also treated. Chapter 7 concludes with several criteria for evaluating predictions.

Chapter 8 is concerned with the nature of control—that is, the systematic manipulation of some element related to or contained within a system so as to effect a change in one or more elements in that system. The chapter discusses the interventionist, theory implementation criteria, types of strategies, and levels of understanding in control. It concludes with a discussion of the task of translating practical problems into theoretical issues and the evaluation of control efforts.

Thus we develop concepts, propositions, and theories for the purpose of being able to explain, predict, and control events.

CHAPTER 2

THE NATURE OF CONCEPTS

INTRODUCTION

The subject matter of this chapter concerns concepts. Concepts are the fundamental units that marketers employ in their thinking about marketing problems and in their approaches to solving those problems. Examples of frequently used concepts in marketing include product positioning, market segmentation, brand loyalty, innovation, retailing, and loss leaders. It is
appreciable, then, to choose the subject of concepts as the starting point in our exploration of metatheory. The discussion will focus first on the distinction between concepts, terms, and objects. This follows a treatment of formal and nonformal concepts. The chapter concludes with a treatment of observational and theoretical concepts. Although concept formation is an important topic, it cannot be treated here. However, the reader is encouraged to consult some of the interesting literature available on this subject.\(^1\)

A concept refers to certain characteristics or phenomena that can be grouped together. Alternatively, a concept represents similarities in otherwise diverse phenomena. For example, the concept “consumer” as it is used in most marketing contexts identifies and groups together at least three characteristics, namely the (1) consumption of (2) nonindustrial (3) ideas, goods, and services. Some authors add a fourth phenomenon, purchasing, to their treatment of the concept consumer. Other frequently used marketing related concepts include brand loyalty, personality, habit, convenience goods, product life cycle, and channel.

Concepts are of fundamental importance in science. “Scientific knowledge is entirely conceptual: it consists of systems of concepts interrelated in different ways.”\(^2\) Thus concepts are those items which refer to the subject matter of science: “In normal scientific discourse we use phrases like ________ is the antecedent of ________, or if ________, then ________, with a probability of X.”\(^3\)

The terms that would go in the blanks are examples of concepts or units of a theory.

Whereas concept formation is basic to theory formation, good theory is also necessary for good concept formation. Kaplan refers to this as the paradox of conceptualization.\(^4\) “The proper concepts are needed to formulate a good theory, but we need a good theory to arrive at proper concepts.” The paradox is resolved somewhat by approximation: “The better our concepts, the better the theory we can formulate with them, and in turn, the better the concepts available for the next, improved theory.”

CONCEPTS, TERMS, AND OBJECTS

Concepts have to be distinguished from both objects and terms. Concepts are located in the world of thought rather than in the world of actual things referred to here as objects, including linguistic objects commonly referred to as terms. They are abstracted forms and do not reflect objects in their entirety but comprehend only a few aspects of objects. Those aspects of the objects that are comprehended in concepts are called their intension. To illustrate the distinction between concepts, terms, and objects, consider the case of “attitude.” First of all, we may think of the concept of attitude. This is likely to elicit a number of aspects, properties, or attributes such as (1) a mental and neural state (both affective and cognitive) (2) of a readiness to respond (3) in organized ways, and so forth.\(^5\) Next, there is the term attitude, which was responsible for eliciting our mental response in the first place. Finally, we can think of people who behave in a consistent way toward social objects or who fill out questionnaires concerning these objects, and this may constitute the “real” attitude, the object whose properties are reflected in our concept of attitude.\(^6\)

Concepts, objects and terms are related as shown in Figures 2.1a and 2.1b. Figure 2.1b is taken from Harvey, who substitutes percept for object: “We may therefore think of a set of connections running from sense perceptions (percepts), through mental constructs and images (concepts) to linguistic representation (terms). Percepts, 'concepts,' and 'terms,' cannot be regarded as truly isomorphic. They possess, in some degree, an independent existence.” The s in Figure 2.1b represents a perspective from which perception, thought, and language can be viewed. It is important to note Harvey's observation that the relations among percepts or objects and concepts and terms are never truly isomorphic and that concepts are expressions of organized percepts and are in turn expressed by terms. In the discussion to follow we shall examine these relationships.

CONCEPTS AND TERMS

The relationship between terms and concepts is called designation: a concept is designated by a word or group of words. It may be useful to think of this relationship in terms of mapping: On one hand there is a set of concepts, and on the other hand a set of terms, with the designation relationship establishing the connection between the two sets.

As just noted there is not a one-to-one correspondence between concepts and terms: for example, the term “balance” corresponds to one concept in ordinary language and to another concept in the psychological literature. Another example is provided by the term “market.” In some instances market refers to a set of potential customers, whereas in another instance it may refer to a place where vendors congregate. For example:


\(^3\) Robert Dubin, Theory Building, p. 29.

\(^4\) Abraham Kaplan, The Conduct of Inquiry: Methodology for Behavioral Science, pp. 53-54.


\(^6\) Lewis W. Brandt and Wolfgang Metzger, “Reality: What Does It Mean?”

\(^7\) David Harvey, Explanation in Geography, p. 19.
Second, it is important to keep in mind that "rules of designation introduce symbols by convention."\textsuperscript{10} Rules of designation stipulate names in a very arbitrary way and definitely do not constitute analyses of the properties of the concepts. An example of rules of designation: Let $P[A(t)]$ represent the choice probability of product $A$ in time $t$,\textsuperscript{11} or let $A$ stand for new products. The statement or designation that $A$ represents new products is not a proposition and cannot be tested for truth. It is simply a "ground rule," established for convenience. In some few cases it may happen that a rule of designation may be missing. This means that either there is no term corresponding to a given concept or that there is no concept corresponding to a given term.

The first situation may be exemplified by the lack of French and Spanish terms corresponding to the concepts of "marketing" and "merchandising." One could think of three remedies to that situation: (1) the "importation" of the English terms; (2) the use of existing terms, which badly designate the defined concepts, such as "commercialisation" and "mercado,\" which are in fact the solution adopted by some French and Spanish purists (the term marketing was banned from the "Académie Française" dictionary); or (3) the creation of a new term, which is the usual procedure taken in any language when new objects or perceptions and their corresponding concepts are born. An example of an instance where a concept does not exist for a given term is provided by the many types of snow for which Eskimos have individual names or terms. However, for many individuals in more temperate (but snow) climates whose activities are less dominated by snow, the individual terms the Eskimos have for snow are not differentiable into separate concepts.

Barring those rather exceptional instances, the search for rules of designation is a problem frequently encountered during the process of growth in a science. Suppose, for example, that one wants to characterize antecedents of consumer behavior by adapting Ackoff's distinction between necessary and sufficient conditions of an event. Four possibilities exist in this regard (see Figure 2.2): The antecedent conditions may be necessary but not sufficient; sufficient but not necessary; neither sufficient nor necessary; or sufficient and necessary for the event to occur. Ackoff calls the first three possibilities response, reaction, and act.\textsuperscript{12} He does not designate a term for the fourth concept, for the necessary and sufficient conditions. As an exercise the reader is invited to develop a term for the underlying concept of his percept of the upper-left cell in Figure 2.2.

\textsuperscript{11} David B. Montgomery and Adrian B. Ryans, "Stochastic Models of Consumer Choice Behavior."
reflect (are isomorphic with) the nominal definitions, linking a concept to the empirical world is crucial to the development of science. The notion of nominal definitions can be used to develop two logical types of terms, namely primitive and derived (or defined) terms. We have assumed that the definiens in nominal definitions contains only terms that have been defined previously in the same way. Now we must acknowledge that this is not the case. To avoid the pain of infinite regress we must decide upon certain primitive terms that then can be used to define the derived terms, but that themselves remain undefined in the system under analysis.7 (They may be defined in another system.) For example, if we define homophily in an interpersonal selling situation as the degree to which salesmen and prospective clients show common traits and perceive themselves to be similar, we rely on the undefined or primitive terms contained in the definiens such as “traits” and “perceive.” Similarly, if we define empathy in a mass media advertising situation as the degree to which the audience identifies with the source of the message, we use the term “identifies” as a primitive term. In Kotler’s definition of the marketing concept as “a consumer orientation backed by integrated marketing aimed at generating customer satisfaction as the key to satisfying organizational goals,” the terms customer orientation, integrated marketing, and customer satisfaction are primitive terms.

Because of the theoretical isomorphism between terms and concepts, definitions, in addition to establishing equivalence of use among terms, are also said to establish equivalence of meaning among concepts. Anlogously to the logical types of terms, one can also speak about derived and primitive concepts.

CONCEPTS AND TERMS RELATED TO OBJECTS

Now having discussed the relationship between terms and concepts we are still left with two more links, namely between terms and objects, and between concepts and objects. We shall deal with the two at the same time and label the relationship as “reference.” (We say “a term” (concept) refers to an object.) The reference relationship can be thought of as composed of two arrows pointing in opposite directions (Fig. 2.3). One arrow originates with the objects and points to the terms and concepts; the other arrow leads from terms and concepts to objects. The latter arrow can be said to represent the process of abstraction, whereas the former represents the process of abstraction.

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14 For the definition of brand loyalty see David B. Montgomery “Consumer Characteristics Associated with Dealing: An Empirical Example.”
The process of abstraction can be described in the following way:

When we consider the common form of various things, or various events, and call it by a name that does not suggest any particular thing or event, or commit us to any mental picture... we are consciously, deliberately abstracting the form from all things which have it.  

The common form of things are those properties that constitute the intension of concepts. As an example of the process of abstraction, consider the concept of attitude. The term “attitude” abstracts at least three basic orientations toward objects: affect, cognition, and predisposition to act. Consequently, particular attitudes toward soap, cars, freedom, and pollution all involve the same orientations of the basic concept of attitude.

Phillips has suggested a ladder of abstraction for concepts for viewing the range of concepts from observation to theory. This ladder, presented in Figure 2.4, involves the concept of choice behavior. As one moves up the ladder the basic concept becomes more abstract, wider in scope, and less amenable to measurement although some form of measurement is still possible even at the highest level of abstraction. The ladder approach is useful, for it is important to define clearly what level of abstraction is involved in the formulation of a given concept. This is necessary for it helps determine measurement procedures and sensitizes the researcher to problems involved in relating different concepts that are at different levels of abstraction.

