RESEARCH PAPER P-488

INDIVIDUAL AND ORGANIZATIONAL FORCES INFLUENCING THE INTERPRETATION OF INDICATORS

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INSTITUTE FOR DEFENSE ANALYSES
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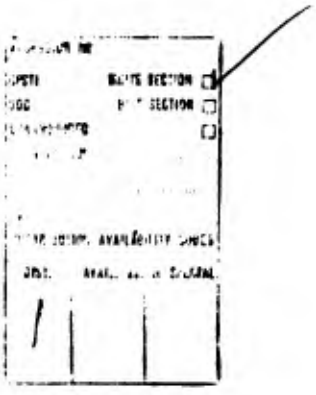

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FOREWORD

The work on this paper was initiated at the request of the Director, Overseas Defense Research, ARPA, and a preliminary version was submitted to ARPA in April 1969. The general purpose of this effort was to improve the accurate interpretation of military field data, especially with regard to the role played by perceptual factors.

ABSTRACT

This paper is a review of the major psychological and organizational factors which may distort the interpretation of indicators. A general "lens model" is used to explain how indicator data are pattern-matched to earlier learned hypotheses about possible outcomes. The forces influencing judgment within this model work in a way to produce conservative, inertia-bound evaluations. A series of recommendations to counter informational biases is included.

CONTENTS

INTRODUCTION

Régis Debray has argued that history advances in disguise. The fragmentary evidence that describes those disguised advances, the indicators of political and social change, is the focus of this paper.

There is no magic in indicators or in their numerical manipulation. If anything, our knowledge and experience lead to suspicion. The scope and quality of available indicators are at best uneven, their conventional usage is frequently ad hoc, and substantial temptations for distorted selection are commonplace.

But decisions must be made, almost always on evidence that is incomplete and fallible. If one views indicators as only evidence, and not as proof, then it may be profitable to ask what can be done to improve the quality of the evidence necessary for reasonable decisions. Here one may simply apply the general criteria for all evidence: is it pertinent? is it trustworthy? is it perturbing the system it measures? A set of evidence can meet the admirable criteria of being "unobtrusive, systematic and where the action is" without necessarily being complete or sufficient for decisions. Uncertainty and risk are continuing components of all decisions, and only the naive expect more from indicators than a reduction of some uncertainty. One may be confident of perceiving events correctly and still face the risks and consequences of responses to the events.

> ...White House decision-making is not a science but an art. It requires, not calculation, but judgment. There is no unit of measure which can weigh all the substantive consequences of a decision against the political consequences, or judge the precise portions of public opinion and congressional pressure, or balance domestic against foreign, short-range against long-range or private against public considerations. (Sorenson, 1963, p. 10)

However impeccable a series of data may be, it must be interpreted and assessed in a man's mind and that man is typically embedded in a bureaucratic organization. Thus to understand indicators, it is essential to address the system to which the indicators are inputs.

This paper describes a "lens model" for inference deduction, one based on a pattern-matching concept of thinking processes. It further stresses the organizational factors in processing information and deriving inferences from indicators. This approach is based on the belief that indicators do not speak for themselves. They are modulated by predictable states of the man and the system.* Most importantly, the systematic errors of both man and system are conservative. Conservative is not meant in the ideological sense, but instead with the meaning of the maintaining of old thinking and the resisting of new forms of data or new interpretations of information.

These inertial forces are expected and should not be troubling. To the degree they are known, they can be countered, and a significant number of organizational procedures are designed to be counters. Determining whether enough corrections exist, and, if not, how to develop

*"Surprise, when it happens to a government, is likely to be a complicated, diffuse, bureaucratic thing. It includes neglect of responsibility, but also responsibility so poorly defined or so ambiguously delegated that action gets lost. It includes gaps in intelligence, but also intelligence that, like a string of pearls too precious to wear, is too sensitive to give to those who need it. It includes the alarm that fails to work, but also the alarm that has gone off so often it has been disconnected. It includes the unalert watchman, but also the one who knows he'll be chewed out by his superior if he gets higher authority out of bed. It includes the contingencies that occur to no one, but also those that everyone assumes somebody else is taking care of. It includes straightforward procrastination, but also decisions protracted by internal disagreement. It includes, in addition, the inability of individual human beings to rise to the occasion until they are sure it is the occasion--which is usually too late. (Unlike movies, real life provides no musical background to tip us off to the climax.) Finally, as at Pearl Harbor, surprise may include some measure of genuine novelty introduced by the enemy, and possibly some sheer bad luck." (Schelling, 1962, p. viii)

more, is one of the concerns of this paper. The relative gain from increasing the quality of indicators may be less than from controlling more of the error sources in the use and interpretation of indicators.

The final section of this paper discusses some possible corrections, and is largely drawn from a paper presented by Davis Bobrow (1969). Hopefully, these thoughts address the "so what?" question.

Error will always be with us. And its presence in data, organizational design, or interpretation should drive us neither to despairing futility nor arrogant empiricism. To Daniel Lerner, "The methodological concern is how to use the partial regularities disclosed by scientific investigation to fortify, without overpowering, the introspective element needed to make net judgments on particular cases." (Lerner, 1958) Sorenson added, in another setting, "...the only infallible experts are those whose forecasts have never been tested." (Sorenson, 1963, p. 68)

PATTERN MATCHING AND INDICATORS

Concern with indicators should be grounded in their link with judgments--not with hopes for data fastidiousness per se. The data are important to the degree that they lead to accurate judgments, and this paper begins with a general model of judgmental pattern matching with data a critical (but not exclusive) element.

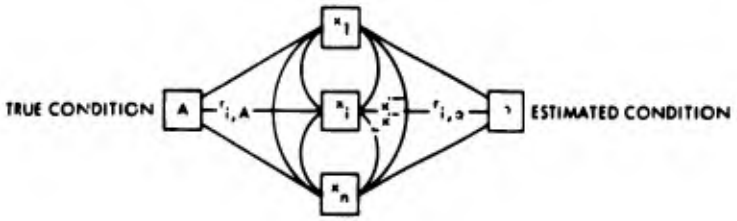
The simple model expressed in Figure 1 is derived from the work of Egon Brunswik. Called the "lens model," because of its emphasis on converging lines of information, it was originally generated for the study of visual perception (Brunswik, 1952, 1956). In recent years, the model has been significantly generalized to other psychological areas (Hammond, 1966).

The central assumption is that an inference or judgment is derived by perceiving a group of indicators or cues and then matching that cluster of information against a set of innate or learned "images." The congruence between the data and each of the alternative images leads to a best estimated description or interpretation of the data cluster--presumably by some form of a psychological goodness of fit test.

It is apparent that there is a close relationship between this position and much of the recent writing on pattern recognition, artificial intelligence and pattern matching. Indeed, the most useful treatment comes from D.T. Campbell, who generalizes the lens model to the questions of "how do we know?" and "how do we judge one theory to be better than another?" (Campbell, 1966)

In Figure 1 a group of indicators are labelled $x_1 \ldots x_i \ldots x_n$, and i is assumed that a "true condition" (A) exists. This true

condition may be the presence in a country of a foreign insurgent, the perceived brittleness of a society to an internal stress, or the level of dissatisfaction with a ruling government. The estimate (α) of the true condition is considered valid to the degree that the associations perceived between the indicator set and the estimated condition ($r_{i,\alpha}$) agree with the true associations or weightings ($r_{i,A}$). The estimate derives not only from the simple additive effect of the associations but also from the contextual effects or intercorrelations ($r_{x_i x_j}$) among the indicators.



A = TRUE CONDITION

α = ESTIMATED CONDITION

x_i = INDICATOR

$r_{i,A}$ = WEIGHTING OF INDICATOR TO TRUE CONDITION

$r_{i,\alpha}$ = WEIGHTING OF INDICATOR TO ESTIMATED CONDITION

$r_{x_i x_j}$ = INTERCORRELATIONS OF INDICATORS

FIGURE 1. General Form of Lens Model

This statement is in the simplest form. It becomes more interesting as the notion of pattern matching is introduced and we find a decision maker selecting among alternative estimates or assigning a probability value to each (Campbell, 1966). This is represented in Figure 2, where a decision maker chooses between two rival explanations (α_1, α_2) for the same array of data. These alternative explanations or hypotheses may be grossly stated ("safe-dangerous," "friend-foe," "send troops-don't send") or more finely graded with more plausible states--say estimating which one of four or five levels of internal conflict is present.

