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THE LOCATION AND MEASUREMENT OF POWER: A CRITICAL ANALYSIS

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THE LOCATION AND MEASUREMENT OF POWER

The political scientist's dilemma is that it is hardly possible to think about politics without some concept of power, but that it is extremely difficult to create and then to use an operational definition in empirical work.

Davis, Dempster & Wildavsky (1966)

Introduction

Norbert Weiner--prodigy, mathematician, father of cybernetics--supposedly was once asked, "How do you tell a mathematician from someone who is merely skilled at mathematics?" He replied, "By the problems he chooses to work on." The mathematician, in contrast to others with similar skills, focuses on problems critical to the theoretical development of his discipline.

By this standard, there are far fewer political scientists than one might think. The basic analytic problems of the discipline often seem to receive far less attention than transitory policy interests. However, as Thomas Kuhn (1970, 96) so sagely observed, "...an excessive concern with useful problems, regardless of their relation to existing knowledge and technique, can...easily inhibit scientific development."

Perhaps the key problem of political science is that of locating and measuring power--determining who holds it, over whom, to what degree, etc. The literature of the discipline is replete with impressionistic assertions about power that cannot be rigorously defended (Cohen 1959, 6; Berkowitz 1982, 110). Without an ability to measure power accurately

and in diverse important settings, political science verges on being an exercise in punditry. Yet, at present, it seems fair to say that we do not have any satisfactory, accepted way of making those measurements. Even worse, despite a few spasms of concern, there has been no sustained attempt to do so. The measurement of power appears to be the major obstacle to effective, empirical political theory, but it is generally glossed over by political "scientists".* As a consequence, much of the literature is at best inevitably inconclusive and at worst, to employ the marvelous metaphor of Senator John Warner (Va.), a "Byzantine thicket of quicksand."

* The type of candor shown by Licklider (1971, 26), for example, is altogether rare: "One of the difficulties of this study is its inability to measure empirically whether the population [of private nuclear strategists] has had any real effect on American foreign and military policy."

The costs of this inability to measure power can be illustrated in many areas of social science. For example, we now possess literally hundreds of so-called "elite studies." Unfortunately, they are fatally flawed by an inability to demonstrate that the putative elite--always located in terms of other attributes such as formal authority, prestige, wealth, etc.--actually does occupy the pinnacle positions of real power. Moreover, the power relations within the putative elite are dubiously mapped, the specific relations between elite and mass elements are questionably displayed, and the cut-off point separating elite from non-elite is arbitrary and often biasing (Frey 1970).

Several notable works in international politics attempt to rate the power positions of nations and describe international or world power structures. They will be discussed in more detail later. For now the essential point is that they all founder on an inability to measure power in compelling fashion. Almost without exception, they examine presumed resources and other proxies for power, thus producing unconvincing results despite great labor and frequent ingenuity.

Most analyses of political structures depend fundamentally upon power measurements which the users are unable to accomplish. The distribution of power, balance of power, democracy, totalitarianism, corporatism, and similar concepts, unless defined by questionable proxies or institutional terms, imply power measurements that are not available. Without these notions, however, structural analysis in political science becomes virtually bankrupt. The answer would seem to be to shore up the mensurational foundations on which the structural analysis rests.

The number of elite studies is roughly matched by that of community power studies. Some of the latter exhibit the most direct grappling with the problems of measuring power yet attempted. They have contributed several of the major methods available and most of the comparative data. Nevertheless, despite their relative attention to measurement problems, these must be regarded as "the best of a bad lot." Most community power studies proceed naively without clear measurement criteria, use only one technique and that often dubiously, and so cannot support substantive or methodological advance (Clark 1975). As Walton (1976) points out, there has been little progress in community power research in more than a quarter century (though exceptions would include, e.g., Laumann & Pappi 1976; Breiger 1979; Burt 1981).

A great deal of attitudinal research has been accomplished in the social sciences, some with impressive sophistication. However, the social import of the ascertained attitudes commonly remains unclear because the attitudinal research is structurally unanchored. The power positions of the holders of the attitudes are not correspondingly well located. Attitudinal profiles are likely to be misleading without information about concomitant power positions; it usually makes a great deal of difference who, in power terms, holds a given attitude. Research on the family, organizations, diffusion of innovations, and many other social systems and processes is similarly hampered by faulty power measurement.

As a last illustration, one might note that many important concepts used in political analysis are threshold notions, that is, they refer to phenomena that do not commence until a certain point is passed. Current examples include ideas such as "hegemony" in international relations (e.g., Snidal 198; Keohane 1980, 1984) and "capture" in American politics (e.g., Bernstein 1955; Lowi 1979; Brand 1988). The former refers to the idea of a "dominant power"--i.e., a leader sufficiently separated from the nearest competitor that new systemic effects may be engendered; the latter refers to a situation in which independent regulatory agencies are dominated by the "clientele" they are supposed to regulate. However, all top leaders are not "hegemons" and all regulatory agencies influenced by their clienteles are not "captured". These notions become applicable only after a point of power distancing or a degree of power imbalance is passed. Hence, they depend critically upon reasonably precise power measurement. This measurement at present

is insufficiently developed to support effective use, exploration and testing of such threshold concepts and related hypotheses.

The purpose of this essay, therefore, is to present a critical analysis of the problems and techniques of measuring power. Several basic theoretic concerns must first be addressed, such as the concept of power, causation, and certain key aspects of power relations. Then fundamental criteria for developing and assessing power measures will be discussed, followed by consideration of the main existing methods for locating and measuring power. An examination of research permitting empirical comparison of these different methods and some final remarks conclude the analysis.