Table 2.1 is another form of illustration showing the range from general to specific psychographic concepts involving opinion leadership. Note that there are different alternative statements operationalizing the constructs at each of the three levels. There is a basic issue as to whether or not two different operationalizations can represent a single object or the exact same attributes of a given object. For example, Tucker and Painter and Boone studied the personality trait of sociability as it relates to consumer behavior.

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21 Fred D. Reynolds and William Darden, "Constructing Life Style and Psychographics."
23 L. E. Boone, "The Search for the Consumer Innovator."

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**Figure 2.4** A ladder of abstraction for concepts.

<table>
<thead>
<tr>
<th>The choice behavior of human beings</th>
<th>Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>The choice behavior of living human beings</td>
<td></td>
</tr>
<tr>
<td>The choice behavior of living Americans</td>
<td></td>
</tr>
<tr>
<td>The choice behavior of John Smith</td>
<td></td>
</tr>
<tr>
<td>The choices John Smith makes during a series of interviews, as well as under periodic observations, over a period of one year</td>
<td></td>
</tr>
<tr>
<td>John Smith’s answer to a question about his preferences among product brands</td>
<td></td>
</tr>
</tbody>
</table>


However, Tucker and Painter studied the concept by using the Gordon Personal Profile test and linked the test findings with the use of vitamins and acceptance of new fashions. Boone, on the other hand, used the California Psychological Inventory as his measure of sociability and linked this with the adoption of CATV. The question raised is whether Tucker and Painter and Boone actually studied the same concept? Are the concepts of sociability as measured by the GPP the same as that measured by the CPI?

Let us consider now the process of interpretation. Given that we have constituted a concept (attitude) and a corresponding term (the word "attitude"), we go back to the world of objects and events, examining each one in order to ascertain whether they embody the properties listed in the intension of the concept. If an object does possess these properties we say that it is an instance, or an interpretation of the concept. Thus if a product is one purchased frequently by its consumers with a minimum of effort in comparison and buying, we say it is an instance or example of the concept of a convenience good. Equivalently, we can say that the object is a member (element) of the class (set) X, where X designates the concept.

There are various kinds of interpretation procedures; the three most important will be discussed here. Ostensive interpretation of a concept is done by pointing out something to which it applies. It usually takes the form of an utterance such as "this is a so and so" accompanied by some gesture with "so and so" indicating the name of the object. As an example, one can...
### Table 2.1 Example Measures Illustrating the General-Specific Continuum of Psychographic Constructs

<table>
<thead>
<tr>
<th>General</th>
<th>Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Designated Opinion Leader</td>
<td>Self-Designated Fashion Opinion Leader</td>
</tr>
<tr>
<td>1. My friends or neighbors often come to me for advice.</td>
<td>1. Several of my friends asked my advice about whether the midi would become a fashion or not.</td>
</tr>
<tr>
<td>2. I sometimes influence what my friends buy.</td>
<td>2. I told my friends that the midi was a recurrent style from yesteryear and that it would be unflattering and make most women look older.</td>
</tr>
<tr>
<td>3. People come to me more often than I go to them for information about brands.</td>
<td>3. My friends come to me more often than I go to them for information about clothes.</td>
</tr>
<tr>
<td>4. I feel that I am generally regarded by my friends and neighbors as a good source of advice about clothing fashions.</td>
<td></td>
</tr>
<tr>
<td>5. I can think of at least two people whom I have told about some clothing fashion in the past six months.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Reynolds and Darden, "Constructing Life Style and Psychographics."

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only after a certain number of examples of the application of the term "innovation" to various objects would it become clear to any degree what particular combination of properties was meant. A variation of this type of interpretation is called quasi-extensive interpretation. It consists of enumerating objects that are proper interpretations of the concept. For example, consider the following interpretation of the concept of innovation:

Examples of innovations... would be electric typewriters, language laboratories, a new brand of soap, smoking pipes for women, charge accounts, stainless steel razor blades, saunas, baths, and Cinerama.26

Another example is the following:

(demographic characteristics) ... include the kinds of things one learns about people from published statistical sources such as the census. Among the most important of these are age, national origin, location, size of family, family status and religion.27

Still another type of interpretation procedure is operational interpretation. It establishes correspondences between concepts (terms) and controlled operations or their results. Operational interpretations not only ascertain the possession of properties by objects but also measure the degree to which they possess them. Particular operations of measurement produce ordered pairs, each having as one element a member of a class of physical properties and as the other a member of a class of mathematical entities, usually a number. Thus, we can distinguish two component parts of operational interpretation. The first one can be called observation (identifies the property to be measured) and the second consists of operations, which generate the values of this property.28 Consider as an example of an operational interpretation the following interpretation of the concept of attitude: "Attitude is... measured (either verbal or self-administered) on a set of bipolar scales reflecting salient purchase criteria. ..." 29 Different operational interpretations of attitude may be given, such as the type and intensity of pupillary response upon presentation of the social object,30 and the direction and amount of bias on an information test.31 It might be noted here that it is important not to confuse the operational definition of a concept with a dependent variable to be

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26 Keiter, Marketing Management, p. 506.
27 Alfred R. Ozselenldt, Executive Action in Marketing, p. 102.
30 John J. Woodman, "The Pupil Response as a Measure of Social Attitudes."
31 Louise H. Kidder and Donald T. Campbell, "The Indirect Testing of Social Attitudes."
explained by that concept. Cronkhite raises an interesting example of such confusion.

To ask whether "attitudes" predict "overt behavior" is to ask a rather strange question, because we have no measure of "attitudes" except "overt behavior." An attitude test response is certainly behavior, and is certainly overt as well, although it may not require quite as much energy as a lynching. On the other hand, to participate in a lynching can certainly be interpreted as a response to an attitude test, in that an observer is certainly likely to infer that the participants hold certain attitudes toward their victims and toward law enforcement. That is, "overt behavior" may be viewed as an attitude test response.\(^\text{a)}\)

**INTENSION, DENOTATION, CONNOTATION, EXTENSION**

To conclude our discussion of the reference relationship let us introduce a few notions that may prove useful. First is the already mentioned *intension* of a concept. The intension of a concept is the list of all the properties it possesses, such as reversibility, demonstrability, complexity, and so forth.\(^\text{a}^2\)

The *denotation* of a concept is the class of objects and events embodying the properties of a concept. Given the denotation, we may be interested in finding out all the properties that are common to the elements of the denotation. These properties, including those comprised by the concept's intension, constitute the *connotation* of the concept. Finally, we can extend the notion of denotation to all possible objects, past or future, known or unknown, that if they existed would belong to the concept's denotation. We shall call this set the *extension* of a concept.

**TYPES OF CONCEPTS**

**FORMAL AND NONFORMAL CONCEPTS**

Given the nature of concepts, what are the various types of concepts? The first distinction required is between *formal* and *nonformal* concepts. The basis of this distinction is the reference of these concepts. Formal concepts are defined within formal systems that are not intended to refer to any objects of the real world. Nonformal concepts, in contrast, always refer to some aspect of the real world.\(^\text{a}^4\) Formal and nonformal concepts, however, are intertwined in the study of real systems. In such contexts, formal concepts most often are related to the scientist's methodology and, in particular, to the treatment of data. As an example, consider again the concept of brand loyalty as defined by the proportion of a household's purchases of a product class devoted to the most frequently purchased brand. The nonformal concepts in this definition consist of "purchase," "household," "product class," and "brand." The formal concepts are "proportion" and "most frequently." Both of these formal concepts refer to the treatment of data—data that have been gathered through the interpretation of the nonformal concepts. Let us note one important difference between these two types of terms. The formal terms have *little vagueness* and a *high consistency of use*, whereas the nonformal terms are generally vague and their use is often inconsistent. If we presented the same set of data to a number of researchers with the instruction to compute the brand loyalty, as we have chosen to define it, there would be perfect correlation between the results, assuming no computational mistakes. Compare this with the results that we would obtain if we performed the same experiment not for the treatment of the data but for their gathering. What correlation among researchers would occur for the brands included in the product class? Howard and Sheth pose this problem in the form of a question: Should one place freeze-dried Maxim coffee in a product class containing only other freeze-dried brands, or should one include brands of all types of instant coffee, or even group all types of instant coffee together with regular coffee, to form a comprehensive product class?\(^\text{a}^8\) Different researchers might well follow different approaches with differing results and interpretations. If different researchers differ in what they perceive as similarities or common elements in otherwise varied phenomena then we are, for all practical purposes, dealing with different concepts. Some variation is of course inevitable, but care should be exercised when comparing research utilizing the same term. Do the researchers mean essentially the same thing? Exactly what are the elements viewed as being common to different phenomena?

The same problem exists in data collection. Do respondents interpret or decode the stimulus (the concept) in similar ways? Some definitions of innovation, for example, have stressed the importance of potential user's perception as a determinant of whether an idea or thing should be classified as an innovation. To the extent that there are different perceptions, and hence conceptualization, there are correspondingly different concepts. The product concept or "image" will vary. That newness is common to the different images held by a consumer group enables us to use the term "innovation" with reference to that group.

**DEGREE OF OBSERVABILITY OF NONFORMAL CONCEPTS**

The next distinction among concepts concerns only the nonformal concepts. These concepts can be ranked along a dimension of observability. The degree of observability of a term or concept can be defined as the extent to which its use is prompted by environmental events as compared to intraverbal contexts. Verbal utterances of consumers during an interview are part

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\(^{a}^2\) For a discussion of properties related to innovations see, Nan Lin and Gerald Zaltman, "Dimensions of Innovations."


\(^{a}^8\) Howard and Sheth, *The Theory of Buyer Behavior*, p. 293.
of the environment of the researcher and, thus, constitute data. Verbal utterances referring to these data, however, can be considered to occur within a scientific intraverbal context. For example "I do not like brand A" as uttered by an interviewee belongs to the researcher's environment. "The interviewee said, 'I do not like brand A.'" however, is a scientific statement, containing the two relatively observational concepts "interviewee" and "said."  