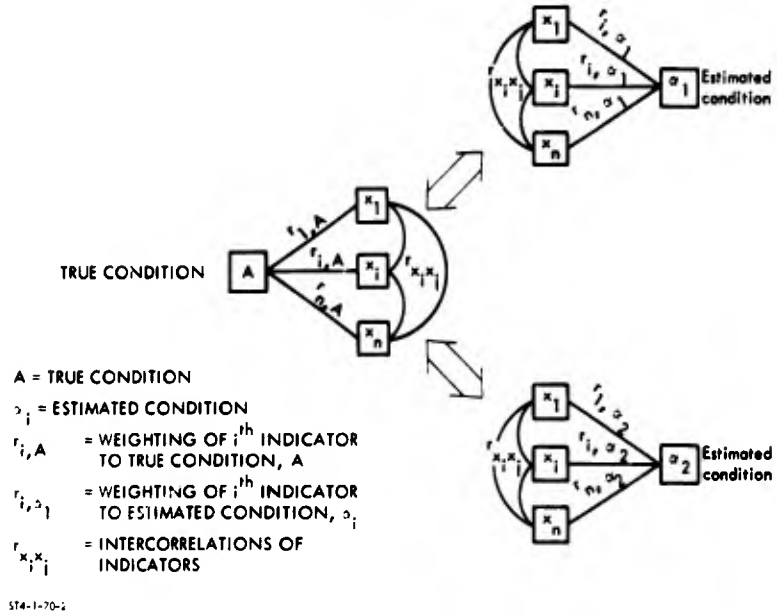


FIGURE 2. Pattern Matching of Indicators

A "template" exists in each judge's thinking for each possible condition or hypothesis, including all the main and interactive relationships among indicators. Shaped by past experience and learning, these templates are the criterion states against which a given configuration of evidence is compared. Put more simply, a man might ask, "Does this group of information look as if it squares with the idea of trouble or calm?"

The computing hardware developments of recent years have focused attention on pattern matching and discrimination. But it should not be forgotten that this software notion of how man judges is an old one. Paisley (1968) has pointed out that "pattern recognition (is) the cornerstone of an empirical connoisseurship."

Discussing the topic, he cites the recollection of the eminent critic, Bernard Berenson:

> A generation ago, when a beginner, I enjoyed the privilege of being guided through the Borghese Gallery by a famous connoisseur. Before the Pieta now ascribed to Ortolano I fell into raptures over the tragic pathos of the design. My mentor... cut me short with, "Yes, yes, but observe the little pebbles in the foreground. They are highly characteristic of the artist." "Observe the little pebbles" has become among my intimates a phrase for all the detailed, at times almost ludicrously minute, comparisons upon which so large a part of activities like mine are spent.

Each artist or each condition has its unique set of signs and the role of the analyst is to go beyond the surface ones and search out the subtle cues. Although subtlety is superfluous under certain conditions (an attack on Pearl Harbor means war), it becomes important when spoofing is possible or when ambiguity is the rule. For understanding social change in most developing societies, both spoofing and ambiguity may be present.

In assigning the authorship of an unknown painting, book or work of music, Paisley (1962) has stressed attention to the "minor encoding habits" of an artist. That is, his template is largely composed of attributes or indicators which are both common and non-obvious. If one is attempting to fake a Rubens, it is obvious to portray robust and pink women. But a forger typically will not key on the shape of ears or hands. The pattern matching, in this case leading to forgery detection, is grounded in having a large enough number of validated Rubens to derive a template containing multiple indicators of hands, ears, pebbles or whatever.* See Fig. 3 for individual styles among Renaissance painters.

Such procedures have obvious application to studies of detecting the source of domestic violence. A more systematic exploitation of the "modus operandi" files of murders, for example, should aid in

*In a study of disputed authorship in The Federalist Papers, Mosteller and Wallace (1963) found the use of adverbs an important "minor encoding habit."

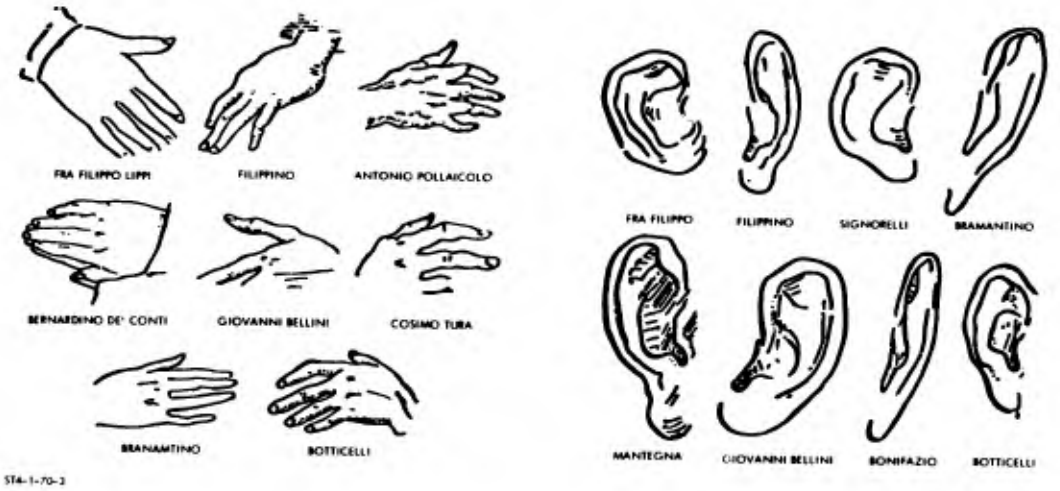


FIGURE 3. Hands and Ears Sketched by Giovanni Morelli to Illustrate Idiosyncrasy in the Execution of Minor Details by Renaissance Painters (Source: Morelli, 1900, pp. 77-78). (Paisley, 1964)

establishing whether a series of acts was committed by one (α_1) or a series of different men (α_2). For a gendarmerie, an extension is to discriminate between murders or violence committed by political forces or by apolitical criminal elements.

A suggestion from this approach is that the set of indicators needed for effective pattern matching need not be exhaustive of all possible descriptors. The set can be composed of recurrently appearing data on which some book can be built up, and when the data contain enough non-obvious cues so that one is not jammed by deliberate false alarms. The content of political propaganda, for example, can be scanned for stylistic characteristics which reflect either serious intent or disruptive harassment. Diplomatic observers do this on a continuing basis, of course, and veteran country watchers note minor changes in a foreign power's political emphasis on different themes. It remains an empirical question whether a set of novel attributes in content or style presentation, beyond the typical analysis of conventional signs, would yield more. It would not be completely unexpected if a new template composed of sentence length, rhythm or other speech components could add incremental intelligence in predictions of intent or descriptions of current position.

SOURCES OF INDIVIDUAL ERROR

Pattern matching can be a completely automatic machine process, and the experience of banks in their clearing of checks shows it can be a trivial one. But for social and political description the lack of simple alpha-numeric indicators, combined with enormous textural complexity, suggests matches will not be trivial or automatic in the foreseeable future.

The judgment and experience of reasonable men must be a part of the indicator system, and with that component comes the threat of human error and inertia of thought. Conservatism in the inertial sense may be a necessary characteristic of individual men in such systems, for to learn enough to produce sufficient alternatives and relationships means acquiring expectancies that mould new data to old shapes.

Figure 4 introduces a human observer to the earlier mentioned "lens" system, suggesting that his observation of a set of indicators provides a selective filter. He keys on certain indicators, ignores others, and transforms the information into a residual set that serves as one facet of the pattern matching. The other facet, the templates, has been created and shaped by past learning which has similarly been influenced by systematic human tendencies that may lead to distortion.*

This section looks first at the factors that modulate the individual's perception of indicators. In certain unhappy conditions,

*The following discussion on forces pressing for distortion derives strongly from Campbell (1958).

