

design should incorporate three elements:

1. a diagram of the relevant policy variables and their interrelationship, that is a graphic representation of the conceptual framework
2. a connotative definition of each policy variable, that renders it understandable in terms of other, more familiar concepts (Operational definitions come in stage 6 of the design process.)
3. a brief explanation of each relationship depicted in the diagram as that has revealed itself in the deductive testing of the framework

With the completion of the conceptual framework, the analyst is in a position to specify the precise question(s) of fact about the conceptual framework which constitute his or her research objective(s). To the specification of that objective(s) we turn in the next chapter.

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chapter 8 / stage 4: statement of the research objective(s)

The research design process began with the analyst assisting the decision maker to identify the policy problem and to define the information needed to move toward effective action. Next, the analyst examined prior efforts to deal with the policy problem on a theoretical, on a research, and on a practical level, thereby illuminating the action choices available and desirable. On the basis of the knowledge that he or she thus accumulated, the analyst constructed a model of the many variables that comprise the policy problem and its solution, depicting the interrelations of these variables. With this as a background, the analyst should now be able to state clearly the objective(s) of the contemplated research.

The statement of research objective(s) designates the specific variables and the question(s) of fact about their nature, distribution, or interrelations which must be answered to resolve the policy problem. In this sense there may be more than one objective, as there may be more than one question of fact. By specifying which variables will, indeed, be observed, the statement defines the parameters of the investigation. Hence, in formulating a statement of the research objective(s), the analyst is committed to the study of a given set of variables. This stage of the research design completes the conceptual phase of the design process and serves as a transition to the technical phase that follows.

The statement enunciating the objective(s) of the prospective research is derived from the conceptual framework. When the conceptual framework is extremely complex, attempts to compress all of it into the research objective(s) rarely succeed. Under such circumstances the research objective(s) must focus on a manageable portion of that framework. The analyst can, of course, return to the framework and revise it to conform to the more modest objective(s). How-

ever, we advise against this. Better to leave the framework in its expanded form and to justify the exclusion of certain variables and relations from the research objective(s). By the time the analyst is ready for the research statement, he or she sees clearly the priority among the relations depicted in the framework and the sequence in which various aspects of the policy problem should be investigated in order to facilitate policy making. Leaving the framework in its expanded form is preferable, because it provides a context in which the research findings take on a greater meaning. In addition, an expanded framework provides the basis for a series of research efforts based on a number of questions and hypotheses. Such serial investigations would be discrete and disconnected were they not interrelated by an overarching conceptual framework.

Once the objective(s) of the contemplated study has been clearly formulated, the analyst can attend to the technical aspects of the design. The statement setting forth the research objective(s) implies the method of research to be employed in obtaining that objective(s); and this method in turn determines to a large degree the techniques that must be implemented in stages 5 through 8. Thus, only because the research objective(s) is known, can the analyst work out the details attached to specific data-gathering techniques. For example, the research statement will invariably specify who will be observed and what variables will be observed about them. Such information enables the analyst to visualize the study population, the data to be collected about it, and the analysis to which the data will be put. The technical details of population sampling, data collection, and data analysis are then worked out in design stages 5, 6, 7, and 8. *Hence, a clear statement of the research objective(s) imparts direction and focus to the design stages that are to follow.*

We have already referred to the dynamic character of the design process, namely, that the design stages influence each other. While the statement of the research objective(s) sets the parameters of the investigation, these may have to be modified here and there as a result of technical and/or practical constraints encountered during subsequent design stages. Perhaps the precise population required by the research statement is inaccessible, or the data called for are either unavailable or necessitate infeasible techniques for their collection. Or, again, the way in which the variables can actually be measured differs from what was implied in the research statement. Hence, it is not uncommon for the statement of research objective(s) to undergo some modification to accord with one or more of these contingencies, although the set of variables specified for observation remains basically unchanged. To this extent the initial formulation of the research statement has a certain tentativeness. It is something for the analyst to work with as he or she moves into the technical stages of the design and may thus be thought of as a "working statement."