Theoretic Considerations

The initial theoretic concern must be the concept of power itself. Measurement is unlikely to be successful without clarity and understanding concerning what is to be measured. In the discipline of political science as a whole, the concept of power is still beclouded by the ambiguity that Riker (1964), Easton (1968) and others discerned decades ago, despite apparently growing consensus among some power analysts (Baldwin 1979, Frey 1989). That ambiguity revolves about several basic definitional decisions: power as relation vs. power as property, actual vs. potential power, "power-over" vs. "power-to," power limited to intended effects or limited to severe sanctions vs. power not so limited, etc. (Frey 1977).

Obviously, the present essay cannot evaluate all of these conceptual matters and still have space to examine measurement problems. The position taken here is that these ambiguities can be categorized and resolved, as indicated in Frey (1977). The result is the conception of

power as a relationship among actors such that the behavior of one or more actors (influencers) at least partly causes the behavior of one or more other actors (influencees). Actors can be individuals or collectivities that display unitary behavior. Behavior is broadly defined to include any activity on the part of an actor, including psychological activity and "actions" (i.e., interpreted behaviors).

Logically, power is an asymmetric, irreflexive relation of uncertain transitivity until the relevant power behaviors are properly specified. These relevant behaviors are the scope and influential behavior of the power relation. Scope (response), after Lasswell and Kaplan (1950), refers to the behavior of the influencee affected by the influencer. Influential behavior (power tactic) refers to the behavior of the influencer that at least partially causes the scope by the influencee. Thus, we are trying to locate and measure actual causal relationships among specified behaviors (very broadly defined) of designated actors, unrestricted by type of power, intention, or other component features. Those important considerations are introduced through subordinate conceptualization rather than by definitionally limiting the concept of power itself, which is designed to designate the discipline's most basic focal phenomena and extension.

Conceptually Inadequate Measures

Any decision regarding the definition of power plainly has major implications for power measurement. A number of popular measurement procedures may thereby be regarded as valid or invalid. The latter may measure something, even something interesting, but not power as defined. For example, power is sometimes conceived as a causal relation between actors' preferences and other actors' behaviors or social outcomes, a

conception of power with a long history and important advocates (e.g., Weber 1947; Coleman 1973; Nagel 1975; March 1987). Under this conception, power has been measured by the discovery of statistical associations and impressionistically plausible links between constituency attitudes and legislative voting (Miller and Stokes 1963; Jackson 1974), congressional preferences and bureaucratic decisions (Arnold 1979), and so on (see Nagel 1979).

Problems with this approach lie fundamentally with the conception of power employed (it is unduly narrow), and thus with the measurement techniques consequently used. Defining power as a causal relation between preferences and social outcomes seems unwise for several reasons. First, it excludes non-intended relations by definition. Nothing is gained by this and much is lost. One of the prime features of power as generally understood is that unwanted or unanticipated side-effects are common and extremely important--a major reason why policy-making is often so difficult. Second, preferences per se, if not expressed or acted upon, do not cause other actors' behaviors or social outcomes. If the asserted causal connection is challenged, the analyst must then adduce the behavioral links mediating preferences and outcomes--i.e., must return to the more basic behavioral conception of power and its measurement. It seems wiser to start with this core relation rather than with less central factors. Indeed, the move from a broad behavioral conception of power like that above to a preference-outcome conception is provoked and justified by a misunderstanding of the problem of anticipated reactions and an unduly narrow conception of "behavior" (Frey 1977).

Another example of a well known and otherwise useful measure that fails because of deviation from the concept of power is the Shapley-Shubik (1954) power index, which measures the power of an actor by the actor's probability of being pivotal to a winning coalition, commonly in a rather formal voting setting. However, being pivotal to a winning coalition is clearly not power by our definition (it is being pivotal to a winning coalition), and its relationship to power even in the limited setting described is theoretically and empirically uncertain (cf., Riker 1959). The same comments apply, mutatis mutandis, to the Banzhaf (1965) index and others of this ilk (Lambert 1988).

Because power as defined is difficult to measure, there is a tendency for researchers sometimes to redefine it in terms of operations more easily performed. In this fashion, power has frequently been defined in terms of supposed resources--e.g., the ability to mobilize resources (Walton 1971, 45), possession of resources (Mitchell 1969, 105; Weingrod 1977, 42), and other forms of what Elster (1976, 252) calls "generalized fetishist theories," i.e., theories that attempt to regard relations as properties. Resources are also frequently used to measure power without redefining the latter to refer to resources, but rather as a proxy for power relationally defined. This will be discussed under inferential techniques in a subsequent section.

Causality

Having briefly dealt with some salient conceptual concerns about power, let us focus equally briefly on causality and an ideal measure of power. Three essential features are involved in the demonstration of causal relations: association, temporality, and theoretic linkage. Causes and their effects must have clear association (not be random);

the effect must not antedate its cause; and, most difficult of all, there must be an acceptable theoretical understanding of the connection between cause and effect, i.e., of how the cause produces the effect. (Similar considerations apply to the enabling conditions of a "realist," natural necessity interpretation of causality. See, e.g., Harre & Secord 1973.)