Now consider the statement "the interviewee dislikes product A," which contains the concepts "interviewee," "dislikes," and "product A," all non-formal concepts. Now imagine that we perform the kind of experiment that we performed with the concepts "proportion," "most frequently," and "product class." This time we want to compare the uses of "said" and of "dislikes." Few researchers will disagree over the use of the term "said" when they can observe mouth movements and hear sounds coming from the direction of the interviewee. Less agreement can be expected, on the other hand, for the use of the term "dislikes." One researcher may argue that the interviewee said that he disliked the brand but he really did not mean it since the tone of voice and nonverbal behavior suggested sarcasm. Another researcher might say that the interviewee really like the brand, contrary to what he said, because of past or recent purchases as evidenced by his having a whole carton of the item in his home. A third researcher might argue that the interviewee did not mean what he said because the interviewee was simply trying to please him. Thus the use of the term "dislikes" is subject to greater inconsistency than that of "said." It might be inferred that "said" is relatively more observational than "dislike." However, someone might argue that "dislikes" is really not less observational than "said," for it is easy to define "dislikes" contextually as "the interviewee dislikes brand A is the definitional equivalent of: "the interviewee said 'I do not like brand A.'" Consequently, because "said" and "interviewee" are observational, "dislikes" is also observational. For the definition of a nominal definition is in principle as observational as the terms in its definition. Note the caution expressed by "in principle." It is to be emphasized that the observability of a concept's constituents (that is, its intension) is necessary but not sufficient for the observability of the concept itself. The argument is essentially right. It is possible to define "dislikes" in such a way as to remove its ambiguity. The question is whether it is useful to do this. We shall return to this problem, which is an example of the normative aspect of metatheory, after a more detailed investigation of the implications of the varying degree of observability of scientific concepts.

**Observational Concepts**

First, what are the characteristics of observational concepts? Following Hempel, they can be defined as referring to certain directly observable characteristics of objects, i.e., properties or relations whose presence or absence in a given case can be intersubjectively ascertained, under suitable circumstances, by direct observation.

Let us look at the constituents of this definition.

Consider first the expression "characteristics of objects, i.e., properties or relations..." It is important to note that Hempel does not talk about the objects, but about their characteristics. Behind this is the rationale that researchers never deal with objects qua objects but rather with their characteristics. This distinction between objects and their characteristics is reflected in the logical types of concepts. In logic, one distinguishes proper (individual) concepts and generic (class) concepts. *Proper or individual concepts* refer to the characteristics of one object only and are applicable only to it. Names of individuals are examples of such concepts—for example, Gerald Zaltman, Christian Pinson, and Reinhard Angelmar. Clearly, while the goal of science is the construction of general statements, individual concepts also have an important place in scientific language. *Generic concepts* also refer to objects, but they are based on the possession of certain characteristics by these objects, characteristics that are in principle also applicable to other objects. Hence, whenever we utter a certain term in response to an object it is by virtue of its possessing a number of attributes—namely, the intension of the generic concept.

The next constituent in Hempel's definition is "directly observable," which he also rephrases as "...whose presence or absence can be... ascertained." Thus demonstrability as a product characteristic is directly observable from an inspection of the product. The term in this case is a descriptive one. Hempel's use of the term "directly" implies that concepts may also be "indirectly" observable. *Indirect observables* involve inferences, usually causal, "between what is directly observed and what the term signifies." For example, we don't actually see a consumer's attitude toward a salesman but infer it from particular verbal and nonverbal expressions by the consumer. Similarly, "satisfactory experience" with a product is a not a visible term but inferred from its repeated purchase. "Diffusion" is a construct measured directly over time and social-system space, but it is not observable nor can it be inferred in a given instant. The diffusion rate at a particular point can be calculated but not directly observed.

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27 For a very good discussion of this general topic, see W. S. Torgerson, *Theory and Methods of Scaling*.  

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The next element in the definition of an observable concept is "under suitable circumstances" or "in a given case." This implies that the observable character of a concept is not absolute but relative. There are two aspects to the relative observability of concepts. First, it may be "relative to the current development and to the sophistication of the observers." For example, perceptual processes have become more and more observational with the development of new experimental devices (such as the tachistoscope technique). Second, it may be relative to the context of application such that a term is observable in certain situations but not in others. The concept of cost effects on purchase behavior may be more readily observed among low-income consumers than among high-income consumers. Deal proneness, for instance, may be readily observable in a laboratory situation where many variables intervening between this deal proneness and overt response to a stimulus may be held constant. In the real world it may be very difficult to observe deal proneness. It might be added that certain elements of concepts are more readily observed than others. For example, the behavioral component of attitudes is more readily and reliably observed than are their affective and cognitive components. Similarly the concept of "information-gathering behavior" will be far easier to observe when product adoption is viewed as a risk-taking decision than when it does not. The element of risk causes consumers to be more deliberate in their actions and hence their behavior to be more readily monitored.

The final part of Hempel's definition is "intersubjectively." The purpose is to ensure that the same concept is being "observed" not only by one researcher but by most researchers in one discipline. We have illustrated this characteristic in our thought experiments involving "proportion" and "product class," and "said" and "dislikes." The problem here is that a concept will be said to be "observable" when "observed" by several observers, but there is no clear criterion as to the required number and/or quality of those observers.

CONCEPTS DEFINED IN TERMS OF OBSERVABLES

Thus far we have attempted to describe the characteristics of concepts that are relatively observational. It is necessary now to go one step further and look at the concepts that are not observational but that are introduced into scientific system or theories by way of nominal definitions involving directly observational concepts. We shall distinguish several varieties of such concepts.

One common type of nonobservational concept definition is in terms of the manipulations performed by an experimenter. This is a special case of what is frequently called operational definition, wherein the use of a term is specified by a set of operations. For instance, innovators have sometimes been defined as the first 3–10 percent of a population to adopt an innovation. Cosmopolitanism is operationally defined in various ways, including travel to communities larger than one's own place of residence, variety of media exposed to, membership in formal organizations, and so on.

One other type of concept is what is called an "intervening variable," which Labovitz and Hagedorn view as a factor occurring between and connecting the independent and dependent variables. The distinguishing characteristic of this type of concept is that it involves the treatment of data. Consequently, the definiens can usually be represented as a mathematical formula. (For the preceding types only a logical representation could be achieved.) Examples of this type of concept include brand loyalty and opinion leadership.

Finally, the last concept type is the so-called "disposition concepts." According to Hempel, disposition concepts refer to a tendency "to display specific reactions . . . under certain specifiable circumstances . . ." This can be interpreted in a more behaviorally oriented terminology as follows: "These [concepts] describe the disposition of an object or organism to display a certain characteristic or response, under certain given conditions of stimulation." An example is the concept of attitudes. We can define consumer A as having a favorable attitude toward brand X if and only if his score is "higher than . . ." Similarly, we could define "If consumer A is presented with brands X, Y, Z, then A prefers X if and only if A chooses X." The concept of innovativeness could be defined in a similar way: "If A and B are exposed to information about the innovation X at the same time, then A is innovative if and only if A adopts X earlier than B." Or X is an innovation if and only if it is perceived as new.

THEORETICAL CONCEPTS

Theoretical concepts (also referred to as hypothetical constructs) are those that derive meaning from their role in the theory in which they are embedded and the purposes of the theory. For example, the concept "consistency" derives one meaning when used in the phrase "consistent brand choice." 43

42 Thomas S. Robertson, Innovative Behavior and Communication.
43 K. MacCorquodale and P. E. Meehl, "On a Distinction between Hypothetical Constructs and Intervening Variables." See also Howard and Sesh, The Theory of Buyer Behavior, for a good treatment of the notion of intervening variables in a consumer behavior context.
44 Labovitz and Hagedorn, Introduction to Social Research, p. 106.
46 See, for example, M. Venkatesan, "Cognitive Consistency and Novelty Seeking."
Similarly, personality as a concept takes on different attributes depending upon context and hence the theory within which it is being used.48

Theoretical concepts "are not introduced by definitions or reduction chains based on observables; in fact, they are not introduced by any piecemeal process of assigning meaning to them individually. Rather, the constructs used in a theory are introduced jointly, as it were, by setting up a theoretical system formulated in terms of them and by giving this system an experiential interpretation, which in turn confers meaning on the theoretical construct."49 Let us look at the three main components of this definition in more detail.

The first characterization of hypothetical constructs is a negative one: They "are not introduced by definition or reduction chains based on observables." This characteristic distinguishes them from all of the previously discussed types of concepts. These other concepts could ultimately all be reduced to relatively observational concepts by replacing each concept by its definition.

Now that we know how theoretical concepts are not introduced, how do they actually enter our scientific system? Again following Hempel, they "are introduced jointly, as it were, by setting up a theoretical system formulated in terms of them." As an example of such a system, consider the fragmentary theory that is depicted in Figure 2.5. In such a system the meaning of each concept is not given by a definition of the nominal variety but by the relationships into which the concepts enter. It is "defined" by the relationship that it entertains with "choice criteria," "brand comprehension," and "intention." Thus, attitude is the result of an evaluation according to choice criteria which is performed on social objects that have been identified and described by brand comprehension.50 In the absence of any "inhibiting" variables, intention is identical to attitude.

Figure 2.5 Example of how theoretical concepts enter our scientific system.

\[ \text{Intention} \rightarrow \text{Attitude} \]
\[ \text{Choice criteria} \quad \text{Brand comprehension} \]

48 See for example William D. Wells and Arthur Beard, "Personality and Consumer Behavior."
49 Hempel, Aspects of Scientific Explanation, p. 32.
50 For more perspective on consumer choice criteria, see Steven H. Chaffee and Jack M. McLeod, "Consumer Decisions and Information Use."

The foregoing example should render more clear the assertion made previously concerning the degree of observability of a term. It was said that the "observability of a term (concept) can be defined as the extent to which its use is prompted by environmental events as compared to intraverbal contexts." The concept of attitude above has been given a primarily intraverbal definition.

This brings us to the third component of Hempel's definition, namely where he speaks of "giving this (theoretical) system an experiential interpretation, which in turn confers meaning on the theoretical concept." Because a system of concepts that are without linkage to observational concepts would have no value for explanation, prediction, and control. Such systems would have a purely formal character, just like pure mathematics, for example.