The experienced reader will recognize that what we have called the "statement of the research objective(s)," some textbooks in social research refer to as the "statement of the research problem." We believe there is an important

distinction between the two terms. A research objective connotes an end to be attained, a specific piece of information that will answer the question of fact that motivates the research. The term *problem* implies a puzzle to be solved. It is often used to connote both the end, or solution, and the means or method by which that solution is to be derived. It is therefore a less precise term. In our view, the technical stages of the research design that follow the statement of research objectives operationalize the method by which the policy objective is to be attained. We recognize, however, that in every statement of a research objective is implied a method of research—either exploratory, descriptive, or explanatory—that is appropriate for its attainment. It is this method which governs the selection of techniques in the design stages that follow. Therefore, in stating the research objective(s) the analyst should explicate the method implied.

THE RESEARCH OBJECTIVE(S)

The statement of the research objective(s) concentrates on the specific variables and their relations to be investigated. It is unusual for an investigation to focus on an entire conceptual framework. To do so may result in a study of inordinate complexity, or may involve resources in time and money that exceed those available to the analyst. It is important to recognize, however, that the variables and relations to be investigated depend largely on the stage of the policy-making process at which research is required.

If the need for research occurs at the stage of specifying the policy objective, it is likely to focus on the dependent variable of the conceptual framework. If research is done to facilitate formulation of alternative courses of action, it will focus on the independent variable. If research deals with the estimation of the consequences of these courses of action, it will focus on the relation between the independent and dependent variables, as mediated by the bridging variables. To increase the accuracy of such estimates, the analyst must incorporate into the analysis the relation of adjunct and constraint variables to the dependent variable. Clearly, the analyst can achieve greater precision in estimating how fully the policy objective can be reached by each alternative course of action when he or she considers the varying effectiveness of these alternatives upon different segments of the target population, within different environments, and in the presence of auxiliary actions which influence such effectiveness. Similarly, a more complete picture of the consequences of policy would include consideration of the unintended and the latent as well as the intended effects.

If the research occurs during the implementation stage of the policy-making process, it will focus on the intervening variables, either in establishing their presence or in verifying their relation to the independent and dependent variables. If the decision maker is interested in evaluating the outcome of a policy that has already been implemented, the research may have one of several

foci. For example, if the policy maker wants simply to know whether the objective was achieved, research will focus on the dependent variable. If instead he/she wishes to verify a "theory of intervention" (that is, that a given policy brought about the attainment of its objective), then the research will focus on the relation between the independent and dependent variables. If the interest is in the side effects of policy, then the research will focus on the unintended or latent consequences. Again, the more variables and relations that are included in the research, the more valid the evaluation. For example, if constraint and adjunct variables are included with the independent variable, the verification of an intervention theory will have greater validity by virtue of the elimination of rival hypotheses.

In determining the research objective(s), the analyst is actually delimiting in a precise manner the variables and their relations to be studied. How many variables and relations to include rests, in part, on the benefits for decision making to be gained from each additional variable versus the cost of studying it. Each variable raises the cost of research by increasing the populations to be observed, the data to be collected, and the analyses to be undertaken, a fact to become apparent later. Because the analyst wants to resolve the policy problem with the least cost, he or she tries to formulate a research objective that will be simple and yet result in an acceptable solution.

THE FORM OF THE STATEMENT

The objective of policy research is to obtain some specific piece(s) of information needed to carry out the policy-making process. In the previous section we noted that the objective(s) derives in large part from the stage in policy making at which the need for research arises. But what method of research should be adopted in pursuit of that objective(s)? Elsewhere in this book (see pp. 50-57) we noted that the method of an investigation—that is, whether it be exploratory, descriptive, or explanatory—depends on the level of knowledge about the variables or their relations needed to solve the policy problem. We further pointed out that this level is often determined by the stage in the policy-making process at which research is initiated. For example, research required during the specification of objectives is most likely to require the descriptive method; that required in designing alternative courses of action, the exploratory method; that required to estimate the consequences of those alternatives, the descriptive method; and that required to evaluate the effects of policies once implemented, the explanatory method. But we also noted that there are frequent exceptions to this pattern (see pp. 57-60). The actual method required depends on the level of knowledge needed to solve the policy problem at whatever stage of policy making that problem arises. If the need is to identify a property of the phenomenon which is the subject of policy making, i.e., to dis-

cover a policy variable missing in the conceptual framework, the method required is exploratory. If the need is to determine the size or distribution of a policy variable, the method required is descriptive. If the need is to verify the causal nature of a relation between policy variables, the method required is explanatory.

