting behavior.

To determine if communication seemed to be an adequate substitute for information I used a two step process. First, I compared the voting behavior in round one to that of round two. In this way, I could determine, from a control group

perspective, if subjects behaved the same given complete and incomplete information. The null hypothesis in this case, is that subjects will make the same voting decisions given complete and incomplete information. Second, I compared the information in round three to that of round one. In this way, I could determine if subjects made similar voting choices given full information and given credible communication. Here, the null hypothesis is that subjects will not make the same voting decisions given full information and given credible communication. Finally, I compared the outcome from these two tests to determine if full information was equivalent to credible communication.

First, I compared voting behavior in round one to that of round two. I simply looked at the results to see if subjects made the same selections when choosing alternatives. In this way, I could determine if subjects made the same decisions when given a chart of complete information, as they would given incomplete information. These rounds involved no communication. Therefore, in both rounds, I expected subjects to choose the alternative that yielded the greatest payoff. Their decisions should look similar between these two rounds. Of 180 decisions, subjects seemed to make the same decisions in round one as round two 85 times (47.2%). Then, I made the same comparison between rounds one and three. In this way, I could determine if subjects behaved the same given complete information (round one) and incomplete information with credible communication (round three). This allows me to determine if credible communication acts as an equivalent decision making factor as complete information. Of 180 decisions, subjects seemed to make the same voting choices in round one as in round three 130 times (72.2%). Subjects seemed to make different decisions most of the time in rounds one and two, when they had complete information and incomplete information respectively. Additionally, subjects seemed to frequently make the same decisions when faced with full information as they did when they had credible communication. Therefore, it seems I can reject both of the above null hypotheses and conclude that full information is equivalent to credible information.

Question:	Observed:	Expected:
Was Round one behavior similar to round two behavior? (control)	47.2% (85/180)	100%
Was Round three behavior similar to round one behavior? (experimental)	72.2% (130/180)	100%

I will describe in detail the conclusions from this data in the next chapter. However, this evidence suggests that committee members can gain useful information about other committee members' preferences when given the opportunity to exchange credible information. A penalty for lying is a necessary condition if such communication is to be advantageous to the decision makers. On the outset, this simple experiment about committee decision making seems to support my hypothesis about how collectives can make reasoned choices.

CHAPTER 6

CONCLUDING WORDS:

COLLECTIVE REASONED CHOICES IN AN UNCERTAIN WORLD

Determining if democracy is a stable and functional form of government, is no small task. This daunting project is comprised of hundreds of unknowns with which scientists and pundits have struggle for centuries, and will continue to toil for years to come. An essential part of this endeavor includes our attempt to understand how decisions are made in collectives. This question presents a dilemma because people by nature are self-motivated. Generations of theorists have studied collective decision making and created models that describe how committees make reasoned choices. However, these models lack the element of decision making with less than complete information. This is a crucial element because lack of information is a ubiquitous feature of human society. This study has proposed two hypotheses about how collectives, or committees can make reasoned decisions when faced incomplete information. I have proposed that as decision makers seek the information they lack, they gather two types of information. They pursue information about the causes and effects of the policy before them, and seek information about the preferences of other committee members. This external information and internal communication, when credible, allows collectives to make reasoned choices.

The previous literature about collective decision making provided a sound basis upon which to build the premises of this thesis. From the works of Gamm and Shepsle (1989), Shepsle and Weingast (1995), Kingdon (1973), Krehbiel (1993), and Cox and McCubbins (1991), I concluded that previous theories about collective decision making did not consider the case of incomplete information. This is a critical and lacking element. Therefore, I was able to use previous research as a foundation upon which to

base my hypotheses, and expand it to create the link that research in collective decision making required to become a more sound democratic model.

Considering that collectives lack and seek two types of information (external information about the affects of the policy and internal information about the preferences of other committee members), merits two hypotheses.