CONCEPT VALIDITY

In an article devoted to the problems in consumer behavior research, Kollat et al. pointed out that "future progress in consumer behavior research will depend on overcoming several problems with commonly used variables and constructs, including the need for standardised definitions and categories. . . ."51 Their request implies two evaluative judgments. First, a judgment has to be made as to the standard. Second, it is implied that the lack of standardisation is bad. Whenever such an evaluative judgment of concepts is required, the problem of concept validity is raised. This means that the question "How valid is this concept?" has to be answered. We shall present general answers to this question given by philosophers of science and behavioral scientists. Following this, an approach that considers the objectives of consumer behavior research is proposed.

SEVERAL APPROACHES TO CONCEPT VALIDITY

There are a variety of answers to the question, "What is a valid concept?" The first and most traditional approach considers that only observational concepts are valid. In its extreme form it requires the exhaustive reducibility of all concepts to observations.52 This school of thought has been called operationism. Hempel notes that the "central idea of operationism is that the meaning of every scientific term must be specifiable by indicating a definite testing operation that provides the criterion for its application."53 Concepts that are provided with such criteria are said to be operationally defined. Bridgman has added a further specification to this point of view by stipulating that different operations characterize different concepts and that these

52 See Ernest Nagel, The Structure of Science, pp. 119-121; and M. Hesse, "Laws and Theories."
53 C. G. Hempel, Philosophy of Natural Science, p. 8.
operations should be ideally designated by different terms.\textsuperscript{54} This version of operationism has also been called "definitional" operationism.\textsuperscript{55}

The basic motivation underlying operationism is to "emancipate science from any dependency on unverifiable 'metaphysical' commitments."\textsuperscript{56} The extreme operationalist view has been criticized on several counts. One counter-argument notes that "if explicit definitions of all theoretical terms by means of observables could be carried out, theories would be incapable of growth and therefore useless."\textsuperscript{57} Hempel argues that the definitional operationist maxim would lead to a proliferation of concepts "that would not only be practically unmanageable but theoretically endless, and this would defeat one of the principal purposes of science; namely, the attainment of a simple, systematically unified account of empirical phenomena."\textsuperscript{58} Campbell advances a theoretical and a practical argument against definitional operationism. The theoretical argument says that any specific measurement reflects not a single parameter of a scientific theory but is "a joint function of many scientific laws."\textsuperscript{59} The practical argument says that the doctrine does not take into account the ongoing effort to improve measurement devices: "While logical positivists were defining intelligence in terms of the Stanford-Binet, 1916 edition, Terman was already initiating revisions designed to make it a less biased and more accurate test of intelligence."\textsuperscript{60}

A less extreme form of operationism has been advanced by Carnap.\textsuperscript{61} He requires only partial reducibility of concepts to observations. If a concept is introduced into some scientific system one must be able to construct some proposition containing this new concept, which, together with one or several other propositions containing only already tested terms, entails observation statements whose truth can be directly tested. This approach avoids the disadvantages of the extreme operationist position while still guaranteeing the empirical significance of concepts.

A second, widely held approach defines concept validity as the degree to which an instrument can measure the concept under investigation. Three types of concept validity—namely content, criterion-related, and construct validity—are usually subsumed under this definition.\textsuperscript{62} Content validity refers to "the degree that the score or scale being used represents the concept about which generalizations are to be made."\textsuperscript{63} Criterion-related validity is concerned with how well the concept enables one to predict the value of some other concept which constitutes the criterion. Criterion validity consists of the two subtypes of predictive and concurrent validity. In predictive validity the criterion measure is separated in time from the predictor concept, whereas for concurrent validity both concepts are measured at the same time.

The studies by Axelrod\textsuperscript{64} and Assael and Day\textsuperscript{65} provide examples of predictive validity studies. Axelrod was interested in finding a "measure that not only reflects the immediate effect of a stimulus on a consumer but also predicts his subsequent purchase behavior."\textsuperscript{66} For this purpose Axelrod developed ten measures. The predictive validity of each measure was determined as the percentage of obtained market as compared to predicted market. Axelrod concluded that two of the measures, namely "First Brand Awareness" and the "Constant Sum" had the highest predictive validity as far as short-term trends in purchase behavior are concerned. For situations where one is also concerned with "providing diagnostic information—what beliefs are held by those who are going to switch to various brands, what do they like, want, etc.—the Constant Sum is superior."\textsuperscript{67} The study by Assael and Day was concerned with the nature and strength of the predictive relationship between attitudes, awareness, and usage to subsequent market share. The predictive validity of each independent variable was indicated by \( r^2 \) (the coefficient of multiple determination), which represents "the percentage variance in market share explained by the particular independent variable."\textsuperscript{68} The findings indicated that in general all of the independent variables were important factors in explaining the variance in market share. Their relative importance, however, varied by brand and product category. Consequently, Assael and Day concluded that "predictive models must be built by product and by brand in forecasting changes in aggregate market response."\textsuperscript{69}

Cohen's study on interpersonal orientation includes concurrent validation among other validation procedures.\textsuperscript{70} He developed a scale purporting to measure the interpersonal response traits of compliance, aggression, and detachment. Rosenberg\textsuperscript{71} had previously related the same traits to occupational preference. Based on Rosenberg's work Cohen developed a set of

\textsuperscript{54} Percy W. Bridgman, \textit{The Logic of Modern Physics}. \\
\textsuperscript{55} Donald T. Campbell, "Definitional versus Multiple Operationism." \\
\textsuperscript{56} Nagel, \textit{The Structure of Science}, p. 119. \\
\textsuperscript{57} Hesse, "Laws and Theories," pp. 406-407. \\
\textsuperscript{58} Hempel, \textit{Philosophy of Natural Science}, p. 94. \\
\textsuperscript{59} Campbell, "Definitional versus Multiple Operationism," p. 14. \\
\textsuperscript{60} Donald T. Campbell, "Prospective: Artifact and Control." \\
\textsuperscript{61} R. Carnap, "The Methodological Character of Theoretical Concepts." \\
\textsuperscript{63} G. W. Bohrnstedt, "Reliability and Validity Assessment in Attitude Measurement," p. 91. \\
\textsuperscript{64} Joel N. Axelrod, "Attitude Measures That Predict Purchase." \\
\textsuperscript{65} Henry Assael and George S. Day, "Attitude and Awareness as Predictors of Market Share." \\
\textsuperscript{66} Axelrod, "Attitude Measures That Predict Purchase," p. 3. \\
\textsuperscript{67} Axelrod, p. 4. \\
\textsuperscript{68} Assael and Day, "Attitude and Awareness as Predictors of Market Share," p. 7. \\
\textsuperscript{69} Assael and Day, p. 10. \\
\textsuperscript{70} Joel Cohen, "An Interpersonal Orientation to the Study of Consumer Behavior." \\
\textsuperscript{71} Morris Rosenberg, \textit{Occupations and Values}. 
different measures of the same response traits. Because of this prior empirical basis the latter measures could be considered to be somewhat validated—that is, actually to reflect the three traits of interest. Since Cohen's new scale purported to measure the same traits, he should have been able to predict from the new scale how subjects responded to the other scale. Thus Cohen correlated the responses to both scales, with the intercorrelations among the measures of compliance and detachment being significant at the 0.01 level, among the aggression measures at the 0.05 level.

**Construct validity** consists of convergent, discriminant, and nomological validity. Convergent validity is represented by the correlation between two attempts to measure the same concept through maximally different methods. Discriminant validity measures the extent to which a concept differs from other similar concepts.

Davis illustrated convergent and discriminant validation procedures for the concept of husband-wife influence in consumer purchase decisions. He used four different measures of purchase influence and administered each to both husbands and wives. Convergent validity was examined by looking at the size of the correlation between husbands' and wives' answers to the same questionnaires. Only two of the measures testified to convergent validity, which in this context means to ask whether "husbands and wives within the same family agree in their perception of relative influence." As far as discriminant validity is concerned, Davis investigated three relevant criteria: (1) The association between husbands' and wives' responses to the same questionnaires should be higher than the association between questionnaires as perceived by either spouse or between husbands' and wives' answers to different questionnaires. (2) The correlation between husbands' and wives' responses to the same questionnaires should be higher than the correlations between each spouse's responses to the different questionnaires. (3) The same pattern of interrelationship should be found between each spouse's response to different questionnaires, "that is, if the furniture and automobile purchase measures are the most highly correlated based upon husbands' responses, the same should be true in the wives' responses."

Among the four measures used, only two satisfied two of the three criteria of discriminant validity. Nomological validity, finally, validates an instrument by interpreting the obtained scores in terms of a theoretical concept and consequently generates predictions that, if confirmed, have a validating effect. Cohen's study on interpersonal orientations includes also nomological validation procedures.

As previously mentioned, Cohen developed a scale, responses to which

should reflect the interpersonal traits of compliance, aggression, and detachment. The underlying theory suggested that persons having any one of these traits should respond in a particular way to face-to-face influence. If the scale were a valid measure of the response traits, persons who scored as highly compliant should actually show compliant behavior in the experiment. Similarly, people scoring as highly aggressive on the scale should actually display aggressive behavior. The results of this particular validation of the scale confirmed the scale's validity for indicating the compliant and aggressive trait but failed to validate it for the detached trait.

Criterion-related validity, by its very nature, is concerned with explanation and prediction. Content and construct validity, by comparison, aim primarily at the description of some real referent although they may also entail prediction. A third approach considers concepts to be more valid the more they "establish relations among concepts and contribute thereby to systemicity (theoretical fertility)." We propose to call this type of concept validity, systemic validity. The emphasis is thus on the extent to which a concept enables the integration of previously unconnected concepts and/or the generation of a new conceptual system. A fourth approach, which we propose to refer to as semantic validity, requires that concepts have a uniform semantic usage. This serves the objectives of comparing, synthesizing, and accumulating findings, objectives which are characteristic of paradigmatic research. Finally, users of consumer behavior research, such as marketing managers and other change agents, judge the validity of a concept according to its manipulability and capacity to influence variables of interest. We propose to call this type of concept validity, control validity. Table 2.2 summarizes the various types of concept validity.