A crucial difficulty here is that we do not yet have in the social sciences a body of explanatory laws similar to those of the natural sciences. One might argue, therefore, that causality as conceived is impossible to demonstrate in the social sciences and that the analysis of power is thus a chimera. There are no established laws or theories under which the essential linkage between the influential behavior of the influencer and the scope of the influencee can be subsumed and explained or enabling conditions established. Lacking that, power can never be demonstrated.

This is a fairly recondite problem best discussed in a separate treatment of the concept of power. However, the fundamental response is to admit that the social sciences lack established laws corresponding to those of the natural sciences, but to insist that the alternative is not complete ignorance. We possess a great many relatively loose understandings of human behavior--what can perhaps be called "fuzzy laws" as an analogue to the "fuzzy concepts", "fuzzy sets" and "fuzzy logic" currently being studied by some mathematicians and philosophers (Zadeh 1965; McKean and Dworetzky 1985). We need to understand much better the explanatory power of such fuzzy laws, although it is certainly not nil. Without "fuzzy laws," human society would be impossible, since the

necessary degree of predictability of human behavior on which human institutions rest would be absent.

For instance, if we explain an automobile accident in part by the fact that the driver was drunk, we implicitly employ the fuzzy law that drunk drivers are much more likely to have accidents. This is not a universal law nor even a statistical law, yet it obviously contains important information useful to understanding the causal relations involved. The analysis and measurement of power rests overwhelmingly upon fuzzy laws of this type. As a result, considerable error is likely and will need to be sorted out. The contribution to knowledge of fuzzy laws is, however, indubitable and essential and provides a basis for the early stages of power analysis.

Ideally, to measure power among a set of actors we should like to have a kind of invisible, ectoplasmic, audio-visual device hovering over each actor, recording all relevant behavior of that actor (assuming that the profound problems of perspective and coding would be adequately handled). Then we should transmit all such observations for a given time period to a supercomputer for analysis. In an initial run, all significant associations between the behaviors of some actors and those of others would be distinguished. In a second run, they would be filtered for temporality. In a third, they would be scrutinized in terms of available theory to remove those without the requisite theoretical basis. Now this is patently impossible for various reasons, some hopefully temporary and others seemingly permanent. But it provides a mental model for the power measurement process. All power measurements are approximations to the association-temporality-theory observations described, some clearly closer and others sadly remote.

Structure, Scope and Resistance.

At a somewhat more specific level, the measurement of power involves three basic factors: structure, scope and resistance. It deals with what actors are involved, what behaviors are affected, and how difficult it is to affect those behaviors. Let us consider each of these in turn.

Power Field and Domain. The concept of power has been defined as a causal relationship among actors' behaviors. That conception alone does not indicate, however, what it means to be more or less powerful. For this, and for the analysis of power structures, two essential building-block concepts are necessary--power domain and power field.

The domain concept was introduced in 1950 by Lasswell and Kaplan in their seminal work on Power and Society. It refers to the set of actors influenced by a given actor of reference. Surprisingly, Lasswell and Kaplan and subsequent analysts neglected the no less essential counterpart notion of power field, which refers to the set of actors influencing a given actor of reference. Influential behavior, scope, or both (as in "issue-area) are assumed specified (controlled) for domain and field. In graph theory, domain refers to the "outbundle" (arrows out) from a point and field refers to the "inbundle" (arrows in) to that point. In power matrices, domain is customarily represented by rows and field by columns of the matrix.

In addition to their role as the basic elements of structural analysis, domain and field are necessary to indicate how powerful or powerless an actor is, i.e., to measure an actor's power. With other factors constant, theoretically, the maximally powerful actor in a system is one who influences everyone else and is influenced by no one --the unmoved mover. An increase in domain adds to an actor's power and

an increase in field decreases it. A reduction in domain is a loss of power for an actor but a reduction in field is an increase in power. Other things equal, if actors A and B each influence the same three actors in the same way, but actor A has complete autonomy while B is under the thumb of two different actors, we regard actor A as more powerful than B. Hence, measures of power must rest upon information about both the domain and the field (influence-out and influence-in) of each actor considered.

This has been recognized by many writers such as Knorr (1973, 75), who comments that "There are two sides to national economic power. One, the active side, is concerned with what a country can do to other countries; the other, passive side, concerns a country's ability to limit what other countries do to it," though the activity-passivity labels may be questioned. Burtenshaw (1968, 584) similarly maintains that ordinary speech "...incorporates the idea of autonomy in the idea of power." However, many proposed measures of power do not, and, to that extent, they are inadequate.

A very gross but useful measure of an actor's net structural power, scope and resistance controlled, is that actor's domain minus his field, divided by the maximal possible difference between those two features, for standardization. Hence, ignoring redundancy, an actor i 's structural power is $d - f / n - 1$, where $d = i$'s domain, $f = i$'s field, and n is the number of actors in the system of relevance..

Scope. Measurement of an actor's power also fundamentally involves the idea of the scope or response in the power relation, i.e., the set of behaviors of the influencee affected by the influential behavior of the influencer. An actor's power is assessed not only by its domain and

field, but by its scope. As Lasswell and Kaplan (1950), Dahl (1957) and many others have noted, if A and B can each get C to do the same things, but A can also get C to do something else as well, A's power over C must be regarded as greater than B's. Thus, in addition to domain and field, power measurements must consider scopes, although it is by no means clear how different, nonoverlapping scopes can be compared, as we shall see. If A gets C to do X, and B gets C to do Y, we cannot now effectively compare the power of A and B (Dahl 1957). However, if the concept of "resistance" can be developed, this basic difficulty might be resolved or, at least, reduced.