If properly drawn, the form in which the research objective(s) is stated reflects the level of knowledge needed. Therefore it behooves the analyst to examine carefully the form in which that objective(s) is worded because it has implications for the particular method to be incorporated in the remaining stages of the research design. The wording of the objective(s) of the proposed research will inevitably vary, depending on the subject matter investigated. And yet research statements do tend to assume certain modes, so that it is possible to speak of the form of the statement. In general, research statements assume three forms: the open-ended question, the closed-ended question, and the causal hypothesis.

The Open-Ended Question

When policy maker and analyst initially confront the policy problem, their knowledge about it and its context may be quite minimal. They are, of course, able to recognize the phenomenon to be studied, because they are dealing with it. But they may not understand it well enough to specify its distinguishing properties—the variables that constitute it and set it apart from similar phenomena. Thus the objective of research is to identify those properties. The form in which such objectives are stated is an open-ended question, so called because the properties of the phenomenon in question cannot be specified. In terms of the triangle of reference, we can say that an open-ended question refers to a concept of which the idea and term are known but the referents are unclear. The intent of such a question is to complete the triangle.

To illustrate, consider the possibilities of the following open-ended question for research, "What are the factors that characterize a maximally successfully desegregated school?" Here the analyst's thinking runs somewhat as follows, "I can recognize an exemplary school which has desegregated itself so successfully that it can serve as a model for emulation. I can also recognize its opposite, a school in which desegregation has failed. But I cannot name the properties that distinguish the two, and this task will therefore be the objective of my investigation." At times the open-ended question focuses upon the policy—that is, the independent variable in the conceptual framework, as in this example, "What kinds of attendance plans have districts adopted in an effort to achieve school desegregation?" At other times the open-ended question might focus on the dependent variable in the conceptual framework. For example, "What types of jobs do graduates of job training programs obtain?"

An open-ended question is not always confined to the identification of the component variables of a concept; it may also be used to identify the antecedents or consequents of a key variable in the conceptual framework. For

example, the question for research might be, "What are the factors that impede unemployed persons from obtaining a job?" Here the analyst reasons, "The objective of the policy maker is to reduce unemployment, the properties of which can be specified. However, there are factors that must be overcome (bridging variables) to achieve that objective, factors that cannot be specified on the basis of available information." Another research question might be, "What are the consequences of adopting a racial balance attendance plan?" Here the analyst is reasoning, "The policy maker has identified a policy to be adopted (and, by implication, the objective that policy is intended to achieve), but we do not know what unintended consequences might occur were the policy to be adopted."

The Closed-Ended Question

Next, there is the situation in which the analyst is well aware of important properties or variables that comprise the policy problem but has little or no knowledge about their size or frequency. Perhaps the analyst cannot say how these properties are distributed in a given population in terms of the classes, categories, or values that they assume; or perhaps it is not known whether such properties are interrelated.

To produce information about either type of objective, the research statement would take the form of a closed-ended question. Such a statement is considered closed-ended because it specifies properties of the phenomenon under study, the alternative forms and limits of which are known beforehand. For example, age, sex, education, and neonatal fatality are properties expressible in terms of *a priori* classes, or quantitative values. At times the closed-ended question might focus upon a single variable within the conceptual framework. For example, "How many people are unemployed?" or "How many births resulted in neonatal fatality?" Sometimes the closed-ended question might focus upon the simultaneous distribution of two or more variables in the conceptual framework. For example, "What is the distribution of unemployed persons by age, sex, and level of education?" At other times the closed-ended question may focus on the relation or covariation between two or more variables in the framework. For example, "What is the degree of association between the amount of prenatal care received by women and neonatal fatality among their offspring?"