The first hypothesis I proposed claimed that decision makers can trust information gathered from sources external to the committee if the information provider is both knowledgeable and has common interests with the decision makers. Only under these two necessary conditions will a decision maker be persuaded by the information she receives and use it to fill her gap of incomplete knowledge. Then, with credible information from a trustworthy source, the decision maker makes a rational decision. This hypothesis was tested in a series of experiments which reflected this model in a simple coin flipping analogy.

The external information experiments personified the model in the form of subjects who acted as information providers and decision makers who made binary decisions. The information providers were given external knowledge about the outcome of a coin toss and the decision makers were asked to make predictions based on the information they received. In some cases, the decision makers received reports from two different information providers who often had different levels of knowledge and interest. The experiment tested various combinations of knowledge and interests in an attempt to test the hypothesis that both are necessary for reasoned choice. That is, the reporter(s) either had knowledge or no knowledge about the coin toss outcome and the reporter either had common or conflicting interests with the decision makers. The results showed that only when the reporters were known to be both knowledgeable and have common interests were the decision makers persuaded by their reports. The data overwhelmingly supports the hypothesis that decision makers were persuaded only when they had a reason to trust the information that they received.

The external information experiments only tested two conditions and it is possible that competing hypotheses exist that did not play a part in these experimental sessions. It is feasible to assume that decision makers could be affected by unobservable, non-measurable, and non-testable factors such as impulse decisions, emotional responses, or unexplainable behavior. One must assume that no laboratory experiment can create a perfect microcosm and analogy of the "real world," and therefore one can not deny that alternative hypotheses could explain the observations I have made. However, the results of the external information experiments are similar to those performed by Lupia and McCubbins (1997) and the results are just as strong. The conditions of knowledge and interests in collective decision making was tested in a variety of combinations, and the aggregate results illustrate that when given credible information, decision makers can overcome their lack of information and make reasoned collective decisions.

However, the external information collection is only half of the story. The literature review of chapter two revealed that decision makers also rely heavily on information gathered from other decision makers about the preferences of their fellow committee members. In chapter three I proposed that decision makers also seek this type of internal communication and, again, will only trust the information they receive if they have a reason to believe it. Therefore, I suggested that when faced with a lack of information, committee members can gather information about each other by credible communication. Communication is only credible, I posit, when committee members are faced with a penalty for lying. If no penalty or restrictions are imposed, then communication is worthless. However, when communication is credible, I hypothesize that committee members can substitute trustworthy communication for complete information. In other words, information received from a credible, or truth worthy source, results in the same decision making behavior had the decision maker previously received the information as a straight forward fact. This hypothesis was tested in experiments described in chapter five.

Fiorina and Plott (1978) created committee decision making experiments that provided an excellent basis from which I could test my model. The main element I added to the Fiorina Plott model, is that of monetary incentive. Like the Fiorina Plott experiments, I asked a committee of subjects with competing interests, to make a collective decision by majority rule. To induce preferences, unlike Fiorina and Plott, I attached a monetary value to the alternatives that subjects voted on. Therefore, subjects had an incentive to try to get their preferred alternative to win the election. The experiment continued with four rounds of elections that tested the complete/incomplete information hypothesis. The simple voting model allowed me to measure they way in which subjects behaved, or voted, given certain conditions (such as a Condorcet winner). I hypothesized that subjects would make reasoned choices when given full information, and they would be able to make equally reasoned choices when given incomplete information and the ability to receive credible information about the preferences of their fellow committee members.

The results of the internal communication experiment support the hypothesis. Subjects were able to make reasoned choices when given complete information, and they were not able to make reasoned choices when given incomplete information. The round of communication with no penalty for lying produced behavioral results similar to the round with incomplete information. Therefore, unreliable communication is equivalent to incomplete information. Conversely, behavioral results from the complete information round were similar to results from the communication with penalties for lying, round. Therefore, when given credible information, decision makers can use it as information to make their reasoned choices. While the percentages were not overwhelming (several percentage points away from a 100%), they demonstrate confidence in the model.