Resistance. Resistance refers to the intrinsic difficulty of getting the influencee to behave as he did, looked at from the influencee's perspective. How reluctant or willing was he to perform the scope involved, regardless of the influencer and influential behavior? It refers to his basic "susceptibility to influence" to perform that behavior, as it is sometimes expressed. For example, it is relatively easier to get most people to go to a film than it is to get them to lend one a month's income; it is relatively easier to get President Bush to eat ice cream than broccoli. And this is true irrespective of the influencer and his tactics, though those, of course, also contribute to compliance or the lack thereof. At the same time, it is important to note that resistance, despite its name, is not always negative; in some instances, the influencee may want to be influenced, as in teaching, dependency, cue-taking, etc.

Weber builds the notion of overcoming resistance into his basic conception of power; Dahl's measurement suggestions include consideration of the influencee's "subjective psychological costs of compliance"

and his original "probability of compliance"--good, brief alternative descriptions of what we mean by "resistance"; and various writers echo the opinion of Edwards and Harper (1975, 62) that "winning in the face of opposition from the other side should be more heavily weighted than winning issues of little salience to the opposition."

If resistance could be satisfactorily conceptualized and measured across actors, it would provide the unit needed for comparative measurement of power. The more resistance an influencer can overcome, the greater his power. However, the notion of resistance as indicated is plainly very difficult to analyze and measure. It appears basically to involve the valence the influencee attaches to the scope involved. In addition to this "pure" resistance, the valence attached to being influenced in general (i.e., the sacrifice of autonomy--being subject to the power of another) should also be considered if the influencee perceives the power relation.

The idea of resistance is even more complex than these features suggest, however. It is analogous to interpersonal comparisons of welfare, pleasure, pain, and the like, presenting the same basic logical problems. In addition, resistance often varies according to prior experience; diminishing marginal utility, satiation, appetite-whetting, addiction, and similar phenomena must be considered. Nevertheless, if resistance could be determined, it would provide the key to comparative measurement of power. Even if full and precise measurement proves unattainable, partial success, such as ordinal measurement, would be of striking value.

With adequate measurement of resistance, an actor's power would then be assessed by consideration of three factors: 1) the sets of actors

in his domain and field, 2) the scopes affected for each actor in his domain and for himself as influencee, and 3) the resistance associated with each scope for each actor. One would then sum the domain scopes times their resistances and subtract the sum of the field scopes times the resistance of the focal actor to each. Standardization, however, remains a problem since the maximal number of scopes and maximal magnitudes of resistances remains indeterminate. Nonetheless, even without precise measurement, when resistance must be subjectively estimated by the analyst, these are the essential elements underlying informed impressionistic judgments about the relative power of diverse actors in a political system.

Issues (Foci). One of the early observations from community power studies, later applied to other subfields, was that patterns of power are likely to vary from issue to issue. Global measurements of power with issue unspecified are commonly obscure. Therefore, it is usually analytically convenient to examine patterns of power with issues (foci) specified and controlled. The issue (focus) furnishes a basis for selecting the scopes and influential behaviors to be examined--providing a necessary analytic cut into the enormous snarl of influential interactions in any substantial real system. In fact, one must often go beyond issue specification to consideration of issue/phases such as formulation, decision, implementation, and evaluation. Similarly, one must consider not only issues (matters of contention) but also routine or noncontroversial activities, which, together with issues, constitute foci. These are as much a reflection of power in many cases as matters of controversy, and may suggest different interpretations.

Measurement Criteria

"Locating" power refers to establishing the existence of a power relationship among actors. "Measuring" power has dual referents: 1) quantifying the strength of any particular power relation, and 2) summarily quantifying the relative power positions of the actors of interest in a political system. Put another way, the first meaning of measuring power involves assigning numbers reflecting the amount of influence that a given influencer has over a given influencee, scope and influential behavior specified. This usually refers to the probability that the influential behavior of the influencer will produce the specified scope by the influencee. The second meaning involves assigning numbers summarizing the relative power positions of all the actors in a system.

In locating and measuring power, an early order of business must be the establishment of criteria for evaluating proposed techniques. What features should a fruitful technique have? On what bases should we accept or reject proposals? There are very few discussions of this topic. One must gain insight largely from the logic of power, general research sophistication, scattered comments, and the principles tacit in critiques of specific methods. Among the chief criteria for evaluating power measurements appear to be the following.

Relationship to the concept of power (validity). As indicated, many proposed measures of "power" seriously diverge from the concept defined. Some concept/operation gap is unavoidable for most major social scientific concepts (unless one wishes to adopt an "operationalist" philosophy of science with its egregious problems). That gap, however, must be small enough not to jeopardize the testing of crucial

hypotheses. The greater the concept/measurement gap, obviously, the less the validity of measurement. Many of the existing power measures wander so far from the concept of power that using them for even rough testing of important hypotheses is impossible.

Applicability to all systems, settings and foci. If a measure is to support comparisons of power among various systems, settings, and foci, then it must be applicable across such variations. Many of the measures proposed are applicable only in limited or special systems and settings, such as very small systems, closed systems, formal systems with certain types of voting procedures, and so on. Or they may be applicable only to conflicts, manifest issues, wars, and the like. Other things equal, the broader the range of applicability, the better the measure. One can surely see, nevertheless, that inventing a technique that will be applicable to systems of six or six hundred million, whose boundaries are known or unknown, covering simple to extremely complex foci, open or secret, across time and culture, is not accomplished over lunch.