The Causal Hypothesis

Lastly, there is the situation in which the analyst knows both the properties of a phenomenon and their size or distribution but lacks information that would allow him or her to account for this phenomenon in terms of the size or distribution of one or more other phenomena. Knowledge is needed about whether the variation exhibited by one variable is accountable in terms of the variation exhib-

ited by another. The descriptive information that may be available does not fully satisfy this need. The form assumed by the research statement in such a study is what we call a causal hypothesis. In order to specify the form of a causal hypothesis, we must recall briefly the requirements for testing causality.

As we pointed out in Part I (p. 33) three conditions must prevail in order to validate a causal hypothesis: (1) variation in one variable must be associated with variation in the other(s); (2) the variable which is the presumed cause (independent variable) must precede in time the variable which is the presumed effect (dependent variable); and (3) the effect of the presumed cause was not produced by some third variable. Therefore, covariation of two variables does not in itself permit the analyst to conclude a causal connection between them. The analyst must posit or hypothesize that variation in one (or more) variable(s), A, precedes variation in a second variable, B, in the absence of variation in a third (or more) variable(s), C.

In order to demonstrate that some other variable C, also an antecedent, did not produce the consequent B, we must control the suspected factor by holding it constant. If the suspected factor C is indeed exerting some effect, we must then demonstrate that the presence of the antecedent A in the relation under examination results in an overall effect B in excess of what would otherwise be. This condition is known as the falsification principle in hypothesis testing and was discussed in Part I (p. 28). It recognizes the impossibility of proving a causal hypothesis true. All one can do is to falsify alternative hypotheses and thereby increase the plausibility of the research hypothesis. For this reason, the validity of a causal hypothesis lies in the number of alternative causal hypotheses that can be refuted (Blalock 1960, pp. 92f). Similarly, a given hypothesis can be said to be true only in relation to the specific factors that have been refuted as alternative causes through the research.

It is important at this point to comment on the difference between a research hypothesis, as we conceive it, and a null hypothesis. Much confusion has been bred because of the changing interpretation of this difference since the introduction of the null hypothesis. The reader is urged to consult the more recent literature (Morrison and Henkel 1970). The null hypothesis is sometimes treated, erroneously, as an alternative to the research hypothesis. In actuality the two hypotheses are distinctly different, and serve different purposes. The research hypothesis posits or predicts an observable covariation between two or more variables. The null hypothesis refers to the probabilistic nature of that observed covariation. It posits that the observed covariation is the result of factors not controlled in the research design, namely unknown factors that are presumed to operate on the dependent variable in a random manner. Testing the null hypothesis, therefore, is a way of adding to the validity of the research hypothesis by ruling out the influence of factors uncontrolled in the research design. Such a test is applicable, however, only when randomization has been used in the design of the study (Selvin 1957). We will say more about the null

hypothesis, or the statistical significance of the findings regarding a research hypothesis, in the data analysis section of research design (Chapter 12) where that discussion properly belongs.

Let us turn now to some examples of causal hypotheses that serve as statements of research objectives. (1) "The provision of a manpower training program will be associated with an increase in the entry of unemployed persons into full-time employment, assuming employment opportunities remain constant." (2) "The utilization of prenatal care services by pregnant women will be associated with a decrease in the neonatal death rate of their offspring, given no change in the mothers' living standard." (3) "The adoption of a racial balance attendance plan in a given school district will be associated with an eventual reduction in the gap in academic performance of white and black students, controlling for the ethnic content of the curriculum and the relative social class of the two racial groups." Each of the foregoing hypotheses posits a covariation between at least two variables, one of which is the antecedent and, by implication, the cause of the other. In addition, each hypothesis rules out the influence of at least one other relevant antecedent variable by the inclusion of such clauses as "assuming employment opportunities to remain constant" and "given no change in their living standard." If the analyst is able to utilize in the research design a "pure experiment," in which randomization governs exposure to the independent variable, then the phrase "all other factors being equal" may be used in the hypothesis. In such a design both known and unknown factors are controlled (see Chapter 9).

