Part I of a two-part series.
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Problem Diagnosis: Applying Sound Theory to Problem Solving

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How do individuals and organizations solve problems? What factors are important in problem diagnosis? How are these factors useful to the Extension professional in planning programs to solve problems? This article is the first of two that focus on these questions. In Part I, the authors summarize social theory and use of a list of factors identified significant to problem diagnosis. Part II (in the Summer *Journal* issue) will apply these factors to the program planning process for problem solution.

Everyday, men and women in all walks of life are faced with hundreds of situations requiring decisions. Some decisions are easily reached. Others are more complex and involve a greater degree of change. These difficult choices constitute problems that are difficult to diagnose.

Change agents such as Extension agents are in the business of problem solving. For change agents, problem solving involves not only diagnosing the problems but also helping to plan programs that will achieve desired objectives.

Because of the diversity in the nature and complexity of the problems that the county agent faces, any tools facilitating problem solving would be most helpful. Recognizing this need, we have developed a set of diagnostic tools.

The key to effective decision making is to consider all of the important factors, both the obvious factors and the "hidden" factors unconsciously taken into account. Once identified, the importance of the factors to the specific decision-making situation can be evaluated. Furthermore, the relative

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importance of each factor to the particular decision can be established.

This identification requires a thorough diagnosis of the problem, which can include an identification of several alternatives.

When the essential factors and the respective weights of all the competing alternatives are clearly distinguished, the "best choice" usually becomes clear. Seldom are the alternatives equal, and the reasons why one is better than another are likely to be obvious once the factors have been identified.

Our approach to problem diagnosis is to identify the hidden as well as the obvious factors relevant to a particular decision. Then we establish their comparative weights with a minimum of time and energy.

Once the factors important to the situation and their weights are determined, it's possible to plan an effective solution. Figure 1 shows the broad stages in problem solving.

Steps in Problem Diagnosis

Using specific problems as examples, we will describe a step-by-step approach to the diagnosis of the factors involved in specific decisions and actions. When the main factors are identified, you'll recognize that you've experienced each of them hundreds of times in a more specific form, for you and the people with whom you work have made thousands of individual decisions.

What we've done is generalize from individual decisions to develop an approach to facilitate any problem-solving situation. With a comprehensive diagnosis, a better solution to a specific problem can be formulated.

The first step in diagnosis is to state the problem so that a decision can be made about it. For example, "Why do or don't people attend meetings?" is too general a question, for different kinds of meetings are attended for different reasons. A problem must be stated at a manageable level for diagnosis: "Why do or don't the organization members attend the planning meetings of the county Extension club?" This is specific enough to be diagnosed.

The second step is to identify the cluster of reasons that influence the particular decision. Some of these reasons (factors) will be favorable to the solution under consideration and others will be in opposition to it. Each of the factors will carry a particular weight in the mind of the decision maker. What's important is whether the combined influence of the factors favoring the decision outweigh the combined influence of those opposing the decision.

Table 1 lists the reasons given by one person for attending a particular type of training program. Several factors, not just one or two, were considered in the decision.

The open-ended question method for determining the factors considered in a decision is simple and handy. It takes only 10 or 15 minutes of a person's time, and it tells a great deal that wouldn't otherwise be known. A respondent can quickly see a range of factors that influenced his decision. In weighing the factors, he can see which reasons were most important. The

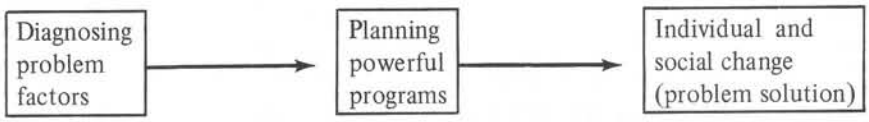

Figure 1. Stages in problem solving.

form's weakness in problem diagnosis is that it doesn't get at the hidden factors.

Our studies of particular decisions revealed that "hidden" factors exposed by a set of probing questions will double the number of factors, or reasons, identified. Moreover, the factors surfaced by the probing questions were given just as much weight in the decision as were the reasons given in responding to the general, open-ended questions.