Quantitative results and relational detail. The more precise and quantitative the measure, other things equal, at least to the level required by the hypotheses of interest, the better it is. Still, we clearly do not wish to sacrifice too much validity or important information for quantifiability. Some power measures currently used yield ratings or batting averages to many decimals without permitting insight into who influences whom--precision without essential information. Techniques which indicate precise power relations--who influences whom--are superior to those lacking such information. Given these strictures, comparable quantitative results are much preferred.

Unbiased. An effective power measure must be unbiased in the sense that it does not artifactually favor the location of some power relations over others or make some appear stronger than others. As one example, the questions asked in some applications of the attribution method were manifestly biased in favor of finding an elite. For another, Holland and Leinhardt (1971) show the bias from "masking" in measuring instruments, that is, from arbitrarily limiting the number of actors who can be named in response to questions about power.

Minimal obtrusiveness. This criterion has two dimensions. One is the usual consideration that we do not want the measuring technique to work unacceptable distortion of what we are measuring. Some of the most appealing methods for measuring power by direct observation run afoul of this requirement; they markedly disturb the relations we wish to study. The second dimension falls under the first but requires particular emphasis. Information about power is often extremely sensitive. Two hoary but accurate cliches well express the difficulty: "Information is power" and "Power prefers the shade". The candor of many political actors in discussing power is limited, at best. Some measures are perceived as threatening and rather quickly raise reactive hackles. An effective technique for locating power minimizes this danger.

Generally, the less visible and transparent the measure the better.

Cost. Obviously, the lower the cost for a given informational result, the better the measure. The only possibly unfamiliar point here is that cost must be calculated by more considerations than money. Some measurement techniques such as decisional analysis are not extremely expensive in financial terms but are very dear in terms of the time and

involvement of highly skilled (if not highly paid) analysts who are difficult to find.

Covering indirect and polyadic relations. One of the most important deficiencies of many techniques for locating power is that they cannot handle indirect, transitive power relations--i.e., chains of power. They cover only direct power relations. The ability to measure indirect power relations to the degree desired is an extremely significant feature of a power measure. Without it a crucial aspect of power remains unclear. Similarly, a power measure should not be limited to dyadic power relations but should be able to provide information concerning polyadic (conjunctive) relations as well, i.e., relations where there are multiple concurrent influencers and/or influencees.

Replicability. Finally, the literature on power contains many impressionistic accounts of "what goes on", so to speak, in a particular community, organization, group, or society. Some of these are quite perceptive, but a problem with them is their subjectivity. We must favor a method that facilitates replication and presents maximal evidence of its objectivity. It should not demand deep experience and consummate skill. Of course, we continue to appreciate insights from such talents. But our preference is to develop techniques that any reasonably intelligent, well trained researcher can use and that can be used repeatedly, both to ascertain reliability and for studying power dynamics, i.e., changes in power relations and structures over time.

Other criteria could easily be added to those here adumbrated. The criteria discussed, however, pertain particularly to power analysis and assume the usual considerations found in texts on research methods.

Figure 1 below evaluates the existing power measurement techniques in terms of the criteria discussed.

Existing Methods for Locating and Measuring Power

Keeping the above criteria in mind, let us now turn to an inspection of the main techniques currently at hand for locating and measuring power. There appear to be six in all, though some have several variants and they are by no means mutually exclusive. These six are: 1) inference from other structures, 2) opinion change, 3) influence attempts or successes/attempts, 4) decisional analysis, 5) direct observation, and 6) attribution. While this is an empirically based classification and does not seem to be a logically exhaustive listing nor to constitute a proper typology, the claim is that it covers all non-exotic, serious methods actually used up to now to measure power.

Inference from Other Structures. Probably the most common technique for locating and measuring power, used by laymen and professional analysts alike, is to infer an actor's power from his position in some other, better known structure that is presumably strongly correlated with power, such as wealth, prestige, formal authority, etc. Such a practice underlies much research in political science, where the inference to real power is most often made from the actor's location in the structure of formal governmental or political authority. A preponderance of elite studies in political science has basically depended upon such inferences. Sometimes this inferential technique is called the "positional method," involving inference from formal position to real power. The true relation between formal authority and actual power is, however, variable and uncertain--to be empirically ascertained for each type of situation at least.

Other types of inference to power also abound, such as inferences from compensation or the amount of discretion in money or time granted to an actor (Whisler 1964), from stock ownership and directorships (Berkowitz 1982), from office size and equipment, who answers the telephone first (communication), who waits for whom (deference), etc. (Kanter 1977). In many instances inferences to power are made simultaneously from several other structures. The proposed power elite will include some selections inferred from formal governmental posts, some from economic positions, some included on the basis of wealth, some because of cultural or communication positions, and so on. No compelling justification is given for the weighting procedures implied by such selections. Where needed, there is no demonstration that the relevant power structure actually coincides most closely with this or that external structure, next most closely with another, etc. The implicit assumptions of the procedure are many and questionable.

In principle, there is nothing wrong with an inferential approach to locating power provided the assumptions on which the technique rests are reasonably well met. The most basic assumption is that we know fairly well the relationship between the given external structure from which inferences are being made and the relevant power structure. However, such is not the case in almost all situations. The distribution of power appears to be both imperfectly and inconsistently correlated with these other structures, so that inference from the latter to the former is uncertain. Wealth, for instance, often gives power, but Mahatma Gandhi, Lech Walesa, Desmond Tutu, and many, many other significant influentials have not been wealthy, nor are the wealthy always powerful.