Upon careful examination the analyst may find that his or her statement of a research objective does not fit one of these three forms. This may be the result of lack of precision in the statement or of lack of clarity in the analyst's mind about the level of knowledge being sought. In such cases the analyst should reexamine the policy problem and the first three stages of the design process until the research objective can be more precisely stated in one of these forms. Failure to state the objective(s) with the proper degree of clarity will prevent the analyst from specifying with certainty the method to be employed in the research.

METHODOLOGICAL IMPLICATIONS

Thus far we have spoken of the substance and the form of the research statement. In substance it sets forth the information needed; in form it is either a question or an hypothesis. The research statement thus specifies the *what* of the research, the objective, but it does not specify the *how*, the means for achieving the objective. It does not tell the analyst in so many words what method to employ to obtain the needed information. At the same time, how-

ever, both the form and the substance of the research statement carry methodological implications. And these the analyst must now explicate. The justification statement, which defines the policy problem, and the conceptual framework, which identifies its variables, already contain preliminary suggestions for method, without actually making the choice explicit.

In order to facilitate the design decisions that are to follow, the analyst must now explicate the research method the study will employ. The type of method determines a number of technical details. It determines how the study population is to be defined, how the population units are to be sampled for observation, and how they are to be exposed to the independent variable(s). It determines what kind of data will have to be collected, how they are to be collected, and, once collected, how they are to be analyzed. Hence, explication of the type of method has the effect of narrowing the range of the technical decisions yet to come.

For example, once the analyst has chosen a research method, he or she can already visualize the requisite data collection and data analysis techniques. As already noted in Part 1 (pp. 52-57), each research method entails its own requirements for research techniques. Of course, specifying a method will not alone determine the techniques to be employed; these decisions will also depend on certain field conditions and cost constraints that will be examined in greater detail in the chapter to follow. For example, the nature of the phenomenon, or its sensitivity to observation, may preclude making a large number of observations or may limit the manner in which they can be made. Thus, although the analyst at this stage can specify with certainty the method of inquiry, this decision will only indicate the range of techniques to be employed in executing that method.

To specify the method we return to the form of the statement of research objective(s). (See Figure 8-1.) A study guided by an open-ended question, whether directed at the identification of the properties of a given phenomenon or at the identification of its antecedents or consequences, calls for the exploratory method. As we shall see in the design stages that follow, the exploratory method has the least rigorous specifications. Such a method allows flexibility in procedure to pursue whatever promising opportunity arises for the identification of missing properties or variables. In order to maximize efficiency, a relatively small study population is observed intensively, and cases are selected on a purposive, nonrandom basis. Observational techniques are open-ended or intentionally unrefined. The data yielded by an exploratory study are qualitative in character, being the classes or types of the property or variable identified, and the inferences to be derived are about the range of these classes or types. Such a study, of course, provides no way of knowing the size or distribution of property or variable throughout a given population.

A study guided by a closed-ended question calls for the descriptive method. Its design requirements are much more exact. When the population

Figure 8-1 Methodological implications of the statement of research objective(s)

<i>LEVEL OF KNOWLEDGE REQUIRED</i>	<i>FORM OF RESEARCH OBJECTIVE</i>	<i>RESEARCH METHOD IMPLIED</i>	<i>TYPE OF INFORMATION PRODUCED</i>
Discovery of missing property or variable	open-ended question	exploratory	qualitative data
Estimation of size or distribution of known variable or relation	closed-ended question	descriptive	quantitative data
Causality of relation	causal hypothesis	explanatory	verification of conditions of causality

being studied is large, samples are drawn for observation by some random procedure. Observations are made by standardized and rigorous procedures. The data generated are quantitative in character. They may come in the form of enumerations, of a frequency or percentage distribution, or of averages, rates, ratios, or proportions based on previously established types, classes, or categories. They may also come in the form of measures or coefficients of association. It is possible to infer from such a study the size or distribution of a known property or variable in the population under study within a specified range of error.