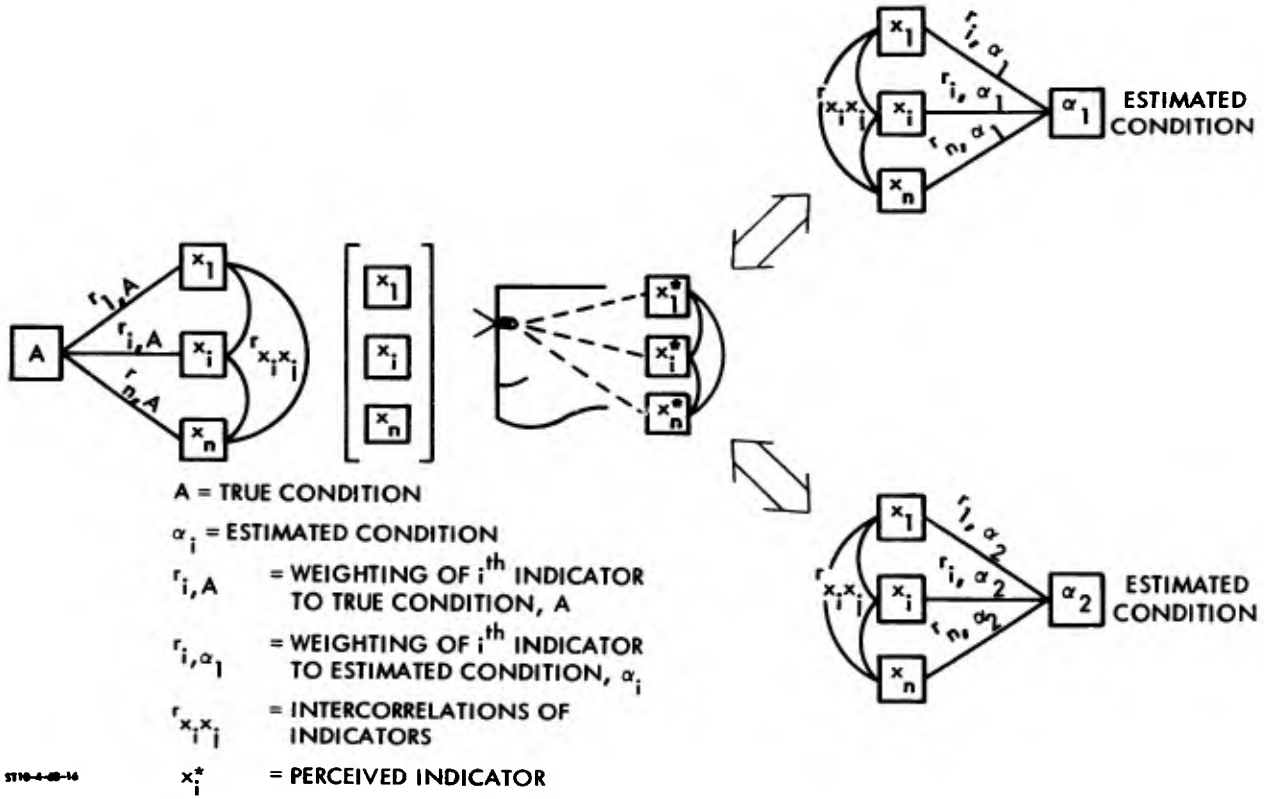


FIGURE 4. Pattern Matching of Indicators: Human Transfer Function

typically where organization control and couterchecks are weak, it could be that the purest and best indicators are overwhelmed by systematic sources of individual error.

Templates: The Adequacy of Expectation

Many potential error sources are associated with the observer's or analyst's templates--particularly with the breadth of perceived alternative explanations. Hempel (1966) wrote of templates as conceptual knots, clusters of perceived interrelationships that explain (by approximating) a body of data. Yet templates do more than explain data; they drive it. The template of interrelated events expected to go with an externally inspired insurgency versus a nationalistic movement leads to a search and selection of specific data points.

Moreover, political and social expectancies and estimates do not live in an insulated or sterile laboratory. They contribute to policy taken or not taken, and that in turn alters the true condition that was predicted. Notable among the biases in this zone is the self-fulfilling prophecy in which the response to a prediction shapes action, or another's response, so that the prediction has a higher probability of coming about.

These images of possible states or outcomes have a history, a memory and a future. They are, in Cronbach's words, "...an act of imagination based on observation." (Cronbach, 1960) So central to both interpretation and data collection, in the ideal state they should be exhaustive, internally consistent and parsimonious. They never are, of course. A constant threat is that we do not possess a broad enough range of alternative explanations. The tendency to deal with few rather than many possibilities, to rely on old experience to abbreviate and condense that experience often leads to "a poverty of expectations--a routine obsession with a few dangers that may be familiar rather than likely." (Schelling, 1962)*

* "There is a tendency in our planning to confuse the unfamiliar with the improbable. The contingency we have not considered seriously looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously." (Schelling, 1962, p. vii)

In some unreachable ideal state, there is an optimum number of templates or theories. The number lies between the constricted bounds of the "they're for us or against us" school and the nihilism of the "every situation is so unique that experience is no help" approach. In both errors, one can note a systematic "response set" of the advocate, a stable disposition to fit any group of observations into one extreme distribution or the other.*

The disciplined flexibility to define the appropriate number of plausible hypotheses is what we sometimes label wisdom. Since response set is so stable within individuals, some conditions may demand that this form of wisdom come from a collective effort, perhaps even a formal adversary process.

The way in which thinking may be restricted, and indicators inflated or deflated in importance, may be illustrated with some hypotheses about internal war. Most reasonable men believe the preconditions of internal war are convoluted and that one should have indicators of many sectors of a society.

But individual observers vary in the stress placed on these different sectors; this is what is meant by different templates. Stated in the symbols of Figs. 1, 2, and 4, we observe different $r_{i\alpha}$'s for the different observers. What follows is a list produced by Harry Eckstein of common hypotheses about internal war. The reader familiar with writings on internal war should find little difficulty in identifying proponents of these hypotheses. Each group represents a cluster of high weightings on one subset of an indicator domain. Depending upon the rigidity of the observer, one or more might receive high weightings.

*An example of such a response set is the psychiatrist's fallacy: interpreting all behavior as in the pathological mode. The apocryphal story is told of Freud's secretary who, when early for work was labelled anxious, when on time noted as compulsive, and when late was said to be hostile.

Common hypotheses about the preconditions of internal war:

(a) Hypotheses emphasizing "intellectual" factors--internal wars result from the failure of a regime to perform adequately the function of political socialization; internal wars are due to the coexistence in a society of conflicting social "myths"; internal wars result from the existence in a society of unrealizable or corrosive social philosophies.

(b) Hypotheses emphasizing economic factors--internal wars are generated by growing poverty; internal wars result from rapid economic progress; internal wars are due to severe imbalances between the production and distribution of goods.

(c) Hypotheses emphasizing aspects of social structure--internal wars are due to the inadequate circulation of elites (that is, inadequate recruitment into the elite of the able and powerful members of the non-elite); internal wars result from too much recruitment of members of the non-elite into the elite, breaking down the internal cohesion of the elite; internal war is a reflection of frustration arising from little social mobility.

(d) Hypotheses emphasizing political factors--internal wars are due to the alienation of rulers from the societies they rule; internal war is simply a response to bad government (government which performs inadequately the function of goal-attainment);* internal wars are due to divisions among the governing classes, not to the attacks of the governed on those who govern; internal wars are responses to oppressive government; internal wars are due to excessive toleration of alienated groups.

(e) Hypotheses emphasizing no particular aspect of societies, but general characteristics of social process--political violence is generated by rapid social change; political violence results from erratic rates of social change, rather than from changes which are even in tempo, whether rapid or not; internal war occurs whenever a state is somehow "out of adjustment" to society (Eckstein, 1963, pp. 116-117).

*"When a country is being subverted it is not being outfought; it is being outadministered." (Fall, 1967)

There will be cases in which the advocate of any one set of hypotheses is proven correct by some single historical event. Whether his set of hypotheses will apply equally well across all settings is less clear. Indeed the proclivity to generalize from one or a few successes to the universe of all cases is an understandable human tendency. History is a good teacher, however, only when comparable conditions and interactions hold. When they don't, error is probable and one has what psychologists call "negative transfer"--an inappropriate and persistent misapplication of previously correct, rewarded principles.

These remarks may themselves be unduly constricted. Should one generate a truly valid theory of internal war, close-knitted and imaginative enough to explain the major share of internal wars, the fact that only one or a few wars may have suggested the theory is not invalidating by itself. That no such satisfying theory is known to the writer does not preclude its existence or attainability. We should not forget that Kepler worked with data on only a few segments of Mars. Writing of spotty data patterns, Campbell notes, "If the data confirm the pattern insofar as tested, the theoretical pattern as a whole is made more tenable, including the nontested segments of the pattern." (Campbell, 1966, p. 102)

Perceiving the Indicators

The discussion so far has centered on the templates and some error possibilities associated with generating an adequate number of alternative explanations and weighting component elements. Now we turn to the direct perception of the indicators by the analyst or observer. In terms of the modified lens model (Fig. 4) this is the process of changing an existing indicator x_i to an element in reaching a judgment, x_i^*. The characteristics of systematic biases in perception extend equally well to the selection, interpretation, credibility and importance of the indicators. Earlier noted was the continuing tendency to simplify, lose detail, and sharpen what we see. This is a conservative pressure in that the changes that occur flow in the direction of previously noted material.

It may be worthwhile to briefly catalog these conservatively biasing forces. Experimentation shows them to be pervasive, and if they are potent enough in political and social description, they may be worth more attention than improvement in the data itself.

First of all, there are strong tendencies to assimilate new information to previous inputs. We tend to identify the new with the old, and that inclination is more pronounced when the previous input was recent, when attention to the earlier input was rewarded or punished, and generally when the earlier data were important. Note that these are admirably reasonable tendencies, ones usually functional in our daily lives. Events are autocorrelated, as are individual or governmental responses to them. The conservative tendencies to assimilate to past input are dysfunctional only at times of rapid change. Unfortunately, the most valuable applications of indicators are often just at the point of rapid change.