It can be seen that each of the foregoing approaches emphasizes a different dimension of the problem of concept validity. Each seems to judge a concept's validity in terms of some objective. The objectives to be considered here are description, explanation, prediction, and control, for consumer behavior research aims to "identify the basic properties of the consumer, to understand and explain, as well as perhaps to influence and predict, his behavior." Description is primarily concerned with the what and how of phenomena. A concept's validity for descriptive purposes is therefore determined by how well it describes real objects and events. Explanation is concerned with the why of phenomena. Following Hempel and Oppen-
Table 2.2 Types of Concept Validity

1. Observational validity
   The degree to which a concept is reducible to observations.

2. Content validity
   The degree to which an operationalization represents the concept about which generalizations are to be made.

3. Criterion-related validity
   The degree to which the concept under consideration enables one to predict the value of some other concept that constitutes the criterion.

3a. Predictive validity
   A subtype of criterion-related validity in which the criterion measured is separated in time from the predictor concept.

3b. Concurrent validity
   A subtype criterion-related validity in which the criterion and the predictor concepts are measured at the same time.

4. Construct validity
   The extent to which an operationalization measures the concept which it purports to measure.

4a. Convergent validity
   The degree to which two attempts to measure the same concept through maximally different methods are convergent. It is generally represented by the correlation between the two attempts.

4b. Discriminant validity
   The extent to which a concept differs from other concepts.

4c. Nomological validity
   The extent to which predictions based on the concept which an instrument purports to measure are confirmed.

5. Systemic validity
   The degree to which a concept enables the integration of previously unconnected concepts and/or the generation of a new conceptual system.

6. Semantic validity
   The degree to which a concept has a uniform semantic usage.

7. Control validity
   The degree to which a concept is manipulable and capable of influencing other variables of influence.

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   The extent to which predictions based on the concept which an instrument purports to measure are confirmed.

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   The degree to which a concept enables the integration of previously unconnected concepts and/or the generation of a new conceptual system.

6. Semantic validity
   The degree to which a concept has a uniform semantic usage.

7. Control validity
   The degree to which a concept is manipulable and capable of influencing other variables of influence.

Heim, explanation and prediction are considered to be a symmetrical. A concept's validity with respect to these objectives is determined by how well it explains and predicts other phenomena. Control, finally, is concerned with the manipulation of a variable so as to effect a change in some other variable.

As criteria for the descriptive validity of concepts, we propose the follow-


For the explanatory-predictive validity of concepts, it will be useful to distinguish two evaluative discussions, namely the accuracy and the range of the explanation-prediction. The dimension of accuracy refers to the extent of agreement between the predicted and the observed value for each dependent variable. The range refers to the number of dependent variables that can be explained-predicted with the help of the independent variable. For an observational concept, the accuracy is indicated by the criterion-related validity. Its overall explanatory-predictive validity then depends on the magnitude of the correlation with each criterion and the number of criteria explained-predicted, where the criterion is the dependent variable. In the case where the concept under investigation is a theoretical construct with multiple operationalizations, the concept's explanatory-predictive validity is a function of the validities of its operationalizations. An example of the distinction between the two types of concepts would be the explanatory-predictive validity of a particular instrument of attitude measurement and the concept of attitude itself.

Although interest usually focuses on the independent variable of explana-

84 See Rudner, Philosophy of Social Science, p. 42.
85 Donald T. Campbell and D. W. Fiske, "Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix."
86 Mandler and Kessen, The Language of Psychology, p. 46.
tions and predictions, a look at the dependent variable—that is, the criterion—is equally justified. Here, the question becomes: “How valid is a concept for being explained and predicted?” Since the criterion-related validity indicates the correlation between independent variable and criterion, it is no surprise that the reverse of this correlation can be used to measure the degree of success of a criterion as explanandum. A criterion for which explanations and predictions are difficult to obtain may be poorly conceptualized, may be too complex, or may be the result of too many independent variables. It is here that the boundary between explanation and prediction on one hand and description on the other hand becomes rather fuzzy. A good description may greatly facilitate the finding of an explanation and prediction. After all, explanation can be understood as: stating “what the explanandum really is and, hence, relating it to other systems which are then seen to be essentially similar to it.”

Finally, a concept’s control validity is indicated by its effectiveness and efficiency. Prior to the determination of the effectiveness and efficiency has to be the determination of whether a concept enables control in principle. If this question is to be answered positively, in our opinion the following requirements will have to be satisfied: (1) The relationship between the concept and the criterion has to be causal. (2) The concept must be directly or indirectly manipulable. Attitudes, by comparison, are not directly manipulable. In the indirect case a third requirement has to be added: (3) Another concept must exist that is manipulable and has a causal relationship to the original concept. For example, a marketing manager must be able to control one or several causal antecedents of attitudes, if attitude is to have control validity. For concepts passing these tests, one index of effectiveness of control is given by the criterion-related validity. The criterion of efficiency is the output-input ratio. Further specification depends on which factors are included in input and output in each particular case.

INTERRELATIONSHIPS OF THE CRITERIA OF CONCEPT VALIDITY

The following relationships between the descriptive criteria and the criteria for explanatory-predictive validity can be noted. It has been demonstrated that reliability imposes an upper limit on criterion-related validity, because the correlation of some concept with the criterion can never exceed the square root of the reliability of the concept. In other words, it is necessary to have descriptively valid concepts before attempting to obtain valid relationships between them. As far as content and discriminant valid-

SUMMARY

Concepts have been identified as the fundamental units marketers use in their everyday marketing activities; concepts are the building blocks of the propositions and theories that marketers use in explaining, predicting, and controlling marketplace phenomena. It is essential that a basic understanding of concepts be achieved. This chapter has attempted to provide such an understanding by first distinguishing among concepts, terms, and objects. Further distinctions were made between formal and nonformal concepts and between theoretical and observational concepts. Finally, various types of concept validity of relevance to the study of consumer behavior were examined.

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88 Consider the discussion of the difficulties in defining innovators, in Robertson, Innovative Behavior and Communication, pp. 87–88.
92 See Campbell and Fiske, “Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix,” p. 100.
94 See Donald T. Campbell, “Recommendations for APA Test Standards Regarding Construct, Trait, or Discriminant Validity,” p. 547.
95 Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-experimental Designs for Research.
ter discusses the relationships between sentences, propositions, and facts. After this, the syntactical, semantical, and epistemological dimensions of propositions are investigated. The degree and number of predicates in a proposition are the syntactical dimensions of interest to us. As for the semantical and epistemological dimensions, we shall discuss the precision of propositions and their observational status. Of particular importance is the distinction between empirical propositions, generalizations, and nonobservational propositions. The first two types of propositions are observational, but the latter type is not. Therefore, correspondence rules, another type of propositions, are needed to connect nonobservational propositions to data. Next, the types of relationships that are obtained between the variables in a proposition are discussed.

The final part of this chapter looks at the problems of testability, confirmability, and degree of corroboration of propositions. The concepts of a hypothesis and of laws are defined in this context.

### Sentences and Propositions

Sentences establish relations among terms: for example “‘retail store image’ is the total conceptualized or expected reinforcement that a person associates with shopping at a particular shop” can be seen as merely a sequence of 20 terms—that is, of 20 signs. The form of the foregoing linguistic expression may be expressed as being a particular combination of signs. Not any sign combination is permissible: “permissible sign combinations are ruled by formation rules (or grammatical rules in an ample sense of ‘grammar’); their meanings by designations rules.” A rule of designation is the rule by which a term is arbitrarily introduced. In short, a designation rule stipulates correspondence between a term and a concept.

It follows that a sentence designates a proposition and a proposition cannot be expressed except through a sentence—that is, a specific combination of basic linguistic symbols (terms). In other words, a proposition is the meaning of a sentence.

It should be noted that the same proposition can be expressed by different sentences. For example, the sentences “buyer behavior is rational” and “buyers behave in a rational way” are viewed as expressing the same proposition. Another example of two sentences corresponding to a simple proposition

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1 John H. Kunkel and Leonard L. Berry, “A Behavioral Conception of Retail Image.”
2 Mario Bunge, Scientific Research, Vol. 1, p. 49.
3 This view is not uncontested. Among those who oppose it are Gilbert Ryle, “Meaning and Necessity,” Philosophy; Bertrand Russell, An Inquiry into Meaning and Truth; Stuart Hampshire, “Ideas, Propositions and Signs.” Among those who are in favor of this view are Gottlob Frege, “The Thought”; William Kneale and Martha Kneale, The Development of Logic; Alonso Church, Introduction to Mathematical Logic, Vol. 1; Rudolf Carnap, Meaning and Necessity.
is "Product A is more satisfying than product B" and "Product B is less satisfying than product A." On the other hand, the same sentence used in different contexts may give birth to different propositions. For example, the statement "information seeking is high under conditions of uncertainty" is a relevant proposition in both consumer and industrial settings. However, the functioning or operation of the sentence as a proposition differs in the two contexts. Sources and types of information sought, as well as what constitutes uncertainty, may differ. Moreover, elements of the same sentence may receive differential emphasis in different contexts. Uncertainty in the previous proposition may be manifest in different ways in the category of durable goods than in the category of convenience goods.

There is a second type of relationship between sentence and proposition in addition to that of designation, namely the relationship of reference. The relation of reference establishes links between the linguistic expression (sentence) and the conceptual level (proposition) on one hand and the physical level on the other hand. We say that sentences and propositions refer to facts when they have physical referents. For example, "The young blacks who expressed a more positive attitude than other respondents were not heads of households or spouses" refers to a fact.4

The "reference relationship" can be handled in two ways. First, we may start with some fact and move to the corresponding propositions. Second, we may begin with a proposition and try to find a corresponding fact. To begin with the first case, we assume that we have already a certain number of isolated concepts at our disposition. With these concepts in mind we gather facts; that is, we interpret our concepts and record the results. As an example take the concepts "life style" and "users and nonusers of commercial bank charge cards." To say that we interpret these concepts means that we define them operationally such that we can determine unambiguously in each case whether a person is a user of commercial bank charge cards and what his life style is. For example, Plummer used a 300 Activity, Interest, and Opinion statements measure of life style;5 the concept of bank charge card usage was operationalized by the following question: "Thinking of all members of your family, how many times in the average month do all members of your family use a bank charge card?"6 Then to each of the states of nature that we so encounter, there will correspond a proposition of the form "User A has life style X" "Nonuser B has life style Y" and so forth. Finally Plummer concluded that "the life style portrait of the users indicates an active, upper socioeconomic, urban-suburban life style with many interests outside the home."7 Another example is Wiseman's propositions concerning how buyers of "new season" automobiles differ from buyers of "new leftover" automobiles during the period when both models are available for sale.8 As another example, take the concepts "consumer," "innovator," and "brand loyalty." To say that we interpret these concepts means that we define them operationally such that we can determine unambiguously in each case whether a person is an innovator and to what degree he is brand loyal. To each of the states of nature that we so encounter, there will correspond a proposition of the form "Consumer A is brand loyal and not an innovator," or "Consumer B is brand loyal and is not an innovator," and so forth.