Obviously, a thorough diagnosis requires that the hidden, as well as the more obvious, factors be included so the solution takes into account as many of the relevant factors as possible. It's in this process that theory can be most helpful, for theory can tell us what questions to ask to elicit the factors that really make a difference—the factors that explain why people and organizations behave as they do.

Digging for the Hidden Factors

As we move to this important step in problem diagnosis, let's first introduce the probing factors and link them to your experience.

Everyone, laymen and scientists alike, have either implicit or explicit theories about why people decide and act as they do. For most people, however, the theories they state are much narrower than the factors they actually take into account in making decisions. A theory can often act as a spotlight on a semidarkened stage. In focusing on a particular actor or occurrence, the spotlight will illuminate that aspect and allow for observation of it in great detail.

At the same time, however, the brightness of the spotlight obscures what's happening on the rest of the stage. This is similarly one of the characteristics of theories—they have the capacity to illuminate while at the same time obscure.

Our search for the factors that explain the behavior of people and organizations started with a spotlight on goals elaborated by people like Freud, Small, Thomas, Tolman, and, more recently, Maslow. The second spotlight on the stage was on expectations and norms, which Mead, Linton, Cottrell, and Sherif have described, and which have been elaborated more recently by Bates. The next spotlight was turned on beliefs and values, and the fourth on support.

A large research study on leadership turned the spotlight on three additional factors—opportunity, ability, and commitments. Furthermore, it revealed beliefs and values to be two separate factors that we've labeled "belief orientations" and "value standards."

Table 1. One person's reasons for and against attending the Tulane Health Surveyer Training Program.

The Relevant Cluster of Components in the Decision

Instructions:

1. Write in the reasons pro and con that you thought important enough to take into account in making this decision.
2. Select the most important item on the list and give it a weight of 10 points. Next, give each of the other items the amount of weight you feel it carried in the final decision compared with the most important item. Give them weights from 10 to 0. Underline the item that is chosen as the most important item. If one single factor is so powerful that it by itself would determine the decision no matter what any other factors might be involved, give that factor a score of 100 instead of 10.

Answer:

Components which in your opinion are important in considering this decision at this time	Estimated weight on each of these factors in the final decision
A. Components favoring the action:	
1. Fulfill state requirement–part of job	10
2. More knowledge of survey	8
3. Location of school (hadn't been to N.O. before)	9
4. Wife to visit final week	3
5. Vacation ground nearer to N.O.	8
6. Like travel	2
7. Fellow workers advised–good program	7
8. State paid costs	6
9.	
10.	
B. Components opposing the action:	
1. Backlog of work	2
2. Left family for three-fourths of time	6
3. Commitment as Secy.-Treas. of organization	5
4. More cost to state due to distance	0
5.	
6.	
7.	
8.	
9.	
10.	

With these 8 factors in hand, W. Keith Warner, pointed out 2 omissions–(1) force and (2) habit and custom–bringing the total number of factors to 10.

When each factor was added, the elaboration of items that fell under it soon became evident (Table 2). It was also interesting to note that once each additional factor was identified, people hearing it were ready to say, "Of course, we have always been aware of that." These statements point out that we as individuals so often tend to overlook the obvious, until the "spotlight" is focused on it. Then our previous experiences come into focus and provide face validity for that factor.

These 10 factors that direct actions were identified during the period from 1949 to 1959. They've been tested extensively in research studies since that time. While no new factors have been added in the past 12 years, we assume there are others.

The 10 factors already identified, all beliefs and disbeliefs in the minds of the actors (the individuals making the decision or carrying out the action), are classified under the following headings:

1. Goals.
2. Belief orientations.
3. Value standards.
4. Habit and custom.
5. Expectations and norms.
6. Commitments.
7. Force.
8. Opportunity.
9. Ability.
10. Support.

Having introduced the 10 beliefs and disbeliefs used as probing factors, we're now ready to consider the procedures involved in digging for the hidden factors.

While the form used to elicit the hidden factors can be used with the open-ended questions presented earlier, this form is designed to identify the obvious factors as well as to uncover the hidden factors. The probing form is self-explanatory. It reveals the relevant cluster of factors that enter into a specific decision or action.