Next is an inclination to assimilate the input to expectations and attitudes.

Macbeth's dealing with an earlier revolt offers an example of expectations yielding falsely soothing advice. He was advised "Macbeth shall never vanquish'd be until/Great Birnham wood to high Dunsinane hill/Shall come against him." The reasonable expectation on the stability of trees lulled him ("Till Birnham wood remove to Dunsinane,/ I cannot taint with fear"). Sadly for Macbeth, it was already Act V when he showed this confidence.

A later conflict, in Vietnam, yielded a curiously similar situation. A forward air controller offered the laconic advice, "A moving tree is a camouflaged truck."

Were this disposition to assimilate not present, our world would be perceptual chaos, with no gain achieved from organizing experience. Allied with assimilation to attitudes or expectations is a pronounced tendency to assimilate to prior output. An earlier commitment to a position can tend to make one see in a direction consistent with that

position, and one need not detail the sins committed in the name of consistency. In the next section is a discussion of ways in which one handles inconsistency when the perceptual filters have failed to adequately screen out all unexpected or unwanted information.

Again, it should be stressed that such consistent perceptions, based on either memory or association, are frequently both functional and innocent. We would make a mistake if we judged a man malicious who distorted in the direction of expectation. Sorenson puts it perhaps too sardonically:

> Such a man (an advisor with personal political ambitions) is not necessarily suppressing his conscience and forgetting the national interest. He may sincerely believe whatever it is most to his advantage to believe, much like the idealistic but hungry lawyer who will never defend a guilty man but persuades himself that all rich clients are innocent. (Sorenson, 1963, p. 75)

Although significant dispute may exist among psychologists, a general professional belief is that stress demonstrably modifies perception. Under extreme fatigue or deprivation, one tends to become more primitive and less subtle in his perceptions (Kilpatrick, 1957). Under stress, events are seen more simply, suggestability is higher and there is a greater tendency to hold onto familiar and stable ways of seeing things. Many political observers have noted this effect, which surfaces visibly during political campaigns. With the candidate in a continuously jarring state of fatigue, it is said that the quality of his judgment erodes as the campaign advances. It may be the shrewd candidate who increasingly relies more on previously tested advisors.

High stress may be a recurring condition outside the narrow bounds of political campaigning. The British writer and diplomat Harold Nicolson wrote at length on the conduct of international relations and the attributes of diplomats. James Reston paraphrased Nicolson as follows:

> Under the strain of incessant work, he believes, the imaginative and creative qualities of even the most muscular of human brains are apt to flag; more and more does the exhausted mind tend to concentrate upon the narrower circle of immediate detail; less and less does it aspire to those wider circles of vision which, once entered upon, must entail further discussion, further mental effort. In time, these "ordeals of exhaustion" lead to an aptitude for the superficial rather than for the essential, for the expedient in preference to the awkward, and for the improvised as an escape from the pondered. (Reston, 1967, p. 32)

Another strong force for distorting indicators comes from so-called adaptation levels. As experience accrues, our criteria for coding information changes.

> "Emergency" describes mid-century conditions only by the standards of the past. By present standards what would once have been emergency is commonplace. (Neustadt, 1964, p. 17)

Some adaptation to experience, across long time spans, can be most valuable. The stray and non-recurrent sign may be more properly assigned to noise than to signal as one matures in his observation. The associated risk, of course, is that the observer becomes jaded and inattentive to events that a fresher orientation would flag as important. Reassignment to new areas of responsibility is a frequent method to counteract this tendency, discussed in a later section on the organization and processing of indicators.

This list of possible error sources applies at all levels of an intelligence or indicator system--from an unlettered aborigine reporting the movement of troops to a senior officer evaluating a broadly varied body of evidence. Both the aborigine and the officer have inherited the evolutionary history of man. A component of that history is a perceptual apparatus that relates the present to the past by stressing the similarities. Some of the inertial forces that work on a "thinking" rather than "seeing" basis are discussed in the next section.

PRESSURES FOR CONSISTENCY IN THINKING

The perceptual filters do not bar all unpleasant or unexpected information, and some information always enters which is incompatible with the beliefs or attitudes of the observer. Within academic psychology, this topic has received broad attention under the general label of cognitive consistency (Feldman, 1966).

The relationship (template) between attitudes and the alternative political states or outcomes makes the area pertinent here. Templates, like attitudes, are learned, contain a number of interlinking relations and order thinking. Both templates and attitudes are resistant to change once firmly established. Both are more easily modified if they are not publicly endorsed by the holder, if he doesn't view them as a critical part of his life or work, and if they are relatively independent of other templates or attitudes that are central.

However regrettably, we sometimes have to admit to an interpretation different from what we hold. Eddington wrote of two scientific tables, one the table presented to his eyes, the other consisting of

> ...numerous electrical charges rushing about with great speed...their combined bulk amounts to less than a billionth of the bulk of the table itself. I need not tell you that modern physics has by delicate test and remorseless logic assured me that my second scientific table is the only one which is really there...On the other hand I need not tell you that modern physics will never succeed in exorcising that first table--strange compound of external nature, mental imagery and inherited prejudice--which lies visible to my eyes and tangible to my grasp. (Eddington, 1929; cited in Hempel, 1965.)

In the political and social world, as in one's personal world, consistency is usually good practice. Since the social world is autocorrelated, it is a good bet that next month will be like this one. The burden of proof lays on those individuals or those indications which suggest a significant change is about to take place. Sometimes the change does occur, and when it does the conservative mechanisms of thought may preclude or significantly delay the sighting of it. In terms of the lens model, this says that the weightings between indicators and estimated states are out of line or that a necessary template, a hitherto unconsidered condition, is missing.

William McGuire has provided a convenient and insightful list of the major modes by which people can reduce inconsistency. For our case this is the inconsistency or lack of congruence between the data pattern and the template pattern. When one template is particularly favored--say a position that everything is in adequate control within a country--information discordant to this template may yield a group of defensive responses. The responses are not mutually exclusive and they are more likely to be complementary.*

First of all, the discordant data pattern can be ignored. One can stop thinking about it and simply put the inconsistency out of mind. For professional analysts of indicators this is probably a rare event, but for those who are on the front end of data collection--our friendly aborigine--such a defense may provide more frequent breaks in the communication chain.

*For some people, it may be an interesting game to allocate friends or superiors to the different modes. For reasons already given, it is hard to perceive ourselves as engaging in such defenses.

The interested reader will be greatly rewarded by reading McGuire's (1966) chapter. It is a model of scholarship and engaging writing.

A defense more common among high level decision makers may be the "bolstering" mode. Here the inconsistency is heeded, but the person accrues a large mass of other data that supports the preferred template. The result is that the alien idea is washed over in a flood of compatible input. Camus (1955) observed that "crushing truths perish by being acknowledged."

Next is the "mote" method where solace comes from pointing out that others are even more inconsistent. My position may not be right, but...McGuire (1966) tells the story of "...the Muscovite who was showing the American visitor the beauty of the mosaics in his home-town subway. When the American said, 'Very nice indeed, but the trains? There seem to be no trains on these tracks,' the Muscovite replied, 'Yes, and what about the plight of the Negro in the South?'"

Differentiation is another strategy. Here what was seen as one group of information is fractioned into two. Such a defense can have a practical gain as well as a self-delusionary outcome. The tyro statistician is always taught to be suspicious of bimodal distributions; two populations may be hiding under one cover. Similarly, if data do not fit the available set of templates, it could be in reality that the template set is not comprehensive. But it might be.

The fifth mode reflects the opposite of differentiation. It is transcendence, described as the ability to define incongruous facts or interpretations as two faces of a higher reality, both subsumed under a dynamic equilibrium of opposites. Man's theoretical thought at its best represents this integrating finesse. But it becomes tawdry thought when a false unity is established. When serving well, transcendence is a route to generate new, and fewer, templates from old ones assaulted by data.* When serving ill, it is the dysfunctional route of seeing consensus where none exists, of deriving simple rules that don't fit complex relations.

*See Vossler and Uhr's (1962) discussion of pattern discovery.

One may also distort his understanding of what the data are about when they are incontrovertible but negative. That is, if a group of indicators is initially assumed to represent economic development, a set of findings apparently negative to a favored hypothesis can still be handled. All one need do is reinterpret them as reflecting another facet of interest. Thus a series of data on tax collection can be metamorphosized from economic data to symptoms demonstrating the confidence of a people in their government. The particular ambiguity that shrouds the interpretation of so many gross social indicators permits a high level of such accommodation.

Next is the venerable strategy of devaluing the source when dissettling news enters. Some hundreds of years ago, the diplomatic courier's job was hardly popular. Too many were assassinated by displeased rulers to whom they carried messages.* Short of murder, one can reestablish equilibrium by saying, "I wonder what happened to X? He used to be a reliable fellow." Or, "Well, I've been wondering about this source for a long time. This proves he's not plugged into the right channels." If the source or the data cannot be discredited, all is not lost. There is still open the option to downgrade the importance of the topic being reported.