The results support the hypothesis, however the experiment has raised some unanswered questions. The experimental results suggest that people do not always

attempt to strategize and foresee such complications as voting paradoxes. Also, the four rounds of voting in which subjects participated had purposefully different agenda structures. I did this to prevent subjects from guessing the preference structures of other subjects. Had I repeated the same agendas in each round, subjects may have learned from past experience and made their decisions based on what they thought the other players' agendas might be, rather than on what they learned from the communication. This experiment was not designed to test if subjects would learn from past experience and therefore change their voting behavior. After analyzing the results, this is clearly an interesting question that could be answered given a few alterations in the experimental design. There are other unanswered, yet interesting questions that have been raised through the course of these experiments. For example, how often are the voting *outcomes* identical given various types of information levels and communication?; can decision makers become more strategic as they make decisions more often?; had the order of the rounds been altered in different experimental sessions, would it affect decision maker behavior? Clearly, these experiments have provided some fascinating answers about how collectives gather information about the preferences of fellow committee members, however it has also raised some interesting questions that are left to be tackled by another scientist, with another experiment, at another time. The experiment was designed to determine if decision makers could make reasoned choices based on credible information gained about committee members' preferences, and the results reflect that this is true. It is therefore necessary for collective bodies to gather credible information about each other's preferences to come to a collective reasoned decision.

So, the final question becomes: how does the collective decision making power of committees affect the vitality of democracy? The conclusions presented by this thesis make a contribution to our understanding of human behavior and the institutions we create. The more we understand about how people make decisions in groups, the

more accurately we can design our institutions, and the closer we come to the democracy envisioned by Madison, Hamilton, Jefferson and other creators. Centuries ago, Arrow and Condorcet cautioned the power that elites can impose when they control agendas. The studies performed by previous social choice theorists demonstrates that elites can manipulate the conditions of decision making to a point where reasoned choice is threatened. However, if we can develop institutions with rules that limit elite control and preclude paradoxes, we can limit the problems that Arrow and Condorcet identified. The external experiments show that when individuals receive information under certain constraints, they rely more heavily on that information when making decisions. The internal communication experiments showed that when one person's outcome is dependent upon another person's decision, as is the case in many collective decision making, decision makers can use reliable information to make more strategic, rational and deliberate decisions. Given constraints such as penalties for lying and incentives for accurate information exchange, decision makers can overcome their information shortfalls. In this way, committee members can defeat problems identified by Arrow, Condorcet and others. If we consider the factor of information exchange when designing our political institutions, we can be more confident in our decision makers' ability to make reasoned choices.

In short, as we come to understand that committees can make collective, reasoned decisions, we can apply this understanding to everyday applications of collective decision making. Therefore, we now know that as a group of doctors decides whether or not to perform a heart operation; as a Parent-Teacher association votes on a school dress policy; as OSHA regulates a new infant crib safety policy— they can make more effective and reasoned choices if they gain an understanding about each others' knowledge and interests. They can also communicate more effectively given certain conditions such as, designing methods of communication that promote the exchange of trustworthy information. We know that as we create rules about the exchange of

information, such as penalties for lying, we simultaneously create a better collective decision making machine. This information is invaluable to us as we seek to better the processes by which we govern.

In conclusion, political science has gained one more key to understanding the complex notion of democracy. As we begin to uncover more comprehension of human behavior and how it interacts with our intricate political institutions, society will gain greater knowledge about how and why we persist. This study offers a conclusive understanding of collectives and how they can make reasoned choices given limited information. When faced with incomplete information, decision makers seek to fill the gap with testimony from external sources who are knowledgeable and have common interests with the collective. Additionally, decision makers can bridge the valley of lack of information by learning the preferences of fellow committee members through credible communication. Under trustworthy conditions, these two sources of information allow committees to make reasoned choices in an uncertain world.

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