On the summary page at the end of the form, both the obvious and the previously hidden factors and their weights are presented (Table 3). If two or three alternative decisions or actions are under consideration, the process is repeated for each of the alternatives.

In most decisions that have been studied in depth, two or three of the probing factors were found to be irrelevant to the diagnosis. The factors not included were different from different problems. If these factors were identified in a pretest, they could be omitted ffom the general questionnaire. Dropping the irrelevant factors will save time and give the respondents a feeling that all the probing questions pertain to their situation.

The reasons can be tabulated for all the people who have considered a particular decision. This reveals the frequency of mention for each reason. Thus, the most frequently mentioned reasons can be identified, and the average weight for each determined.

In our studies of social action, from 45 to 65 different factors have

Table 2. Beliefs and disbeliefs at the third and fourth levels of generality.

1. Goals	Physiological, consistency, preservation of self, safety-security, love, belongingness, recognition-esteem, autonomous self-satisfying activities, self-actualization and service, N-achievement, knowledge, beauty, and esthetics.
2. Belief orientations	Beliefs about: the existence or nonexistence of a referent, the reference category characteristics of a referent, the beliefs and past actions of a referent, the real or potential relationships of a referent to other referents and those things that belong together and those that are independent of each other.
3. Value standards	Achievement, efficiency, practicality, progress, material comfort, leadership ability, self-confidence, understanding, faith in science, belief in democracy, belief in equality, belief in freedom or liberty, belief in God or a Supreme Being, honesty, sexual morality, sobriety, cleanliness, loyalty, keeping of confidences, conformity and ability to get along with others.
4. Habit and custom	Ways of thinking, ways of dealing with problems, ways of meeting frustrations, cognitions regarding appropriate response for all those situations in which a single response is automatically considered the appropriate one for the situation.
5. Expectations and norms	Station expectations, situs expectations, position expectations, role expectations, norm expectations, situational expectations, reference category expectations, and self-expectations based on cognitions of the relevance of various referents to the actor.
6. Commitments	Contracts, written agreements, verbal agreements, commitments that go with the acceptance of an office, commitments that are part of group membership, commitments based on actions such as voting, statements of opinions, role-playing, and commitments derived from various types of participation.
7. Force	Physical, military, police, laws, rules, economics, public opinion, threat to livelihood, threat of violence or danger, disability, illness, circumstances, and acts of nature such as floods, hail and drought.
8. Opportunity	Perceived requirements of the various alternatives in the situation: rank, authority, power, money, resources, facilities, knowledge, skills, eligibility, manpower, convenience, awareness, size, strength, intelligence, health, endurance, and time.
9. Ability	Conceived and perceived capabilities of the actor to cope with the alternatives in the situation which he may potentially face: rank, power, authority, money, resources, facilities, knowledge, skills, eligibility, and manpower, convenience, awareness, size, strength, intelligence, health, endurance, and time.
10. Support	The amount of help or opposition the actor perceives others can and will give in relation to actual or potential alternatives: rank, power, authority, money, resources, facilities, knowledge, skills, eligibility, manpower, convenience, awareness, size, strength, health, endurance, time, recognition, guarantee of profit or maximum loss, rationale, goal or value reinforcement, and the creation of special supportive climates and conformity.

Table 3. Diagnosing the relevant cluster of components used in decision making.

My question or issue is _____.

My alternative decision and actions are _____.

	Amount of weight this item carries in the decision.	*Answer categories* 1. Little or none 2. Some 3. Considerable 4. Very much
1. *Goals:*		
a. Do you think you will gain by this action? What do you think you will gain?*		
(1) _____		_____
(2) _____		_____
(3) _____		_____
b. Do you think you will lose by this action? What do you think you will lose?		
2. *Expectations and norms:*		
a. Do you feel others expect you to do it? Who expects you to do it that makes a difference?		
b. Do you feel others expect you not to do it? Who expects you not to do it that makes a difference?		
3. a. Do you feel there are important opportunity factors that favor it? What important opportunity factors favor it?		
b. Do you feel there are important opportunity factors that operate against it? What important opportunity factors oppose it?		
4. *Ability:*		
a. Do you feel you have the abilities and resources needed to do it? What important abilities or resources do you feel you possess?		
b. Do you feel you lack some essential abilities or resources? What important abilities or resources do you feel you lack?		
5. *Support:*		
a. Do you feel family members and others will give or offer support or help? What support or help–from whom?		
b. Do you feel you will receive discouragement and opposition from family members and others? What opposition–from whom?		