A combination of downgrading the topic while deflating the credibility of the source can be particularly soothing. Given a report of a new and troublesome movement in a previously calm location, the harassed man might respond, "Look, Joe is always spooked by shadows under the bed. And even if he's right the regime has such good control that nothing will come of it."

*The Turks have a proverb: "Whoever tells the truth is chased out of nine villages." The Slavs counter with: "Tell the truth and run."

Such defenses are easy to parody; simpler to scorn. They serve us well as individuals, however, and help to provide stability in thought where the alternative, an ad hoc anarchy, can lead only to chaos. Obviously the defenses are an imperfect perimeter. Were that not so no opinion would ever change. So one outcome of incongruity of data and belief is that we change our minds. And then that new pattern of thought is itself subject to conservation.

The remarkable man is the one who, given conserving forces and a conflicting body of evidence, doesn't regress to the stereotypes of the past or the premature locking on of the new. Sometimes the data fit no pattern well, and one must bear the uncertainty and continue to muddle through.*

For students of social and political behavior no theory or set of templates has been developed to fit all phenomenon. Such students may fit Oppenheimer's description of both the man of science and the man of art, who

> ...live always at the edge of mystery, surrounded by it; both always, as the measure of their creation, have had to do with the harmonization of what is new with what is familiar, with the balance between novelty and synthesis, with the struggle to make partial order in total chaos. (Oppenheimer, 1955, p. 145).

*Both professional administrators and research analysts have enjoyed C.E. Lindblom's instructive comment in the essay, "The science of 'muddling through'." (Lindblom, 1959).

THE ORGANIZATION AND PROCESSING OF INDICATORS

So far, the discussion has centered upon ways in which individual men perceive and interpret information. For any non-trivial problem, these individuals are embedded in a group and typically receive and transmit both data and interpretations.

The advantage of an organization, of course, extends far beyond its ability to centralize information and focus attention on salient parts. As a multi-man system, it can provide checks on the inevitable human tendencies for distortion and arrange for richer evaluation and interpretation of material.

With such gains go the inevitable costs of any organization: the strong tendency for consensus judgment, even when none is present, and the allied pressures to conform to the values or expectations of colleagues, superiors, and pertinent internal interest groups.*

Just as the organization can counteract biasing tendencies of individual members, so too can it counter at least some of its own bureaucratically produced biases.

The countering resources include such mechanisms as the reassignment of personnel, the establishment of a formal adversary system for ideals and interpretation, the mixing of attributes of group members and the introduction of hardware or decision systems which supplement human resources.

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*"Had the Gettysburg Address been written by a committee its ten sentences would surely have grown to a hundred, its simple pledges would surely have been hedged, and the world would have little noted nor long remembered what was said there." (Sorenson, 1963, pp. 61-62)

Organizationally Grounded Biases

It should surprise no one that a list of organizationally grounded biases is headed by "distortion to please receiver." Typically one views this as distortion in favor of one who has control over assets that count to the sender--esteem, promotion, salary. One's superior controls more of these assets than most, but distortion to win respect from associates is as significant a pressure.

Neustadt (1964) wrote of "the Washingtonians," and their careful attention to the probable response of the President to their behavior. Expanding on Carl Friedrich's (1940) "law of anticipated reactions," Neustadt wrote:

> The men who share in governing do what they think they must. A President's effect on them is heightened or diminished by their thoughts about his probable reaction to their doing. They base their expectations on what they can see of him. And they are watching all the time. Looking at themselves, at him, at the immediate event and toward the future, they may think what he might do in theory, he would not dare to do in fact. (p.65)

In more stuffy system language, one might talk of anticipated feedback and predict a modification of inputs to a superior function on the assets controlled by the superior, their utility to the sender and the probability of him using his power.* The most crippling distortion occurs when the underling guesses wrong--when he edits the input to what he thinks the superior wants, but when the superior truly wants a straight account or emphasis along some other dimension. Note that emphasis is not equivalent of deck-stacking. Given the inability to attend to all intelligence, selective monitoring is demanded.

*When underlings have power, and they usually do, the superior is advised to anticipate their feedback as well. This is most true in cases where intelligence is power: "President McKinley, according to Speaker Cannon, retained his popularity by 'keeping his ear so close to the ground he got it full of grasshoppers.'" (Sorenson, 1963, p. 50)

In the case of estimating the preconditions for limited war, the trouble occurs when underlings and superiors do not agree on what the critical dimensions are. Given a rigid administrative structure, with formal and low-level interaction among tiers of the hierarchy, the likelihood of subordinates erroneously playing the anticipated feedback game is increased.

Good administrators know the risks and are suspicious of well-intentioned aides. If a man is confident enough (one is tempted to say man enough), he may counter the bias by directly seeking out the views of those who are less likely to be deferential. The story is told of an encounter at Los Alamos between the venerated Niels Bohr and the then 25-year-old Richard Feynman.

> Early one morning Bohr's son, Aage, telephoned Feynman at his dormitory. "This is Jim Baker," he said (the Bohrs traveled under the false name of Baker for security reasons). "We've just arrived and my father wants to hear your opinion on a new idea we have."
>
> "Me?" asked the amazed young physicist. "Are you sure you've got the right guy?" He could not believe that the Prophet would call an unknown and very junior scientist and ask his opinion.
>
> But the moment Niels Bohr started his explanation on the blackboard, Feynman lost all inhibitions. "No! That's wrong!" he shouted. "You can't do it that way!" And, in an excited voice, he gave his reasons. The Danish professor listened attentively, and then with one phrase destroyed the young man's arguments. But two minutes later Feynman was interrupting again. "That's crazy! I think I can do it a better way!" The discussion lasted for two hours, with Feynman shouting questions, alternately criticizing and applauding wildly. At the end Bohr said, "Well, I guess we can talk to the big shots now."
>
> "Why did your father choose me?" Feynman asked Bohr's son later. "I really can't understand."

> "It's simple. After we had been here the first time, my father noticed you and later told me, 'There's a young man whose name we must remember. He objects and argues and doesn't seem to care about my reputation. The next time I'll test my ideas against him. The others are too polite in front of me, and too many of them have studied under me!'" (Groueff, 1968, p. 233)

Another defense for the superior is to let the subordinates fight it out on a lower level and then present their position without the superior's disruptive presence. Sorenson, in his essay on presidential decision-making, wrote of the President's need to carefully weigh his words and sometimes avoid discussion with his advisors.

> Should he hint too early in the proceedings at the direction of his own thought, the weight of his authority, the loyalty of his advisors and their desire to be on the "winning side" may shut off productive debate. Indeed, his very presence may inhibit candid discussion. President Truman, I am told, absented himself for this reason from some of the National Security Council discussions on the Berlin blockage; and President Kennedy, learning on his return from a mid-week trip in October, 1962, that the deliberations of the NSC executive committee over Cuba had been more spirited and frank in his absence, asked the committee to hold other preliminary sessions without him. (Sorenson, 1963, p. 60)

Such avoidance does not solve the problem of anticipated feedback; it only reduces some of the situational cues that may serve to limit discussion. An inadvertent scratching of the head may communicate falsely more than one intends.

Returning for a moment to the lens model, and its structuring of the elements of inference making, we may construct an organizational representation of the flow of intelligence.

Figure 5 displays the simplest case of two observers screening events which are passed along to a superior. The chart assumes that monitoring goes on of events both continuous and episodic and that these events or their sources may vary in other dimensions such as