In fact, to establish the imperfect but important associations that often do exist between other positions and power, we need an independent measure of the power structure of concern which can then be empirically correlated with the external structure. Inference to power from other structures is a derivative technique which depends upon an independent capacity to measure power. But such an independent measure of power is the very thing we do not have from the inferential positional approach, and, if we had it, we would generally not need the inferential approach, though we still might use it in particular cases for convenience, after research to establish its validity had been accomplished.

One particularly important variant of the inferential technique is the inference to power from supposed power resources. Hart (1976) opines that it is "...the most widely used and accepted approach in the study of national power." Nonetheless, in this case, one must ask what is a power resource. Although attempts at definition are rare, two main meanings have been given. With apologies, I shall call these the "stipulative" and the "teleological" interpretations.

Under a stipulative approach, supposed resources are merely listed or enumerated. Wealth, armed forces, raw materials, GNP, population, technology, and so on, are claimed to be resources for power, usually based on face plausibility in some particular case or cases. The problem with this is that, as Baldwin (1979) has emphasized, there seems to be no universally "fungible" power resource. Virtually anything can be a power resource under some conditions, while it is always easy to specify conditions under which any asserted resource such as money, arms, or intelligence is not a resource, i.e., does not contribute to an

actor's power. Even in the same situation, what is a resource for one actor, or one scope, etc., may not be so for another.

Perhaps recognizing the problems with the stipulative conception of resources, other analysts have turned to what I have called the teleological conception. They define a resource as whatever contributes to an actor's power, "...anything an individual or group might use to influence another person..." (Dahl 1984, 31) or "...the actor's properties or facilities that may be converted into power..." (Clark 1975, 274). Without explicit empirical indication of what these resources are, however, this plunges us from the frying pan into the fire, for such a tactic makes uncertain what specific things are in fact resources and eviscerates the explanatory power of the notion of a resource. Such explanations then read, "R had power because he had whatever gives power". One thus eliminates the flaw in the stipulative conception but destroys its basic utility. The problem then becomes one of establishing empirically what things are resources and when.

The long run answer to this dilemma is to combine the two. The teleological conception guides us regarding the analytic function of the notion of resources but does not tell us specifically what they are, so it has no direct explanatory utility. The stipulative conception is empirically dubious unless its ambit of application is specifically and cogently indicated. Thus, we need to develop, if possible, typologies of situations within which stipulated resources can be shown empirically to confer power upon actors possessing them. Stipulated resources, for example, do a rather good job in predicting the victors in wars (Ray and Vural 1985; cf. Goldman 1979), but most of those same factors are not resources in legislatures, urban communities, and most other power

settings. Very little awareness of this problem exists, however, let alone progress in such a direction.

In sum, then, the fundamental problem with locating and measuring power by inference from other structures is that the technique is clearly remote from the concept of power. At best, moreover, it usually furnishes a power ranking but not a delineation of specific linkages.

Opinion Change. Another technique that has been occasionally employed in small group research is the opinion change method, also used by some researchers employing a preference-outcome conception of power, where the outcome is some kind of group decision. Essentially, this method involves ascertaining opinions (preferences) on some issue or issues prior to a presumed conflict-resolving interaction over that issue. Then, in the small group version, after the interaction, the opinions of the actors are again ascertained and power inferences are made on the assumption that those actors who show before-after change have been influenced by those actors who have remained stable in the opinions toward which the others have changed. In other versions of the technique, the outcome alone is related to prior preferences, those actors whose preferences are most realized in the outcome are presumed to have been most influential.

One of the best illustrations of the small group use of the technique is Strodtbeck's (1951) classic work on familial power structures. He analyzed husband-wife "interaction over revealed differences," interviewing married couples and confronting the spouses with conflicts in their individually stated views. He then asked them to resolve those conflicts and ascertained who won, attributing greater power to the victor. Previously mentioned research on legislators' preferences and

vote outcomes or on constituency preferences and the votes of their representatives exemplify other uses of the opinion change technique.

The problems with the method are several. Since the researcher needs to find clear, conflict-resolving interaction, its applicability is limited. Also, the results are not always plainly indicative of who influenced whom. Satellite and chameleon problems may plague the power interpretations, along with the problem of spurious causal inference from ignoring important outside factors shaping both preferences and outcomes. The method works best if the conflict-resolving interaction can be observed directly by the researcher, but that is really a different method (direct observation).

Influence Attempts and Successes/Attempts. Another very common technique for locating and measuring power is based on perceived activity. The committee members who speak most are often taken to be particularly influential. The groups and organizations that are most active (that "participate" most) are commonly regarded as especially powerful. Under this interpretation, an actor's power is assumed to be proportional to the relative number of his influence attempts.

There are many reasons for rejecting such a naive perspective. We have fairly clear evidence that a negative rather than a positive relationship may often exist between influence attempts and real power. The increased number of attempts indicates failure rather than success. Therefore, more astute analysts circumvent this inadequacy by using a successes/attempts ratio, a kind of power batting average. Dahl (1961), for example, employed this plus other measures in New Haven.