A study guided by a causal hypothesis calls for the explanatory method. Its objective is the testing of causality, which is accomplished by verifying the conditions specified in the causal hypothesis. The explanatory method requires the observation of at least two cases which differ with respect to the presumed cause and which have at least one other potential causal variable in common. Observation requires precise and systematic procedures. Such a study yields a conclusion regarding the relative acceptability of the presumption of causality. One can infer causality only with respect to the cases observed and the variables controlled. It is not possible to generalize beyond those cases unless they also meet the requirements of a descriptive study. Therefore, the larger the study population and the greater the number of variables controlled, the greater the generalizability of the causal findings.

At the outset of this chapter we recognized the possibility that a given study may have more than one research objective. Such a situation arises when more than one question of fact must be answered at a given stage of policy making. Assuming that they share the same conceptual framework, multiple research objectives can be accommodated in the same design with relative ease

when they involve the same method of research. For example, an exploratory study may be guided by two or more open-ended questions; a descriptive study, by two or more closed-ended questions; and an explanatory study, by two or more causal hypotheses. The principal constraint is in finding a study population large enough to accommodate all objectives.

However, if the research objectives involve different research methods, the ensuing study design can become quite complicated. The overall study design must meet the requirements of all methods involved. Such a feat involves more than a matter of the size of the study population. It also involves accommodating in one study two or more requirements for the composition of a population, as well as the corresponding techniques of data collection and analysis. Given these complications, it may be wiser to design separate studies for each objective. Nonetheless, there are times when, owing to the cost of data collection procedures, it is advantageous to combine several objectives in one study. A general rule of thumb in such circumstances is that the design for a less rigorous method may be incorporated into the design for a more rigorous method, but not vice versa. For example, it is possible to incorporate an exploratory research objective in the design of a descriptive study, but it is not possible to incorporate a descriptive research objective in an exploratory study. If multiple research objectives involving different methods are to be accommodated in the same study, the method for each objective should be clearly stated, both at this stage of the design and at each subsequent stage.

EXAMPLES OF RESEARCH OBJECTIVES AND THEIR METHODOLOGICAL IMPLICATIONS

Let us return to our study of school desegregation in order to illustrate how research objectives are formulated in exploratory, descriptive, and explanatory studies. Let us assume that we are in the early stages of decision making, and have defined our policy objective as "equalizing academic performance between racial and ethnic groups" (dependent variable). Let us also assume that prior research indicates that social interaction between the groups (bridging variable), providing they are status equals (constraint variable), assists in achieving such equality by raising the performance of low achievers. However, we are unable to formulate a course of action (independent variable) for promoting greater social interaction among racial and ethnic groups and, therefore, that policy variable is missing from our conceptual framework. This calls for the exploratory method. We shall state our research objective as follows:

What policy actions are available for generating social interaction among racial and ethnic groups when they are status equals?

Note that we stated the variable to be identified in terms of its relation to a known variable in the conceptual framework (social interaction), a relation critical to identifying it. The variable of social interaction is used here on the assumption that such interaction promotes the policy objective. If that assumption were untenable, we would look for actions that lead directly to the objective without benefit of a bridging variable. Note the inclusion in the research statement of the constraint variable (status equals), which will help define our study population and thus focus our exploration. The more complete the conceptual framework—that is, the more variables relevant to the policy objective it includes—the more fruitful an exploratory study.

Now let us assume that our conceptual framework is entirely complete and that we are at the stage of estimating the consequences of alternative courses of action. Let us further assume that our exploratory study resulted in identifying several alternatives, each one based on a different assumption about barriers to academic performance. One alternative is a racially and ethnically balanced attendance plan, which we have already discussed. A second alternative might be a supplemental appropriation to schools with a predominantly black or minority group enrollment to bring up the quality of their education programs. A third alternative might be special education services designed to help underachieving students develop perceptual and cognitive learning skills. Thus, three alternative courses of action reasoned from separate assumptions are proposed for equalizing academic achievement between racial and ethnic groups:

1. a racial and ethnic balance attendance plan to promote social interaction among racial and ethnic groups
2. a supplemental appropriation to predominantly black or minority group schools to increase the quality of education
3. provision of special education services to increase perceptual and cognitive skills of underachieving students

In estimating the consequences of these alternatives, the analyst must know how much of the policy objective might be achieved by each. In other words, how many persons in the target population might be changed in the direction of the policy objective by each alternative? To answer this question, we must ascertain the number of students in the target population whose academic retardation is attributable to each of the several conditions to be remedied by the alternatives. Such an objective calls for the descriptive method, and can be stated as follows:

How many black and ethnic students with below average achievement scores exhibit (1) social isolation from white students; (2) attendance at inferior schools; or (3) perceptual and cognitive disabilities?