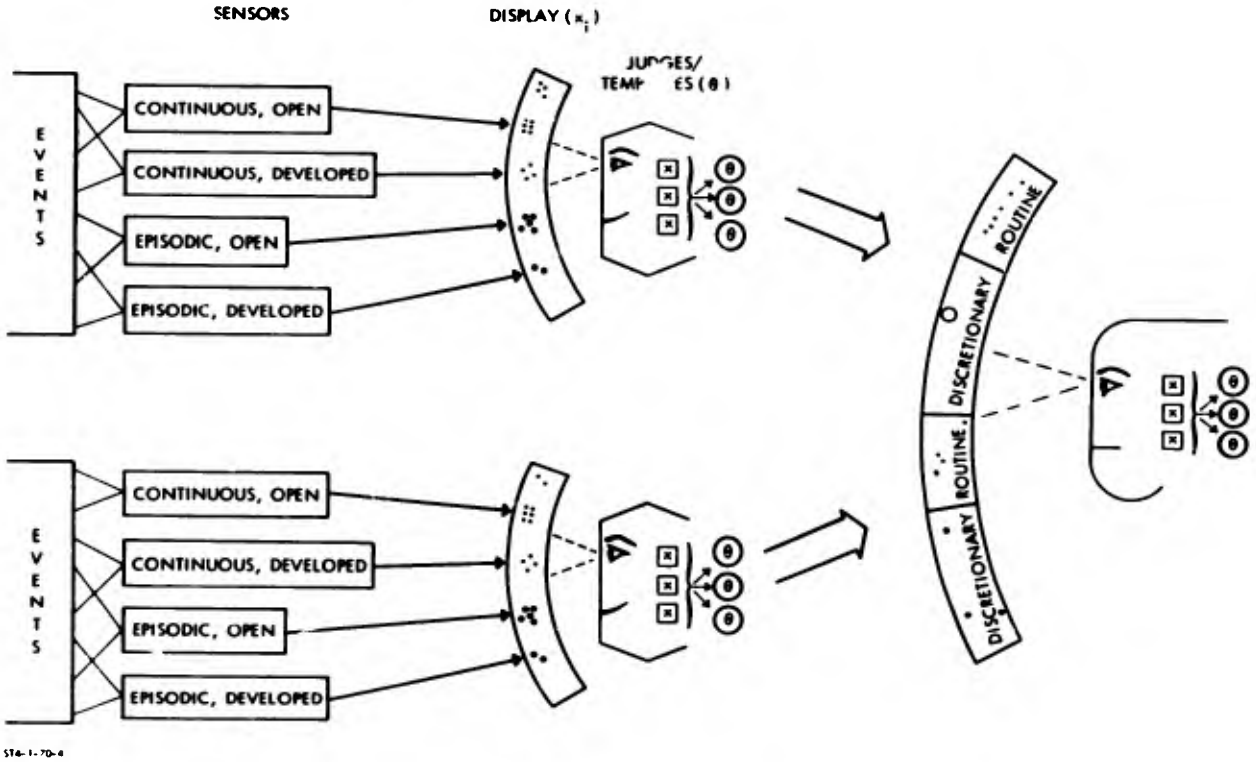


FIGURE 5. Two Observers Screening Events Which are Passed Along to a Superior

whether they are derived from the open-literature or "developed." The evidence is displayed in some form for evaluation (if only in memo form) before a decision is made to transmit or not. Learned templates (called here $\hat{s}$) serve as one side of the pattern-matching process and the perceived and/or evaluated indicators (x) serve as the other side. A collection of information is programmed to flow routinely through the system while another body of discretionary data may be stopped at different levels.

The anticipation of feedback problem is expressed in this formulation by a lack of agreement between subordinate and superior in the relative importance of different indicators for evidencing some description or hypothesis ($r_{x_i a_i}$ or a_i differences in the lens model).

Knowing this, the good administrator does not depend completely on his subordinates, however candid they may appear, and searches out other data sources to corroborate or supplement what the formal information system is yielding. With a constrained capacity to attend all information, both the final decision-maker and the intermediary link in an intelligence system must make tradeoff decisions between levels of information arriving from official and unofficial sources.* The very inability of a line officer or cabinet level official to control a columnist makes the columnist's writings an input of more interest.

*"Franklin D. Roosevelt made a systematic effort to supplement the official sources of information, not limiting his search to the somewhat rarified and often provincial atmosphere of Washington, D.C. Similarly, President Kennedy, although he is careful to rely primarily on the responsible officers involved when a final decision is to be taken, seeks independent information from a vast variety of unofficial sources: newspapers, magazines, books, radio, television, visitors, friends, politicians, pollsters, and the spokesmen for private organizations, and a sampling of White House mail.

"But add any or all of these to the inevitable and inexorable tides of official memoranda, reports, cables, intelligence briefings, analyses, and other government documents, and the occupant of the White House becomes subject to drowning in paper. All Presidents, at least in modern times, have complained about their reading pile, and few have been able to cope with it." (Sorenson, 1963, p. 37)

The way in which a subordinate shapes information is not alone influenced by the behavior or the presumed future behavior of the superior. The relationship among associates can also move the system toward conformity or to a "pseudo-confirmation." Prior discussion, formally or informally, among colleagues before each individual signs off a transmission may result in the receiver obtaining a misleading appearance of consensus.

This pseudo-confirmation is possibly greater in an information system which requires each element at each tier to come to an agreement before transmitting to the next level. An example of such a risk is present in the country team concept, where one interpretation bears an official and collective stamp. The gains for such centralization of thinking are obvious. Equally obvious should be the critical need for a flexible ability to "take a footnote" and file a minority opinion at the time the consensus judgment goes out. One of the significant arts in belonging to such organizations is the ability to balance two competing actions--one the number of objections one formally voices to the thinking of his colleagues and the other the number of times one stays quiet to maintain or build equity for important future dissents.

How much of a future one has with the group will obviously influence the tradeoff. Military and State Department practices in personnel turnover will mean that one may be more willing to register a disclaiming footnote toward the end of a relatively brief tour. Other forces may work against this influence, but it cannot be argued that turnover doesn't have significant advantages. On the negative side we earlier noted the tendency of an individual to apply old, inappropriate templates to new situations--"negative transfer." If any significant level of this exists, then no organizational memory is superior to a transferred memory.

The inequalities among cooperating groups in personnel practices for field or desk men can present effects on their relationships. Kirkpatrick, in his book on the Central Intelligence Agency, notes

> They (CIA representatives abroad) almost always have an advantage over their State Department counterparts because the CIA recognizes the necessity for lengthy tours of duty as being fundamental to its work and to the acquisition of area expertise, while the State Department is much more inclined to frequent rotational tours of duty including experience in all parts of the world. (Kirkpatrick, 1968, p. 296)

The influence of such differences is largely unknown, despite a large body of anecdotal commentary. A pertinent research question to ask is what topics for surveillance require long residence in-country and which don't. Since any single nation typically has multiple observers in a single setting, the length of stay characteristics will influence the amount of unique and common information for each observer. Operationally, in terms of Fig. 5, it is the question of how the world of events is divided up among observers and the degree to which information is coalesced at some point "downstream" in the information system.

A focal point for information is certainly necessary. The organizational point for it, however, is still open to study. Subsequent study of events leading up to Pearl Harbor led Wohlstetter to comment:

> If anything emerges clearly from a study of this alert (of 25 July 1941), it is the soundness of having a center for evaluating a mass of conflicting signals from specialized or partisan sources. (Wohlstetter, 1962, p. 130)

Kirkpatrick makes the same point and then extends it in an argument for interpretative centralization.

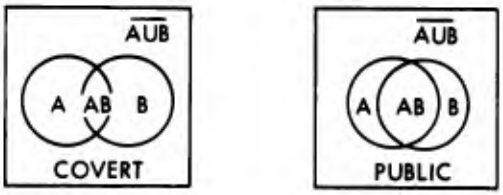
> The tragedy of Pearl Harbor is not that there wasn't enough intelligence. There can always be more information in any situation, and hard information on the location of the Japanese force that was headed for Pearl Harbor of course could have made all of the difference between surprise and alert. The tragedy is the fact that the information that was available was not put in one package so that all of the evidence could be sifted and weighed by an objective and dispassionate group and presented to the President in one package, with one conclusion. (Kirkpatrick, 1969, p. 258)

Social scientists have produced a number of general studies on the degree to which communication or shared information among members of groups helps or hinders performance.* The answer seems to depend on the nature of the task. Reviewing the literature, Leavitt concludes:

> ...for highly programmed repetitive tasks, highly centralized communication structures seem to operate most efficiently, but with some human costs. For more novel, ill-structured tasks, more wide-open communication nets with larger numbers of channels and less differentiation among members seem to work more effectively. (Leavitt, 1964, p. 59)

An optimal organization depends on full detailing of the structure of the tasks in intelligence processing and flow. Who the men are who make up that organization, where they come from and how they are prepared obviously will limit the organization's ability to fully employ and adequately interpret indicators. But some organizational

*In an extension of this, one might ask about the adversary process among nations in intelligence collection. With two countries, A and B, interested in a third nation, C, two Venn diagrams might portray the situation for public and covert sources:



Where, for the universe of covert information

A = covert information unique to country A

B = covert information unique to country B

AB = shared covert information, some or all of which may be thought unique by either country.

$\overline{A \cup B}$ = covert information reached by neither.

For a single nation's collection, A and B could obviously be different intelligence groups, each offering different interpretations as well as different data. Kirkpatrick notes, "It is advisable that the daily report of the CIA have a predominantly civilian viewpoint reflecting the wisdom and experience of that Agency, and it is appropriate that the daily report of the DIA be in turn reflective and representative of the other aspects of government, the absence of a contrary view can often be a danger exceeding the value of a unified presentation." (Kirkpatrick, 1968, p. 230)

procedures may be of value in protecting against individual idiosyncrasy and overcautiousness. The next sections talk of two possible mechanisms--the development of adversary teams and a quick response capability.