Closer analysis rather quickly reveals problems even with the more plausible S/A ratio method. The limitation of focus to influence

attempts tends to redefine power to include only relations intended by the influencer, neglecting non-intended power. It is also very difficult to determine in many situations what is an influence attempt and, even more, what is a success. And, clearly, a superficial ratio of one to the other, without considering resistance, is inadequate. A lobby which gets three trivial bills through Congress in three attempts is hard to regard as more powerful than another which gets two of three extremely difficult bills through. Finally, the batting average produced by the method affords little insight into the precise patterning of relationships--who influences whom.

Decisional Analysis. Decisional analysis, supposedly the favorite method of the "pluralists," consists of tracing presumably representative or critical decisions through the political system, trying to perceive or reconstruct who influenced whom, when, how, etc. The known decision and the actors then involved constitute the analytic entry point and the analysis moves backward and forward in time from there.

The method has the great advantage of indicating specific linkages so that detailed structures of power can be understood and the added advantage of comparative economy in that one deals only with the actors actually involved in the decisional process. The decision analytic approach normally also furnishes rich information about influential behaviors and scopes along with other aspects of power. Unlike most other methods, it provides direct information regarding the sequential timing of the power interactions studied. Another attraction is its broad applicability to social units of any size, although only a small but presumably critical part of the system is usually examined.

There are two basic types of decisional analysis, and, as a research technique, it reduces to other more basic methods. One type is recon-
structive decisional analysis and the other is direct decisional
analysis. In the former, a past decisional process is reconstructed on
the basis of after-the-fact interviews, documentary analyses, newspaper
accounts, etc. Hence, the main ingredients are largely attributional.
It is slightly ironic that there is so much of the (cobweb/snowball)
attribution method in reconstructive decisional analysis whose
practitioners have been very critical of attributional techniques.
Direct decisional analysis involves placing an observer in the mayor's
office or wherever the presumed scene of decision is and relying on his
observations to understand what transpired in power terms. This becomes
essentially the method of direct observation.

The key drawbacks of decisional analysis are two. The first is that,
as used up to now, the method is limited in applicability to rather
structured situations in which some conflict, clear issue or the like
has arisen that leads to an identifiable "decision." Thus, suppressed
issues and more subtle, accepted or routine applications of power are
not well handled by this technique. The second drawback is the problem
of generalizability. The method is so demanding of the time and effort
of skilled analysts that relatively few decisions are usually analyzed,
producing obvious sampling problems in generalizing to the implied set
of similar decisions. In actual use, the method has most commonly been
directed at governmental decisions, ignoring other centers of power, but
that is due more to the conception of politics employed than to the
method itself, which is applicable to all kinds of social decisions.

Direct Observation. One of the most theoretically appealing of all methods for measuring power is direct observation. In fact, it can be argued that all noninferential methods really boil down to someone's direct observations. The essential appeal of the method is that, more than any other, if properly conducted, it can approach the association-temporality-theory measurement model previously described. It is the only method that fully supports measurement of the strength of particular power relations. On the other hand, it is one of the most easily abused methods if the observations are the casual, unsystematic sort of everyday life.

The method has not been widely used in power research. Bales' (1950) studies of task oriented groups, the work of Irving Sigel and others (1956) and of Barker and others (1963) on the child's learning of power, Walter's (1963) and Kovenock's (1973) use of the "communications audit" technique to study municipal officials and congressional subcommittees, and Schubert's (1983, 1984) ethological analyses of municipal councils are some ready illustrations. Obtrusiveness, coding difficulties, applicability limited to relatively small systems, etc., are the main problems confronting the technique. On the other hand, appropriate use of audio-visual techniques seemingly could increase enormously the utility of the direct observational approach. Even in its limited applications up to now, it clearly has the capacity to yield kinds of valuable information unavailable from any other method (Weick 1968). Its promise for the sophisticated power analyst is great.

Attribution. Among the most common and basic methods for locating and measuring power is the attribution or "reputational" technique. I shall use the former term as less pejorative. The label "reputational"

suggests that the method at best merely obtains reputations for power, which is not the case.

The essence of the attribution method is that it attempts to use respondents (usually participants) as power informants or observers, i.e., as the closest possible substitutes for direct observation or for the invisible, ectoplasmic, audio-visual devices previously imagined. Very often, if anyone has been in a position to make the necessary observations about power, it is the participants in the system. Obviously, they may not be appropriately trained, they may be biased, or they may be reluctant to disclose certain information. If so, it is the task of the method to discover and compensate for these drawbacks. But they appear to be the best possible information source in most real life settings, even superior to direct observers because less obtrusive.

The two key research decisions facing the attribution method are: 1) whom to question and 2) what to ask. Four main variants of the attribution method have been developed in response to the first problem, some also differing in their response to the second. These are the sample, panel, cobweb or snowball, and complete enumeration approaches.

The sample approach simply involves drawing a sample of the desired population and questioning the members of that sample concerning their power observations. The panel technique involves locating a small group of persons who are supposedly especially well informed about power in the chosen system and asking them to name and/or rank various actors according to how much relative power they have. The cobweb or snowball technique involves selecting one or more actors as starting points in the system, interviewing them, asking them about their domain and field, interviewing those mentioned to get more names, and so on, thus fanning

out until enough repetition in the names obtained warrants stopping. The complete enumeration (my label) or census technique, involves interviewing everyone in the system, usually twice, so as to obtain as complete a set of reports as possible.