If we look at the reverse process, we start not only with a set of concepts but also with a proposition relating them, such as "Innovators are not brand loyal (in the context in which they innovate)." For example, Corey decided "first, to take the standard definition of opinion leaders, translate it into specific hypotheses about consumer topics, and then test those hypotheses with data from three market studies."9 The standard definition referred to was taken from Berelson and Steiner10 and the hypotheses were the following ones:

H₁: consumer opinion leaders will be significantly more involved in activities related to their topic than nonleaders.
H₂: consumer opinion leaders will be significantly more informed about new developments in their topic than nonleaders.
H₃: the extent to which consumer opinion leaders read in the media related to their topic will be significantly greater than among nonleaders.
H₄: consumer opinion leaders will have the same demographic characteristics as nonleaders, except for their higher socioeconomic status. However, to one extent or another, consumer opinion leaders will be found in all demographic groups.¹¹

Then, we follow a procedure similar to the one described above; that is, we examine the states of nature that we encounter and form the propositions that correspond to them. A comparison of these propositions with our original propositions is then made to determine whether the original propositions

6 Plummer, p. 36.
7 Plummer, p. 41.
8 Frederick Wiseman, "A Segmentation Analysis on Automobile Buyers During the New Model Year Transition Period."
11 Corey, "People Who Claim to be Opinion Leaders, p. 49.
refer to an actual state of nature or not. This then is the crucial difference between the two procedures: If we construct our propositions starting with facts, then the propositions are automatically “factually true.” If, however, we start with some proposition, we cannot be sure a priori whether it actually refers to some existing state of nature or not. Note that the appearance of the sentence does not tell us this difference. Thus, the sentence “consumer opinion leaders are significantly more involved in activities related to their topic than nonleaders” can be arrived at either deductively or inductively. First, it may be the conclusion of a number of premises that belong to some theoretical system. This is the deductive derivation of the sentence. Alternatively, the sentence may be inductively derived not from a theory but as a result of an observation of facts.

It will be useful now to examine the various types of propositions. There are several dimensions of propositions that may be used for the construction of types; propositions can be compared in terms of their syntactical, semantical, and epistemological characteristics. Let us consider first the syntactical dimension.

SYNTACTICAL DIMENSIONS OF PROPOSITIONS

Propositions may first be compared with respect to the number and degree of the predicates they contain. A predicate is a syntactic unit expressing the action performed by or on the state attributed to the subject of the sentence. For example, the proposition “this is a gatekeeper” contains one predicate whereas the proposition “some consumers are both opinion leaders and innovators” contains two predicates, namely “opinion leader” and “innovator.” We recall that a predicate is a syntactic unit expressing the action performed by or on the state attributed to the subject of the sentence. Thus, in the preceding proposition “some consumers” is the subject.

Secondly, one can consider the degree of the predicates contained in the proposition—that is, whether they are one-place or two-or-more-place predicates. A one-place predicate is a predicate that designates properties, not relations. For example, the predicate “is a consumer” is a one-place predicate, whereas the predicates “an opinion leader of” and “innovator” are two-place predicates. They imply a relationship with other individuals. Two-place predicates are also sometimes labeled “relational concept.” Note, however, that “the degree of predicates . . . is contextual rather than absolute; it depends on the state of the body of knowledge in which they occur and on the analytic fineness that is required or possible.”

A second formal syntactical dimension of a proposition is its degree of generality. All propositions purport to refer to a particular segment of the world, their universe of discourse. The notion of “universe of discourse” is related to the notion of “denotation” and “extension” discussed in Chapter 2. The reader will recall that the denotation of a concept refers to the class of actual objects that possess the properties included in the intension of a concept. The extension of a concept, on the other hand, refers to the class of possible or potential objects, “past or future, known or unknown, which if they existed would belong to the concept’s denotation.” Thus, the denotation is a subset of the extension of a concept. The size of the extension (or denotation, respectively) of all the concepts contained in a proposition, then, determines the generality of the proposition, since the universe of discourse of the proposition is the set of entities referred to by the whole proposition. Usually, one distinguishes two aspects of the extension of a concept: (1) the openness with respect to time-space (spatiotemporal universality); and (2) the openness with respect to the kind of objects (referential universality). For example, the proposition “with few exceptions, it is reasonable to conclude that social class is basically inferior to income as a correlate of buying behavior for the consumer packaged goods covered in this study” is remarkably well specified with respect to the above two types of universality. The spatiotemporal generality is rarely given explicit attention. Rather, it is an assumption that underlies most scientific activity. As such it can be formulated as a metasentence of the form “most propositions are independent of location in space-time,” or “most propositions are neither dated or placed.”

The degree of referential generality of propositions is indicated by the quantifiers that are prefixed to the object variables (that is, the concepts) of propositions. Table 3.1 lists the most common quantifiers and shows the types of propositions that result when one uses these quantifiers as a criterion of classification.

Let us consider now the possible propositions that can be formed when we consider the above quantifiers and a single predicate $P( )$, where $P( )$, for example, might mean “is innovative.” The kinds of propositions that result are shown in Figure 3.1 ranging from the lower level to the higher level of generality.

Some illustrations of the types of propositions shown in Figure 3.1 will be helpful. To begin with the singular proposition type, consider “consumer A is innovative.” The next type of proposition, the existential proposition, is exemplified by the statement, “there is exactly one innovative consumer.” Here there is also only one individual to which the proposition refers; the difference with regard to the preceding proposition, however, is that this proposition contains only generic (class) concepts, whereas the previous proposition

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12 Rudolph Carnap, *Introduction to Symbolic Logic and Its Applications.*
14 See Chapter 2 of this text.
### Table 3.1 List of Quantifiers

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<th>Name</th>
<th>Symbol</th>
<th>Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indefinite existential quantifier</td>
<td>( \exists x )</td>
<td>There is at least one x such that . . . Example: There is at least one innovator in any changing society</td>
</tr>
<tr>
<td>Definite existential quantifiers</td>
<td>( \exists x )</td>
<td>There are exactly n x such that . . . Example: There is exactly 10% of any population who are innovators.</td>
</tr>
<tr>
<td>Bounded existential quantifier</td>
<td>( \exists x ) \in U</td>
<td>There are x in U such that . . . Example: There are innovators in peasant societies who have well-developed abilities to identify with change agents.</td>
</tr>
<tr>
<td>Bounded universal quantifier</td>
<td>(x) \in U</td>
<td>Every x in U is such that . . . Example: Every innovator in a peasant community is a high risk taker.</td>
</tr>
<tr>
<td>Unbound universal quantifier</td>
<td>(x)</td>
<td>Every x is such that . . . Example: Every innovator has a perceptual process that differs from noninnovators.</td>
</tr>
</tbody>
</table>

*Note: U designates the universe of discourse, \( \exists \) reads "there is," and x is the variable under consideration. Source: Adapted from Mario Bunge, Scientific Research, Vol. 1, p. 51. Berlin: Springer-Verlag, 1967. Reprinted with permission of Springer-Verlag, New York.

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The nature of propositions is contained in the individual concept "A." An example of the next larger degree of generality is "there is at least one innovative consumer." Next, there is a statement like "there are exactly n innovative consumers; n greater than 1." Finally, we have bounded and unbounded universal propositions. The former are of the form: "All consumers in our sample are innovative" while the latter are as follows: "All consumers are innovative."

Another dimension of interest here is precision. A proposition, as stated earlier, relates attributes of concepts (that is, predicates, or properties of objects). The quantifiers refer to the size of the denotation of the concepts. The concepts appearing in a proposition may thus be either specified or left unspecified. For example, in the statement "the greater the psychological rigidity, the greater the likelihood of avoiding dissonant information," the attribute "rigidity" is not ascribed to either all consumers or some subset. Therefore, in order to render the proposition specific, we have to specify the population to whom the proposition involving "rigidity" applies.

Not only must the relevant domain of concepts be specified in a propositional function but so must the attributes of the concept. For example, we often find assertions to the effect that "the characteristics of salesmen affect adoption decisions by potential customers." Here, we may wonder exactly what characteristics of the salesman are referred to in the proposition: These may be his empathetic ability, his ethnic background, and so on. Another example is the proposition, "a shopping center's trading area is limited by the factor of drive time and . . . the most significant driving-time dimension for trade-area analysis is 15 minutes." Such a proposition would be imprecise if the concept "most significant" were not further defined. For example, Brunner and Mason called the 15-minute driving point "the most significant driving dimension for trade-area analysis" because "three fourths of each center's shoppers resided within this range." Hence, we can see that there are two elements of uncertainty in a proposition: the universe of discourse and the attributes. If either of these two components is left unspecified we say that we have a propositional function rather than a precise proposition.

**SEMTANTICAL DIMENSION OF PROPOSITIONS**

The semantical dimension that can be used to classify propositions is the observational character of the constituents of the proposition. It should be noted that we refer to the observational status of the attributes contained in propositions and not to the object variables to which they are attributed. This implies that one and the same proposition may contain only observational constituents or only theoretical ones, depending on the variables (the universe of discourse) to which the proposition refers. For example, consider the proposition "imbalance creates forces that attempt to redress balance." In one case, the concepts of imbalance and balance may refer to some physical system, such as a scale that is held up on one side. Here, the statement refers to an observable state of nature. Consider, however, the same attributes as...