Adversary Teams

The adversary process formally established within an organization may be an effective method to counter some of the institutional biases. Here one might create a "red team" which is charged with interpreting a common body of data in the way in which an adversary might.

The use of such a device, for rehearsal, training, or new perspectives, is not unique to either the military or recent times. Lawyers have always "role played," and attacked their clients with points likely to be raised by opposing counsel. Similarly, press aides warn their officials of (and sometimes simulate) press conferences peopled with hostile reporters. For sophisticated business gaming, industrial firms set up "competitive" firms that try to do the company in.

What this does is to make more systematic the standard practice of anticipating an opponent's move. In strongly hierarchical organizations, this can be particularly rewarding, for the pressures that suppress a negative opinion may now be reduced; one may articulate a counter position without being tagged a traitor to the organization.

A number of variations can be worked on the adversary team theme. If one is working with data on the national level, the team may be composed of expatriate nationals, one's own nationals trained to take on the perspective of an adversary, or some combination. No simple choice exists among the alternatives.

The mix is possibly superior, but one may not discount the value of expatriates simply because they are not a representative group. They gain in attractiveness because they have grown up in a given culture, and this gain is offset only if the principle which segregates them from their fellows is one that interacts with the material under

study. The biasing principle which makes them available is almost certainly not random, but in some cases it may be independent of the interpretation or perspective they provide. A White Russian may be no Bolshevik, but he is likely to be influenced by the same forces that lead to the general suspiciousness present in so many Soviet nationals.

Another variation is the degree to which the adversary team continuously articulates its interpretation of data or events. One wants the maximum amount of communication consistent with representativeness. Since an adversary is not continuously and publicly stating interpretations and arguing meaning, a full disclosure tactic may warp the adversary team's thinking to be poor surrogates. Locating the optimal point is open to investigation.

Finally, a third major variant is whether or not one holds the amount of information available to both sides equal. That is the simplest route, but one not completely faithful to reality. In some international relations simulations the amount of information has been kept constant but the content of it varied. A common body of data is made available to all participants, but a random group of confidential messages is intercepted and published as "leak" information.

By a systematic variation in message content, one may also determine the relative weights placed on the same cue by both sides. It may be interesting to know that one nation comes to a different conclusion than another when viewing a set of indicators. It is more interesting, and useful, when one can estimate what are the weightings of individual indicators given by each side. Unintended signals are frequent in war and diplomacy and this knowledge would be one hedge against them.

The adversary team, freed of organizational sanctions might thus serve as a research instrument as well as a once-removed intelligence source.*

Preplanning for Quick Response Capability

Most organizational factors center on the control of ongoing operations. Dealing with indefinite future needs is particularly awkward. Economic realities, if nothing else, force the occasional condition that unpredictable events leave one with severe data needs. Response to fill such lacks is typically of the ad hoc variety--freeing anyone not locked into critical operational ventures to feed back information quickly. Instant reporting is not always satisfactory--either because insufficient manpower is available or because the manpower does not employ a systematic method to get at critical topics.

*That we find it difficult to put ourselves in another's place may be illustrated by this quote from The Long, Long War:

> "In the pinpoint bombing raid described, the guerrilla platoon commander and all his section leaders were killed, with 14 of the 21 men. Only a deputy section leader survived with 6 others. All were wounded; they had been in the middle of a tight pattern of bombs of the total power of a low yield nuclear bomb. Nevertheless the deputy section leader led them out with their weapons, eluded the ring of searching troops, survived an ambush in which they lost one man, and got the other 5 away into the deep jungle to recuperate with virtually no medical supplies. Despite their knowledge that comfortable hospital beds and an amnesty awaited them outside, not a man surrendered. Three months later, the same guerrilla led the men to the jungle fringe and launched his recruiting campaign. Within a year, the platoon was back in full strength; it continued to operate under his leadership for the next two years. Such fortitude and leadership must be saluted whatever its motive. The true Communist, the true believer, should never be underestimated or despised." (Clutterbuck, 1966, p. 171)

Quick response teams are a common military mechanism. In this context, the only distinctive idea is that one pre-plans the organization and data collection modes of an intelligence QRT more thoroughly. Experience in the study of effects of natural disasters may serve as a limited model. Here, as in insurgencies or internal war, one knows that events will occur at some time in the future. Although one may know his information needs given an event, he cannot anticipate the exact time at which the event will take place. Contingency planning can make the time-indeterminate event less impromptu in its study (Biderman, 1966).

Table 1 lays out the National Opinion Research Center's work plan for field procedures in disaster situations. Although purely procedural, allied with it is a cluster of substantive topics that are covered. Among them are such concerns as panic reactions, the organization of leadership, and conformity to emergency regulations.

A similar set of concerns could be generally developed for any internal war situation, along with a specific set of data points that would be desirable. All of the data points might not be reachable at time of conflict, but an experienced observer should be able to make a gross ordering of what is probable or improbable to get. To the greatest degree possible, again with the data characteristics grounded in the specifics of an individual setting, collection plans should provide for data comparable to information already available on the pre-crisis condition. This might take the form of anticipating possible trouble and gathering observational baselines. Or, it may require a rich knowledge of the society to suggest what are the linkages between observable events at time of crisis and the pool of information already in-house.

Adequate planning, plus some luck, will direct activity to sample important signs. Under high stress conditions, emphasis should be placed on sampling of both ideas and people. Research technology is beyond the point where one need study a total universe of people to reach valid estimates. A quick response group might, in addition to

TABLE 1. NORC PLAN FOR DISASTER STUDY FIELD PROCEDURES
(Time Schedule and Procedures in Field)

Day	Field Director	First Assistant	Second Assistant	Two Chief Interviewers
1	Makes local arrangements, rents office space, begins informal background interviews with community leaders	Begins design of sample	Begins recruitment of supplementary interviewers	Begin informal exploratory interviewing
2	Continues background interviewing	Continues design of sample	Continues recruitment	Continue exploratory interviewing
3	Trains pretesters, pretesting begins	Trains listers; listing begins	Continues recruitment	Assist in training pretesters, pretesting
4	Continues background interviewing	Block selection completed; listing sheets prepared	Continues recruitment has recruited sufficient interviewers for listing and pretesting purposes which begin the 4th day	Continue exploratory interviewing
5	Pretesting continues	Listing continues	Continues recruitment	Continue pretesting
6	Pretesting continues	Listing completed; selects sample of dwelling units, begins transcription to enumeration sheets	Continues recruitment	Continue pretesting
7	Pretesting completed; revises questionnaire, arranges printing of questionnaire and other forms	Complete transcription, prepare individual interviewer assignments	Continues recruitment	Complete pretesting
8	Begins final training	Assists in final training	Assists in final training	Assist in final training
9	Completes final training	Assists in final training	Assists in final training	Assist in final training
10-16: primary interviewing period	Supervision of 27 interviewers, each with quota of 15 interviews	Assists in supervision, continues background interviews	Assists in supervision, continues background interviews	Interview main sample along with staff of 15 interviewers
17-21: clean-up interviewing	Supervision, interviews "hard-to-get" cases, completes background interview	Interviews "hard-to-get" cases, completes background interviewing	Interviews "hard-to-get" cases, completes background interviewing	Interview "hard-to-get" cases

Source: National Opinion Research Center, Human Reactions in Disaster Situations (Chicago, Ill.: NORC, University of Chicago, 1951), Appendix A-4, p. [illegible].

producing sampling plans for people, develop a sampling plan for behavior that evidences the state of affairs.

A disciplined attention to such information needs before a crisis exists may reduce our dependence on scattered and questionable data produced by harassed observers. If nothing else, a mechanism is provided by which the logistics can be executed with less stress.

COUNTERS TO INTERPRETATIVE BIAS

Davis Bobrow has recently prepared a list of possible counters to the individual and organizational biases discussed. What follows is a listing of problems and possible remedies as seen by Bobrow (1969, pp. 16-19).

Problems associated with biases of individuals

1. Problem: Tendencies to modify information in order to protect from and ingratiate with superiors and peers.

1. Remedy: Assign use of indicator system to persons who are: (1) professionally not dependent on superiors; (2) characterized by low needs for group approval; (3) attached to reference groups which esteem nondistorting use of the indicator system; (4) members of organizations which are in fact and in principle charged with reporting bad as well as good news; (5) in contact with and under the partial protection of alternative authority figures.

2. Problem: Tendencies to modify information to protect favored programs.

2. Remedy: Assign indicator system to persons and organizations which have no direct responsibility for developing or managing particular programs.

3. Problem: Tendencies to fit indicator system to previous cognitions and affects.

3. Remedy: Assign indicator system to persons and organizations which are: (1) diverse in the previous

cognitions and affects represented; (2) aware of the conservative biasing tendencies of all persons; (3) in frank and frequent communication with persons and groups with diverse memories and world-views.