In the sampling and panel variants of the attribution method, the respondents are usually asked which actors are most powerful in the system, begging the question of the distribution of power. Interest in the panel technique was prompted by the obvious drawback that respondents in an ordinary sample were quite unlikely to know the answer to such queries, hence they offered mere "reputations" for power. The panel was chosen to include people who were presumed likely to have such knowledge if anyone did. However, the problem with the panel technique is mainly how one justifies the particular panel selected. How can one show that it is indeed knowledgeable? To do that one would have to show that its choices coincided with the real power structure. But, to ascertain that real power structure, one would need an independent measure of power, the very thing the panel was supposed to provide. Moreover, if one had such an independent measure, one would not need the panel.

If a panel is nonetheless used, the researcher should make it as heterogenous as feasible, within the limits imposed by the presumed power knowledge requirement, to avoid reliance upon the views of a biased clique. One should also check the degree of agreement among the panel members, since a high degree of consensus is required to support the conviction that the panel members are accurately viewing the same power patterns.

Both the cobweb/snowball technique and the complete enumeration technique follow a different interrogative approach. Instead of asking elite-presuming questions about perceptions of the usually remote overall power structure or its upper echelons, respondents are asked about something they are much more likely to know, viz., their own interactions--whom they influence and who influences them, if anyone, in a specified area. Then the structure of the system is put together from the respondents' individual reports.

The great virtue of the cobweb/snowball technique is that it is the only one that is applicable in open systems whose boundaries are unknown, at least initially. It also offers the best attributional purchase on indirect power relations. However, it has its own problems of looping (i.e., getting locked into a clique or subsystem) and indefinite extension (fanning out for a very long time). Looping is avoided by choosing as large a number of random, independent starting points as possible, coupled with a higher cut-off criterion (e.g., 75% repetition of names mentioned vs. 25%). On the other hand, unlimited extension is avoided by having a lower cut-off criterion, so the researcher must balance the two considerations.

The complete enumeration technique has the disadvantage of assuming a closed system, being limited at present to those with a maximal size of several hundred. It also usually focuses on respondents' generalized summations of their power relations over a given period, so that, unless special efforts are made, it does not provide full evidence for measuring relational strength or indirect power chains. In other respects, however, it offers many advantages. It focuses upon the power relations respondents are most likely to know--those in which they are

personally involved. It gives a complete structural picture, including isolates, and it offers special validation opportunities since mutual claims (where A says he influences B and B says he is influenced by A) can be established. It produces data appropriate for rigorous analysis of such features of power structures as their density, distribution, integration, isomorphism, reciprocity and redundancy. Along with cobweb/snowball techniques for open systems, it is a very appealing approach to attributional power assessment.

Network and Path Analysis. The six methods discussed are techniques for securing what may be called original or initial data on power relations, especially the last two. With the noted exceptions, they are techniques for locating power--determining who influences whom--more than techniques for measuring power more quantitatively. One of the encouraging advances in the social sciences in the past decade or so has been the development of network approaches to the analysis of social structure (Frey 1978). In one sense, these advances give even greater significance to the need for effective location of power because we now have the tools for much more sophisticated analysis of such relational data, if they are available. In fact, the secondary level tools of network analysis tend to be relatively unused in political science for lack of appropriate original data.

As noted, apart from direct observation, the cobweb/snowball method, and decisional analysis (which is essentially similar), most methods do not easily handle the crucial matters of indirect power relations and the strength of particular power relations. However, if one obtains appropriate data via these methods, then path analysis (Nagel 1975) offers good prospects for the pursuit of such topics, despite a few

lingering problems. But the ability to use path analysis to investigate power, like network analysis more generally, depends fundamentally on the prior ability to locate and measure power relations through techniques like direct observation and attribution. They are necessary to provide the specific linkages for network analysis and the relational coefficients on which path analysis depends.

Comparative Results and Conclusion

There has been some contention in political science and sociology over tendencies asserted by Walton (1966a, 1966b, 1968) for there to be biases of discipline and technique in the measurement of power. Sociologists supposedly favored attributional methods and inference from other structures and found more elitist, concentrated power structures; political scientists, on the other hand, supposedly preferred decisional analysis and found pluralist structures.

In general, research designed to compare and evaluate different methods of locating and measuring power has been limited. Altogether, there are about a score of studies that use more than one method on the same set of actors. The results are mixed. Less than half a dozen find a rather high degree of agreement ($r > .5$ or more than 50% positional overlap across methods). Most of the agreement lies between the sample attributional and positional inference methods, suggesting that popular perceptions of power may be based mainly on awareness of actors' formal positions. Slightly fewer than half the comparisons found weak agreement ($r < .25$ or less than 25% overlap). Although a few of these included attribution and positional inference, most covered attribution and some other measure such as opinion change, decisional analysis or direct observation. The rest of the comparisons were in the middle

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range of agreement. It should be added, however, that unsophisticated application of many of these methods probably contributes significantly to the lack of agreement.

There have also been very few independent restudies or replications of research measuring power and those that exist are primarily confusing. Jennings (1964) restudied Hunter's Atlanta (1953) and felt that his results were quite discrepant, but Rossi (1966), reviewing both studies, felt that the results were more similar than different. The New Haven analyses of Dahl, Domhoff, and Morriss, the analyses of therapist's power by Lichtenburg and Barke (1981) vs. Tracey and Ray (1984), several analyses of power in families (see Hess and Torney 1963), and the various analyses of national power in the United States by Mills, Riesman, Rose, Hunter and others all reveal marked differences of measurement and interpretation.

[ETHAN: THIS IS IT BUT FOR THE CONCLUSION, WHICH I AM REVISING.]

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