*The lines under goals for the listing of specific reasons and their weights are presented as an example of the way they're actually used in the question form. The lines are omitted in 1b and the nine that follow to save space. Those who wish to use the form should use the pattern given for 1a under goals. *(cont. p. 27)*

Table 3 (cont.)

6. *Commitments:*
   a. Do you feel you are committed to do it? What commits you to do it?
   b. Do you feel you are committed not to do it? What commits you not to do it?
7. *Force:*
   a. Do you feel that you are being forced to do it? What or who is forcing you to do it?
   b. Do you feel that you are being forced not to do it? What or who do you feel is forcing you not to do it?
8. *Belief orientations:*
   a. Do you have any knowledge or beliefs about its characteristics or possible consequences that incline you to do it?
   b. Do you have any knowledge or beliefs about it that make you consider very seriously not doing it? What important beliefs incline you not to do it?
9. *Value standards:*
   a. To what extent is it in line with your principles and value standards of rightness? What important value standards favor it?
   b. Does it involve things that are contrary to your value standards of rightness? What important value standards do you have that oppose it?
10. *Habit and custom:*
    a. Is it in line with most of your existing habits and customs? What important habits or customs favor it?
    b. Is it in conflict with any of your important established habits or customs? What important customs or habits oppose it?

The Relevant Cluster of Components in the Decision

1. Check each item marked with a 3 or 4 and record them on the list below.
2. Select the most important item on the list and give it a weight of 10 points. Next, give each of the other items the amount of weight you feel it carried in the final decision compared with the most important item. Give them weights from 10 to 1. Underline the item that is chosen as the most important item. If one single factor is so powerful that it by itself would determine the decision no matter what any other factors might be involved, give that factor a score of 100 instead of 10. *(cont. p. 28)*

Table 3 (cont.)

Components which in your opinion are important in considering this decision at this time	Estimated weight on each of these factors in the final decision
A. Components favoring the action:	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
B. Components opposing the action:	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

been identified for any particular decision. Ten to 15 factors were mentioned by 15 percent or more of those who considered that decision.

Table 4 illustrates the results obtained by the use of the probing form and presents the answers of three farm operators who had recently considered the shift from full-time farming to part-time farming by adding a second occupation. These examples demonstrate that while great importance was assigned both to factors favoring the shift and factors against the shift, the combined influence of factors in favor outweighed the combined influence of those opposed.

Table 5 presents the most frequently cited reasons given for this same decision by the 52 farm operators in the study who had considered this decision and had made the shift.

From this general survey, the most common factors for a given population can be determined. These factors can be used by planners or other agents in positions to effect change.

What this process does is to use the 10 types of beliefs and disbeliefs as a theoretical frame of reference at a general level to help identify both the hidden and the obvious factors relevant to a particular decision. The form is such that the reasons for the decision are clearly evident, including the situational factors. Having identified the 10 to 15 factors most frequently entering into the decision, we're now in a

Table 4. Full-time farmers who shifted to part-time farming by adding a second occupation.