4. Problem: Tendencies to ignore information about long-range effects beyond tenure in role.

4. Remedy: Assign indicator system to persons with career commitment to problem as distinct from particular organization or policy.

Problems associated with biases from organization characteristics

At least the four following sources of organizational distortion should be taken into account.

1. Problem: Tendencies to act parochially toward indicator system considering only aspects relevant to subset of international relations purposes.

1. Remedy: Assign indicator system to organization: (1) whose members do not view organizational survival as dependent on particular partial goal or alternative means; (2) whose mission is aggregative analysis of international relations rather than of some subset of programs; (3) which does not have a clientele whose interests are better served by some international goals and means than by others.

2. Problem: Tendencies to reduce information to fit with organizational growth, style, and reputation, before it reaches decision centers.

2. Remedy: Assign indicator system to organization: (1) which has little hierarchy and reports directly to highest relevant decision-maker; (2) which has not aged to the point of evolving a uniform, constraining set of internal norms; (3) which

prefers adversary proceedings and dissents to an appearance of consensus.

3. Problem: Tendencies for policy evaluation and planning to be pushed aside by immediate operational tasks.

3. Remedy: Assign indicator system to organization which has no operational responsibility and deny it the resources to acquire any. Separate burdensome detail functions of constructing and updating indicator system from the organization.

4. Problem: Tendencies to monopolize design and use of indicator system.

4. Remedy: Assign indicator system to organization which is kept honest by: (1) independent, professionally competitive peers who have full knowledge of the logic and contents of the system; and (2) influential, autonomous organizations which stand to benefit from different outputs from the indicator system and have access to it.

REFERENCES

Biderman, A.D., Anticipatory studies and standby research capacities. In R.A. Bauer (ed.), Social indicators. Cambridge, Mass.: M.I.T. Press, 1966, pp. 272-301.

Blau, P.M. and Scott, W.R., Formal organizations. San Francisco: Chandler, 1962

Bobrow, Davis. International indicators. Unpublished paper delivered to American Political Science Association Meetings, September 1969.

Brunswik, E. The conceptual framework of psychology. In International encyclopedia of unified science. Vol. 1, part 2. Chicago: University of Chicago Press, 1952.

Brunswik, E. Perception and representative design of psychological experiments. Berkeley, California: Univ. of California Press, 1956.

Campbell, D.T. Pattern matching as an essential in distal knowing. In K.R. Hammond (ed.), The psychology of Egon Brunswik. New York: Holt, 1966, pp. 81-106.

Campbell, D.T. Systematic error on the part of human links in communication systems. Information and control, 1958, 1, pp. 334-369.

Camus, A. The myth of Sisyphus. New York: Knopf, 1955.

Clutterbuck, R.L. The long, long war: counterinsurgency in Malaya and Vietnam. N.Y.: Praeger, 1966.

Cronbach, L. Essentials of psychological testing (2nd Ed.) N.Y.: Harper & Row, 1960, p. 121.

Eckstein, H. Internal war: the problem of anticipation. In I. Pool et al, Social science research and national security, Washington: Smithsonian Institution, 1963, pp. 102-147.

Eddington, A.A. The nature of the physical world. N.Y.: Cambridge University Press, 1929.

Edwards, W., Lindman, H., and Phillips, L.D. Emerging technologies for making decisions. In New directions in psychology II. N.Y.: Holt, Rinehart & Winston, 1965, pp. 261-325.

Engels, Friedrich. Socialism, utopian and scientific. London: Sunshine, 1892.

Fall, Bernard B. Last reflections on a war. New York: Doubleday, 1967.

Feldman, S. Cognitive consistency. New York: Academic Press, 1966.

Friedrich, C.J. Public policy and the nature of administrative responsibility. Public policy, 1940, 1, pp. 3-24.

Gibson, J.J. The survival value of sensory perception. In E.E. Bernard and M.R. Kare (eds.), Biological prototypes and synthetic systems, Vol. I. N.Y.: Plenum Press, 1962, pp. 230-252.

Groueff, S. Manhattan project. New York: Bantam, 1967.

Hammond, K.R. (ed.) The psychology of Egon Brunswik. New York: Holt, 1966.

Hempel, C.G. Philosophy of natural science. Englewood Cliffs, N.J.: Prentice Hall, 1966, p. 63.

Hoffman, P.J., Solvic, P. and Rorer, L. An analysis-of-variance model for the assessment of configural cue utilization in clinical judgment. Psychological bulletin, 1968, 69, pp. 338-349.

Kilpatrick, F.P. Problems of perception in extreme situations. Human organization, 1962, 19, pp. 20-22.

Kirkpatrick, L. The real CIA. New York: Macmillan, 1968.

Knorr, K. The intelligence function. In I. Pool et al., Social science research and national security. Washington: Smithsonian Institution, 1963, pp. 75-101.

Krout, M.H. Gestures and attitudes: an experimental study of the verbal equivalents and other characteristics of a selected group of manual autistic gestures. Unpublished doctoral dissertation. University of Chicago, 1951.

Lake, D.G. Concepts of change and innovation in 1966. Journal of applied behavioral science, 1968, 4, 3-24.

Leavitt, H.J. Applied organization change in industry. In W.W. Cooper, H.J. Leavitt, and M.W. Shelly, New perspectives in organization research. New York: Wiley, 1964, pp. 55-71.

Lindblom, C.E. The science of "muddling through." Public administration review, 1959, 19, pp. 78-88. Reprinted in H.J. Leavitt and L.R. Pondy (eds), Readings in managerial psychology. Chicago: University of Chicago Press, 1964, pp. 61-78.

McGuire, W.J. The current status of cognitive consistence theories. In S. Feldman (ed.), Cognitive consistency. New York: Academic Press, 1966.

Morelli, Giovanni. Italian painters. Vol. 1. London: John Murray, 1900.

Mosteller, F. and Wallace, O.L. Inference in an authorship problem: a comparative study of discrimination methods applied to the authorship of The Federalist Papers. Journal of american statistical association, 1963, 58, pp. 275-309.

Neustadt, R. Presidential power. New York: Signet, 1964. (Published originally by Wiley, 1960.)

Oppenheimer, J.R. The open mind. New York: Simon and Schuster 1955.

Paisley, W.J. Identifying the unknown communicator in painting, literature, and music: the significance of minor encoding habits. Journal of communication, 1964, 14, pp. 219-237.

Paisley, W.J. The museum computer and the analysis of artistic content. Paper delivered at Conference on Computers and Their Potential Applications in Museums. Metropolitan Museum of Art, April, 1968.

Paisley, W.J. Studying style as 'encoding behavior'. In G. Gerbner et al, Content analysis. New York: John Wiley, in press.

Peters, H.W. and Bennis, W.G. (eds.) Comparative theories of social change. Ann Arbor: Foundation for Research on Human Behavior, 1966.

Reston, J. The artillery of the press: Its influence on American foreign policy. New York: Harper & Row, 1967.

Rosenthal, R.A. and Weiss, R.S. Problems of organizational feedback processes. In R.A. Bauer (ed.), Social indicators. Cambridge, Mass.: M.I.T. Press, 1966, pp. 302-340.

Rummel, R.J. Dimensions of conflict behavior within and between nations. Yearbook of the Society for General Systems, Vol. VIII, 1963, pp. 1-50.

Russell, B. Human knowledge: its scope and limits. New York: Simon and Schuster, 1948.

Sawyer, J. Communication in a tragedy: blacks and whites turn on car lights after King's assassination. Unpublished manuscript, Northwestern University, 1968.

Schelling, T.C. Foreword. In R. Wohlstetter, Harbor, warning and decision. Stanford: Stanford University Press, 1962.

Simons, John, Maj. Low altitude recce/strike techniques, problems. USAF, Air Force Systems Command Technical Report ASD-TR-67-17, December 1967.

Sorenson, T.C. Decision making in the white house. New York: Columbia University Press, 1963.

Turner, R.D. Operations research on recognition. Ithaca, New York: General Electric Company, Report No. AFCRL-62-52, 1962.

Vossler, C. and Uhr, L. A computer simulation of pattern perception and concept formation. In E.E. Bernard and M.R. Kare (eds.), Biological prototypes and synthetic systems, Vol. I. New York: Plenum Press, 1962, pp. 233-243.

Webb, E.J. and Roberts, K.H. Unconventional uses of content analysis in social science. In G. Gerbner (ed.) Content analysis. New York: Wiley, in press.

Wohlstetter, R. Pearl Harbor: warning and decision. Stanford, California: Stanford University Press, 1962.

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13 ABSTRACT

This paper is a review of the major psychological and organizational factors which may distort the interpretation of indicators. A general "lens model" is used to explain how indicator data are pattern matched to earlier learned hypotheses about possible outcomes. The forces influencing judgment within this model work in a way to produce conservative, inertia-bound evaluations. A series of recommendations to counter informational biases is included.

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