---

referring to the cognitive system of some individual. In this context, the proposition is clearly nonobservational. Therefore, as was the case with concepts, the criterion of observability has to be applied contextually. With this constraint in mind, we can now distinguish three types of propositions. First, there are those propositions containing only observational concepts. Second, certain propositions may contain both observational and nonobservational concepts. Finally, there are propositions containing only nonobservational concepts. Each of these three types of propositions will be discussed now beginning with the most observational.

**Observational Propositions**

Observational propositions contain only relatively observational concepts and grammatical or logical connectives (that is, formal concepts). Consider the following proposition, "out-shopping [is] less frequent among lower-income families, and families with younger children or a large number of children." Here in order for the proposition to be observational, the concepts "out-shopping," "lower-income families," and so forth must be operationally defined. For example, "out-shoppers" were defined as "those who had shopped outside a five-mile radius of the downtown area one or more times during the previous year;" "lower-income families" was operationalized by introducing four income categories (under $5000; $5000 to $9999; $10,000 to $14,999; $15,000 and over); the concept of families with younger children was operationalized by using two age categories: families with "youngest child 0–12" and "youngest child 13–24." Within the observational type of proposition, two important subtypes can be distinguished, namely, empirical propositions and empirical generalizations.

**Empirical Propositions**

are derived from "facts" or "data" and their linguistic expression is called a "protocol sentence." As such, they must satisfy two conditions. First, it must be possible to reach a decision as to their truth or falsity in a finite number of observations. Second, they must be intersubjectively corroborated, which means that the empirical truth or falsity of the proposition must be agreed upon by different observers.

The first requirement amounts to stipulating that the universe of disc...
Thus if we find empirically $A'$ to be the case then we infer $A$ is the case and hence condition $B$ is also the case which can be corroborated by test $B'$.

Let us look more closely at the way correspondence rules are derived. First, it may be that the correspondence rules are deduced from a set of theoretically relatively independent statements. For example we could deduce the relationship of an "attitude" to an attitude measurement instrument as follows:

Statement 1: The direction and strength of attitudes induces a systematic bias concerning beliefs about a social object

Statement 2: The beliefs about social objects can be measured by an information test

Statement 3: The direction and strength of attitudes can be measured by the bias in an information test

In this kind of test we do not measure the concept directly but rather its effect. The inference from the measure to the construct can be done only after a transformation of the data has taken place that takes into account the various concepts determining the variance in the data. The truth of the auxiliary hypothesis, in this case, is a function of the truth of the theory from which it has been deduced, and it has to be tested within this context.

Another possibility is to use a direct measure. This is the alternative most often chosen by researchers. Howard and Sheth, for example, chose this option by linking certain of their hypothetical constructs or operational measures. Farley and Ring, in their testing of the Howard and Sheth theory, have given operational definitions to the remaining hypothetical constructs. It must be said that this kind of correspondence rule tends to confer on the correspondence rules the character of more or less independent empirical assumptions—that is, independent from the theory they are testing. The problem with such a procedure is that one could always deal with apparent refutations at the observation level by arbitrarily modifying the correspondence rules. Consequently, a refutation of the theory is made very difficult. Farley and Ring provide an example of the tendency, albeit justified in their case, to question the correspondence rules rather than the theory when they suggest that "the model was useful for organizing this analysis of consumer behavior, but the test put extreme pressures on the data."

26 Carl G. Hempel, Philosophy of Natural Science; see also Herbert L. Costner, "Theory, Deduction, and Rules of Correspondence."
27 Hempel, p. 72.
29 David Harvey, Explanation in Geography, p. 88.
30 Wells and Tigert, "Activities, Interests, and Opinions."
31 Hempel, Philosophy of Natural Science, p. 23.
34 Hesse, "Is There an Independent Observation Language?" p. 68.
siderably improved data collection techniques and procedures will be needed before the full empirical potential of such models will be realized."

A third view of correspondence rules regards such propositions as neither deducible theorems nor more or less independent empirical assumptions. Rather, the correspondence rule is the result of an "inductive or analogical inference from other accepted empirical correlations." This, in this view, the relationship of the theoretical concept to the observational base is dependent on a model. Accordingly, the use of attitude questionnaires as a measure of attitudes can be justified by noting that linguistic structures are analogous to mental structures. Figure 3.2 gives an overview of the various types of propositions discussed.

Figure 3.2 Kinds of propositions.

```
Propositions
   /
  /  
Observational propositions  Nonobservational propositions  "Mixed" propositions
   /  /
Observational propositions  Empirical generalizations  Correspondence rules  Others
```

TYPES OF RELATIONSHIPS

Propositions involve statements of relationship between concepts. Either explicitly or implicitly we find statements describing interactions between or among the concepts contained in the proposition. The relationships may be stated with more or less specificity. Specificity may be relevant in several ways. First, there is specificity in terms of how explicit the mechanism assumed in the proposition is. This involves different levels of understanding in explanation (see Chapter 6). Second, there is specificity in terms of identifying other conditions affecting the propositional relationship. What exogenous or intervening variables can we specify as being relevant to the proposition? Among the most specific relationships are quantitative directional relationships assuming cause and effect. As the strength of some measured attribute of one concept changes so is there a change in the strength of a causally associated attribute of another concept. For example, consider the following hypoth-

"A consumer will distort (shift) his affective reaction to a specific product characteristic in the negative direction when that characteristic is linked to an unfamiliar (highly ambiguous) brand name." Here degree of ambiguity is causally linked to changes in negative affect strength. Abell would point out that the connectives relating two concepts or variables (a variable being a measured concept) may be observational or theoretical. Such connectives as "increase with" or "if A then B" are observational, and connectives such as "cause" or "function to" are theoretical in nature. In practical circumstances "cause" may be manifest by "increases with." The causality issue has been aptly described as an "extensive philosophical thicket."

Nevertheless it is important that the notion be raised and, following Abell, we shall present a few basic requirements for propositions where internal structures approximate the form "A causes B." First, cause is a theoretical concept. It is inferred from observations made which are consistent with some causal account. Thus causation is not observed but inferred. Second, A and B must be defined or operationalized independently such that the indicators involved for each are mutually exclusive. A third but highly debatable point is that A must be temporally prior to B. This ignores, however, the fact that the anticipation of an event may bring about its own causes, which is not the same as reciprocal causation. Fourth, causal links cannot necessarily be inferred, even with perfect correlation between A and B. Fifth, a known causal link between two concepts does not always imply correlation between them. Sometimes, other variables may interact with the independent variable of interest so as to cancel its effect on the dependent variable. For example, Jacoby et al. have concluded that "brand image (as mediated by brand name) does affect perception of quality, especially for brands with strong positive images." Presumably, the proposition concerning brand image and quality perception is relevant primarily under conditions of strong positive images and not relevant, or at least less relevant, under other circumstances.

Sheth and Talarzyk have also noted an unexpected finding in a recent study in which the impact of perceived instrumentality of a brand of products (beliefs about a product's ability to satisfy needs or attitudes toward that brand) are muted or dampened by value importance (the importance

37 Hesse, "Is There An Independent Observation Language?" pp. 67 ff.
of motives related to the consumption and use of the brand). Sixth, a distinction should always be made between a logical statement of the conditions supporting a causal notion and the actual causal link or mechanism itself. Seventh, under conditions supporting a causal image or notion, there are three possible logical interpretations of the causal link: A is a necessary and sufficient condition for B; condition A is necessary but not sufficient for B and A is sufficient but not necessary for event B. Here we consider necessary and sufficient conditions both for the dependent variable and for support conditions. First, “A necessary condition is a state of affairs that would justify the prediction of the nonoccurrence of an event.” If a necessary condition were not present there would be no event. Thus we would want to ask whether the particular attribute of the variable concept viewed as the causal factor is a necessary condition. Furthermore, we would want to ask whether there are other variables whose absence or presence constitute necessary conditions for the so-called causal factor to have its impact. For example, store images may have an impact on perceived product quality only in interaction with price. Thus a relatively high price may be necessary before store image can have an impact on perceived product quality. Are these variables taken into account by the proposition? Second, we must consider sufficient conditions, which are states of affairs justifying the prediction of an event: “... if A is a sufficient condition then given that we have observed A we would automatically expect to observe B.”

The element of monotonicity is another important characteristic of the relationships between variables contained in propositions. We must always ask whether the relationship is monotonic or nonmonotonic at least in the relevant range of operation. It is particularly necessary to ask about monotonicity when “U-shaped” relationships are possible. The relationship between fear and likelihood of behavioral response has long been considered to be U-shaped.

Nonmonotonicity is an especially important factor to consider, since it suggests the existence of different explanations for different observed relationships between any two variables. An excellent detailed discussion of this can be found in Howard and Sheth, and only the basic idea is presented here. Consider a proposed relationship between arousal and stimulus ambiguity such as shown in Figure 3.3. Notice that if data gathering and measurement were restricted to the $X_0-X_1$ range, or, importantly, if the observations were made when $X_2-X_3$ was the relevant range, we would have a proposition to the effect that the greater the stimulus ambiguity (for example, the ambiguity of the advertising), the lower the level of consumer arousal. On the other hand, if data were collected from the $X_4-X_1$ range (or again, alternatively, when that range was the relevant market condition or was the range of stimulation used in the laboratory experiment), we would have a proposition saying that the greater the ambiguity of the advertisement the greater the level of consumer arousal. Conversely, as consumers learn more about a brand they have a lowered level of arousal with regard to it.

Figure 3.3 Relationship between arousal and stimulus ambiguity.

![Figure 3.3](image)


(Arousal is used here in the information-seeking sense rather than in an affective sense.) In both instances the propositions would be correct interpretations but neither would fully disclose the true nature of the relationships between the two concepts of concern. It is also particularly important to note that although the propositions based on data from $X_0-X_1$ and $X_1-X_2$ are the same sententially or verbally, rather different conditions may be inherent in two propositions. Moreover, as the consumer moves to the right on the segment of the curve between $X_1$ and $X_2$, stimulus ambiguity increases and hence arousal increases, and as ambiguity decreases arousal decreases; hence in a measurement sense these two propositions are identical. This is very misleading, however; clearly the cognitive state of the consumer is very different in the two situations. In the one case he presumably tries to structure a stimulus and in the other he has presumably already adequately structured the vague stimulus. Although these are not the points that Howard and Sheth are explicitly concerned with, the reader is urged to consult their work for explanations of consumer behavior that underlie the different slopes in Figure 3.3 and the observations made above concerning this figure.