Case No. 1	*Weight*
A. Things favoring the change in work:	
1. Needed increased income.	10
2. Lacked the size of herd and machinery to stay in farming without a nonfarm job.	5
3. The wife thought I should get another job.	4
4. Boys were old enough to help do farm work.	2
5. Gain security through nonfarm job and other fringe benefits.	0
B. Things against the change in work:	
1. Would like to stay at farming full time, would lose satisfaction.	10
Case No. 2	
A. Things favoring the change in work:	
1. Losing money at farming forced change.	10
2. Would gain income.	10
3. Would gain security from good steady job.	10
4. Son could do farm work.	9
5. Farm was too small.	8
6. Had previous experience working at _____.	5
B. Things against the change in work:	
1. Hated to give up the family farm, which could happen if I went to work at _____.	8
2. Might be able to "hang on" in farming without changing.	5
Case No. 3	
A. Things favoring the change in work:	
1. Financial gain.	10
2. Farm was too small.	10
3. Money needs forced change.	10
4. Felt he had abilities to make change.	9
5. Wife would encourage change.	8
6. Was in line with beliefs.	8
7. Felt he could be a good _____.	5
8. Didn't feel opportunity would be around later.	5
9. Was confident in making change.	5
10. It was good, honest work.	4
11. There was the opportunity to change.	3
B. Things against the change in work:	
1. Father and mother did not expect change.	6
2. Parents opposed to change.	6
3. Had abilities for full-time farming.	6
4. Would be more work.	4
5. Less time to spend on the farm.	4
6. There was some opportunity in farming.	3

Table 5. Reasons for and against making a shift from full-time farming to part-time farming by adding a second occupation.

Second level	Fourth level
Factors favoring change:	
1. Economic gain (53).*	Goals
2. Change necessary to perform family head/provider role (33).	Value standards
3. Would have help on one job (17).	Support
4. Employment opportunity available (14).	Opportunity
5. Abilities adequate for specific new job opportunity (11).	Ability
6. Proposed change supported by family and friends (9).	Support
7. Farm size and resources necessitated some change (9).	Ability
8. Time limitation on employment opportunity (8).	Opportunity
Factors opposing change:	
1. Would entail a sacrifice in satisfaction (21).	Goals
2. Had an alternate opportunity (8).	Opportunity

*Figures in parentheses indicate number of mentions from among 52 farm families who shifted from full- to part-time farming. Some mentioned more than one type of economic gain.

position to state a powerful theory to explain the particular action.

Since it's not practical to enumerate 50 or 60 factors in stating a theory for a problem, we simply state that the decision and action is taken as a consequence of the combined influence of the 10 to 15 most frequently identified factors.

At this point, you might well ask if such factors really do make a difference. To determine the validity of the influence of these factors on social action, a study was designed and conducted in which the relationship of 14 beliefs and disbeliefs to 3 types of participation—religious, civic, and fraternal—was determined. We found all 14 factors were significant at the 0.5 level or above (Table 6). We also found that each added factor in combinations increased the explanatory and predictive power.

Consistency

By 1960, we had identified the 10 types of beliefs and disbeliefs and had established their significance to social actions. Based on the findings, we stated the conclusion that every

Table 6. Beliefs and disbeliefs related to participation in religious, civic, and fraternal organizations.

Beliefs and disbeliefs	Religious		Civic		Fraternal	
	Rank	Correlation	Rank	Correlation	Rank	Correlation
1. Personal commitment to organization (C).	1	.49*	1	.48	1	.54
2. Importance to me and my way of life (V).	3	.38	3	.45	3	.47
3. Expectations of spouse and family (E).	5	.35	2	.45	2	.47
4. Expectations of officers and members (E).	2	.46	5	.34	9	.37
5. Feel organization is good or bad (G).	4	.36	7	.32	7	.40
6. Power or influence it exerts over me and my way of life (G).	11	.28	4	.38	4	.46
7. Benefit to my occupation (G).	7	.33	6	.32	8	.38
8. Support of close friends (S).	8	.33	9	.28	6	.41
9. Confidence and trust in the organization (G).	12	.25	8	.32	5	.44
10. Support of spouse and family (S).	6	.35	11	.26	11	.34
11. Difficulty to join (O).	9	.33	12	.26	10	.35
12. Organization active or passive (B).	10	.32	13	.23	12	.35
13. My effectiveness as a meeting chairman (A).	13	.22	10	.28	14	.20
14. Organization is strong or weak (B).	14	NS	14	.23	13	.21

*Coefficients of correlation are all adjusted coefficients of contingency. All are significant at the .05 level or above unless otherwise specified.

G = Goals
B = Belief orientations
V = Value standards
E = Expectations and norms
C = Commitments
S = Support
A = Ability
O = Opportunity

decision and social action is based on a small cluster of relevant beliefs and disbeliefs as perceived by the actor.