Undoubtedly these conditions are not independent of each other, a fact that would have to be kept in mind in estimating the effects of each course of action.

Underlying the study is the assumption that each course of action has a probability of success equal to that of the others.

Note that this statement of the research objective assumes a causal relation between each of the alternative courses and the policy objective sufficient to warrant its consideration as a solution to the policy problem. As an inquiry about the frequency and distribution of the members of the target population who would be benefited by each course of action, the study would use the descriptive method.

Finally, let us illustrate how a research objective might be chosen for an explanatory study. Assume that a course of action, namely, the adoption of a racial and ethnic balance attendance plan, has been selected and implemented; our job is to evaluate its outcome. Further, let us assume that the policy maker is concerned with determining the effectiveness of the policy in bringing about the objective (explanatory), not simply with ascertaining the extent to which the desired outcome occurred (descriptive). In our conceptual framework we may have determined that certain intervening factors (for example, social interaction), certain adjunct factors (for example, a multiracial and multi-ethnic curriculum), and certain constraint factors (such as status equality among students) are necessary to the success of the policy. Since we are interested in verifying the causal relation between the independent (attendance plan) and dependent (relative academic achievement) variables, we control (hold constant in value) all other variables. The research objective is stated as follows:

The adoption of a racial and ethnic balance attendance plan will be associated with an equalization of academic performance when undertaken with a multiracial and multi-ethnic curriculum and with social interaction among status equals.

Note that the assumed causal relation between policy and outcome that is to be verified is stated as a correlation, while the relations to be controlled are stated as constants.

SUMMARY

The statement of the research objective(s) should specify: (1) the variable(s) and/or relations to be observed, and (2) the method of research required for its attainment. For an exploratory study the statement will specify the type of policy variable(s) to be identified or the global concepts, which must be clarified. For a descriptive study the statement will specify the already identified variable(s) and/or relations to be observed. For an explanatory study the statement will specify the conditions of causality to be verified, i.e., the presumed causal relation to be observed and the alternative causal relations to be con-

trolled. The method identified to attain that objective must be consistent with the form in which the research objective is stated.

The research objective(s) may be modified by decisions made at subsequent design stages. Thus the choice of study population will result in a refinement of the variables and relations to be investigated. The selection of procedures for the collection and analysis of data will result in their further refinement. At the conclusion of the design process these refinements are then fed back into the statement of the research objective(s), resulting in a very precise specification of what is to be investigated.

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chapter 9 / stage 5: study population

With the statement of the research objective(s) in hand, the analyst turns to the first technical stage of the research design process, the determination of the population to be studied. The study population consists of those individuals, objects, or events which are subject to observation by the analyst. Its design involves specifying four things: (1) the unit of observation; (2) the particular population of units to be observed; (3) the procedures for selecting units for observation, and (4) the number of units to be observed.

The primary objective in the design of the study population is to operationalize the method of the research, be it exploratory, descriptive, or explanatory. Indeed, traditionally, research design has been equated with the design of the study population. When the method is exploratory, the study population will be designed in such a way as to discover variables or their properties. When the method is descriptive, the population will be designed to permit generalizations about properties of that population on the basis of the fewest possible observations. When the purpose is explanatory, the population will be designed to verify the conditions of causality. We will describe these differences in more detail later in this chapter.

In addition to operationalizing the method of research, the study population serves another important function. It identifies the limits within which the analyst can generalize his or her findings. In policy research, interest lies in some population defined by the policy-making system as in need of public action. This we call the target population. It may be defined in legislation by the eligibility requirements to qualify for service from a public agency, or in the expression of public sentiments in the media or other public forums. However, all studies take