This conclusion generated a new hypothesis:

> If it is true that a decision and action is based on a small cluster of beliefs and disbeliefs of the actor, then it should not make any difference whether we ask the person to express an opinion, a sentiment, to state how he would respond to a hypothetical situation, or to indicate how he had responded in his nonverbal behavior in relation to any given issue or referent being derived from the same relevant cluster; they should be consistent with one another.

In the early 1960s, we set out to test this hypothesis in relation to several different referents in several cultures. The measure we used as proof of consistent relationships was the Guttman scale. The hypothesis was supported in every study designed to test it.[1] The conclusion from these studies was:

> At any given point in time the beliefs and disbeliefs, attitudes and gross behavioral responses of a person toward any given referent will be consistent with each other.

The exceptions to this finding are few.

The idea of consistency, or balance, isn't new to the social sciences. Both Heider[2] and Newcombe[3] presented theories proposing that people make decisions consistent with their own beliefs, or decisional consistency. *Stated another way, a man's beliefs become his facts, and he acts on them.*

In further developments, Festinger[4] and Rosenberg and others[5] presented theories and data to show that following a decision involving inconsistencies, a person will change either his beliefs, attitudes, actions, or all of them to bring them into a consistent relationship with one another. This we call post-decisional consistency.

Our research has focused primarily on a third type, "point-in-time" consistency. By studying the interrelationships among an individual's beliefs, disbeliefs, attitudes, and gross behavioral responses at a given point in time, the effects of decisional consistency and post-decisional consistency will have already been built into the relationship.

What does this information on consistency have to do with problem diagnosis? Essentially, three important aspects of consistency bear on the topic of this paper.

First, it is clear that people's beliefs, disbeliefs, attitudes, and actions are organized around referents (things). If the subject, or referent, is changed, the associated beliefs, attitudes, and actions will also change.

For example, a woman who believes the game of tennis isn't only fun to play but also healthy exercise will speak highly of the game, encourage others to play, and play every opportunity she can. But this same woman may find another sport (referent), such as boxing, both unhealthy and in bad taste. Her beliefs, attitudes, and actions about the referent "boxing" would be entirely different from those about the referent "tennis."

Thus, the same person has quite different beliefs and attitudes and behavior on different issues. A cross-section study of a community reveals that what some strongly favor and like, others do so mildly, while still others are indifferent and others mildly or strongly negative and hostile. There are few if any subjects on which all community members really agree.

Second, at any given point in time an individual has a stereotyped image of a referent; his beliefs, disbeliefs, attitudes, and actions toward that referent all mesh and are consistent with one another. Therefore, each reinforces the others.

The reinforcement aspect of consistency points to the difficulty in changing an individual's beliefs, disbeliefs, attitudes, or behaviors. For him, these beliefs and disbeliefs are facts, and these "facts" aren't easily changed.

Third, in earlier studies of the directive factors in decision making, we found that as a man believes so he acts. But, it's also true that as a man acts, so he also comes to believe. Thus, an individual's participation and actions become powerful factors in reshaping his beliefs, disbeliefs, attitudes, and his future actions.

Table 7 is designed to reflect the frequency and the directions of an individual's actions in the recent past, regarding a given referent.

Summary

We have identified 14 factors that help in eliciting both the obvious and the hidden components that underlie any particular decision or action (Figure 2). Having identified these components for a particular decision, we can determine both the direction and the relative importance of each component in any given decision-making situation.

The procedure can be used for an individual or for a large number of persons who have faced the same decision and action. In the latter case, the frequency with which the factors enter into the decision and their average weight can be established. This information can be formulated into a powerful theory to explain that particular problem.

With a more complete diagnosis of a problem resulting in a summary of the main components that are relevant to it, we greatly increase the rationality of our decisions.

Contrast this comprehensive diagnosis with the usual explanation given for a behavior. When a person volunteers the reasons for an action, he usually mentions only one or two factors. With the open-ended question form, we can easily identify 5 to 9 factors that entered into the decision, whereas with the probing questions we can uncover 10 to 14 components.

Moreover, the forms are designed to reveal both the direction and the relative importance of the factors as well as the factors themselves. The "hidden" factors unmasked by the questionnaire are found to carry as much weight in the decision as the more obvious factors.

In the fall semester of 1972, about 100 students applied the procedures presented above to a problem of their own choice. The procedures

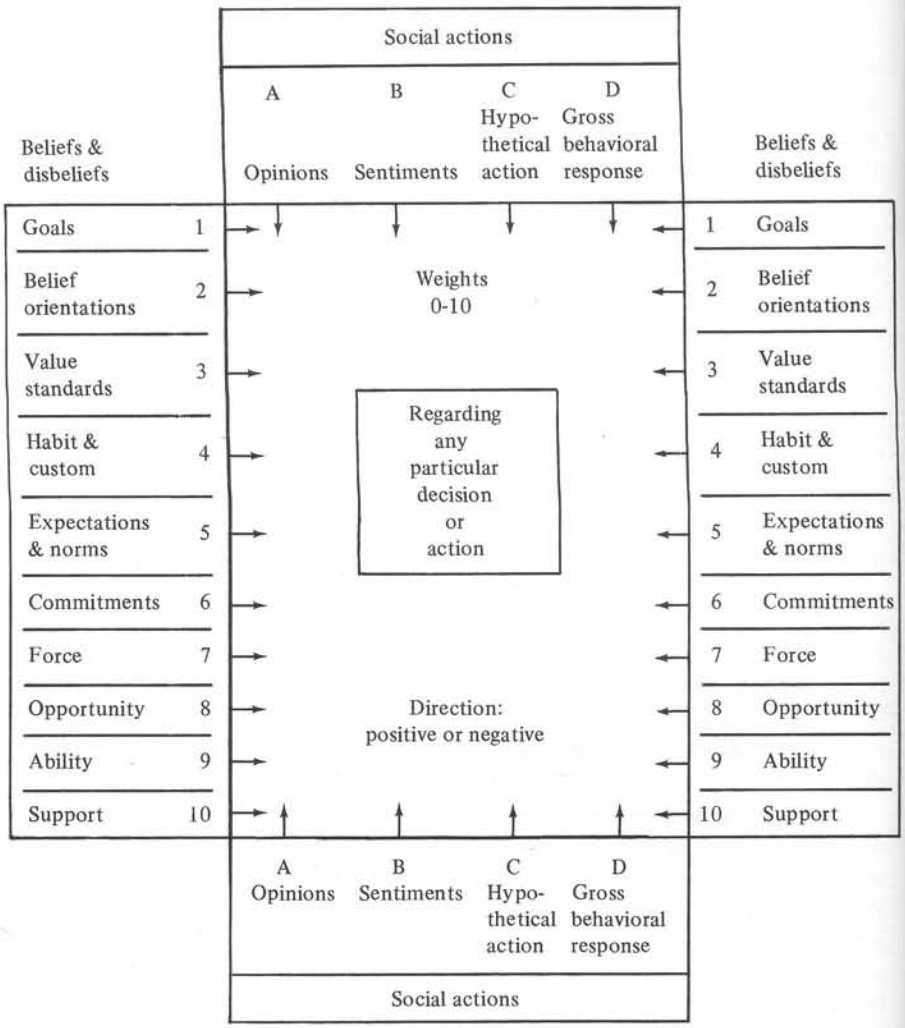

Figure 2. Fourteen general factors used to identify the relevant cluster of components of a decision or action.

were well suited to each of these 100 different problems.

As mentioned earlier, our studies have covered several different kinds of behavior in six different cultures. The steps in this process of problem diagnosis aren't limited to the United States, but are applicable in all the cultures we have studied. From these experiences, we conclude that it can be a useful approach to any problem.

What the comprehensive theoretical frame of reference adds to problem diagnosis is a much more complete picture of the factors involved. More complete information allows for better

analysis of problems and therefore more workable solutions.

In the second part of this series, to be run in the Summer, 1974, *Journal,* we'll show the relationship of this diagnosis to problem solutions, and particularly to the planning of programs that will make a substantial difference in affecting the situations they're designed to change.

Footnotes

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