In some instances nonmonotonicity is due to qualitative changes that occur as changes in strength take place. Rather different attributes of a con-
cept may function at different levels of strength. For instance, as the perceived threat posed by an instance of social change increases in salience to an individual, different psychological mechanisms (attributes) of resistance (the concept) are called into play. It is not only a matter of the greater the perceived threat the greater the resistance but also a matter of a different kind of resistance.

The notion of threshold is also relevant to the problem of monotonicity: Does any degree of change in the causal variable produce a change in the dependent variable or does a critical threshold of change in the causal variable have to be reached before a measurable change in the dependent variable can be brought about? If so, does the statement of the proposition acknowledge this? A proposition that does acknowledge this has been suggested by Rogers and Shoemaker.50 They propose that as the level of knowledge and adoption in a social system increases there is a cumulatively increasing pressure on the nonadopter to adopt. They refer to this as the “diffusion effect” and tie it directly to thresholds: “. . . as the rate of awareness-knowledge of the innovation increased up to about 20–30 percent, there was almost no adoption. Then once this threshold was passed, each additional percentage of awareness-knowledge in the system was associated with several percentage increases in the rate of adoption.”51

THE SEARCH FOR TRUTH: FROM HYPOTHESES TO LAWS

In this section propositions will be considered in a more dynamic perspective: we will examine the conditions that a candidate proposition has to meet in order to qualify as a scientific hypothesis and the way hypotheses upgrade to laws. Following Bunge, a hypothesis will be defined as a specific type of proposition that (1) refers to facts that are unexperienced or perhaps in principle unexperientiable (for example, nonobservable events whose effects, however, are observable) and (2) is corrigible in view of fresh knowledge.52 It follows that any hypothesis goes beyond the data it purports to account for and has a greater context than the empirical propositions it covers. A scientific hypothesis has the following additional characteristics.53

1. The hypothesis must be well formed; that is, it must be correct. It is remembered that permissible sign combinations are ruled by formation rules.
2. The hypothesis must be meaningful; that is, it must have a semantical content in some scientific context. It is remembered here that permissible sign combinations are also rules by designation rules.
3. The hypothesis must be empirically testable.

4. Finally, the hypothesis must be grounded or compatible with previous knowledge.

Conditions 1 and 2 have been already touched upon in other chapters or sections and consequently will not be further elaborated upon here. Condition 4 will be considered as a weak requirement (that is, rather as a conservative warrant that the hypothesis is worth formulating). Scientific research presupposes some already existing scientific knowledge but should by no means be limited to it.54 Consequently, the focus here—will be primarily on condition 3, namely the problem of testability. This, of course, is linked to the semantical status of the candidate proposition.

TESTABLE-IN-PRINCIPLE PROPOSITIONS

The first distinction to be drawn is between analytic and synthetic propositions. Analytic propositions are propositions that can only be logically true or false.55 They cannot be factually true or false. All propositions of formal science (except for the axioms) are analytic propositions. Synthetic propositions, on the other hand, can be factually true or false. In factual science, both types of propositions occur. Operational definitions, and, in general, all nominal definitions, are instances of analytic propositions. Thus, the statement “brand loyalty is the proportion of a household’s product purchase devoted to the most frequently purchased brand” cannot be pronounced true or false. Rather, as we saw in the preceding chapter, it may be more or less useful, depending on the predictive power of brand loyalty so defined, and depending further on the concept’s reliability. Compare this with the following synthetic proposition: “word-of-mouth influences subsequent intention to purchase.”56 It is obvious that this statement is subject to empirical validation; that is, it may be factually true or false. Consequently, the problem of testability applies only to synthetic propositions.

Among synthetic propositions one has to sort out those that can be subjected to an empirical test and those that cannot. The latter will be said to have no “empirical significance.”57

Empirical generalizations pose no problem in this respect, for the observational concepts guarantee “testability in principle.” Testability in principle means that “it must be possible to derive from $T$ (a hypothesis or set of hypotheses) . . . certain test implications of the form; if test conditions $C$ are realized, then outcome $B$ will occur. But the test conditions need not be

50 Rogers and Shoemaker, Communication of Innovations.
51 Rogras and Shoemaker, p. 163.
53 Bunge, p. 229.
54 On this point and the concept of a scientific paradigm, see Thomas S. Kuhn, The Structure of Scientific Revolutions.
realized or technologically realizable at the time when \( T \) is propounded or contemplated.\(^66\)

Correspondence rules and, more generally, propositions containing observational and nonobservational concepts are by definition "linking up" with the observational plane and are thus more likely to be empirically significant.

The problem of testability arises with respect to nonobservational propositions: When they are not related to the realm of observation by correspondence rules they are empirically insignificant and cannot qualify as hypotheses in the sense defined here. If one sorts out the empirically meaningless nonobservational propositions, one is left with a set of propositions that are "testable in principle." One may now ask whether a truth value can, in principle, be assigned to such hypotheses—that is, whether they can be refuted or confirmed, or falsified or verified, respectively.

**CONFIRMABLE AND/OR REFUTABLE HYPOTHESES**

With respect to the confirmability of an hypothesis we can distinguish between (1) purely confirmable, (2) purely refutable, and (3) both confirmable and refutable hypotheses.\(^69\)

All existential propositions are purely confirmable hypotheses.\(^69\) For example, the hypothesis "there are opinion leaders within industrial firms . . ." is a purely confirmable hypothesis. If a number of studies failed to discover opinion leaders in industrial firms, this would still not refute the possibility of eventually discovering them at some future time. Such hypotheses, even though they are irrefutable, are of heuristic value. They are quite often fundamental assumptions underlying a research strategy and, as such, have more of a programmatic than empirical character (for example, the hypothesis that diffusion is essentially a communication process).\(^62\)

Another major class of hypotheses that are primarily confirmable and only weakly refutable are propositions involving probability statements. In marketing, this can be exemplified by the various learning and Markov models that are being proposed. Here, the hypothesis is whether the particular model is "applicable" to consumer behavior or not. The procedure followed is to compare the model's predictions with the actual events and to compute a "goodness-of-fit" measure. Only if the "goodness-of-fit" measure is low is the hypothesis of applicability rejected, and only for the particular application tested.\(^63\)

Next, there are those hypotheses that are purely refutable. These are the universal propositions (see above). Although they can never be confirmed, a single negative instance suffices to refute them; this has been called the asymmetry between verifiability and falsifiability.\(^64\) As an example of such a hypothesis, consider: "All innovators are cosmopolite." We need to find only one case of an innovator who happens not to be cosmopolite to refute this hypothesis. Because universal propositions have an infinite universe of discourse, they can never be confirmed even if all existing testing experience is supportive. Theoretically, there will always be a remaining uninvestigated context which potentially could disconfirm the proposition.

The testing of such hypotheses is not undertaken directly, but by deriving certain test implications from them: for example, "All innovators are cosmopolite" leads to the test implication, "\( A \) is cosmopolite" (with the help of the auxiliary assumption, "\( A \) is an innovator"). While the original hypothesis was only refutable, "\( A \) is cosmopolite" is a singular proposition and, hence, both confirmable and refutable. In the event the singular proposition is refuted, the hypothesis from which it was derived may be considered refuted. In the event the proposition is confirmed, we still cannot say that the original hypothesis is therefore confirmed, both for the reason just given above (the infinite universe) and for a different reason, called the "fallacy of affirming the consequent."\(^65\) Although we are assuming some kind of necessary connection between innovativeness and cosmopolitanism, this connection may, in fact, be spurious—that is, caused by some third factor or by any number of variables. For example, consider the hypothesis: "Messages that are congruent with the values of the audience lead to positive attitude change." From this hypothesis, we can derive the test implication: "The message \( A \) will lead to positive attitude change with audience \( B \)." The auxiliary assumptions required are the following: "Message \( A \) is congruent with the values of audience \( B \)," "Attitude questionnaire \( X \) is a valid measure of attitudes at time \( t \) and \( t + 1 \)." Now suppose that we perform the experiment and actually obtain positive results. The natural inclination would be to say that the hypothesis was confirmed. Suppose, however, that another hypothesis had also received considerable empirical support, namely: "The administration of attitude questionnaires at time \( t \) leads to an increase in scores on the same questionnaire at time \( t + 1 \)." This hypothesis, in effect, says that our positive result could have resulted not from the effect of our message but from previous testing. This situation obviously calls for "control," that is, if we ever want to test the value-congruence hypothesis we either have to resort to different methods of measuring attitudes or we have to "control" for the effects of testing. The latter strategy is quite familiar; it is the strategy of "control groups."\(^66\) The results of an experiment using control groups,


\(^{69}\) See Karl R. Popper, *The Logic of Scientific Discovery*, p. 69.

\(^{62}\) J. A. Martilla, "Word-of-Mouth Communication in the Industrial Adoption Process."

\(^{63}\) Thomas S. Robertson, *Innovative Behavior and Communication*, p. x.


\(^{64}\) Popper, *The Logic of Scientific Discovery*, p. 7.


greater the similarity of the new instance to the previous instances. Stinchcombe argues that the more different things and the more different kinds of implications derived from a test situation the stronger the test of the theory. This argument may be presented in the following way (adapted from Stinchcombe) where $A$ is the hypothesis and $B$ the test implication:

<table>
<thead>
<tr>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>If $A$, then $B$</td>
<td>If $A$, then $B$</td>
<td>If $A$, then $B_1, B_2, \ldots, B_n$</td>
</tr>
<tr>
<td>$B$ is false</td>
<td>$B$ is true</td>
<td>... where $B_1, \ldots, B_n$ are similar</td>
</tr>
<tr>
<td>$A$ is false</td>
<td>$A$ is somewhat credible</td>
<td>$B_1, \ldots, B_n$ are true</td>
</tr>
<tr>
<td>$A$ is substantially more credible</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thus in case I, if hypothesis $A$ implies the test implication $B$ and $B$ is not found to hold, then we can conclude that $A$ is false. On the other hand, in case II if $B$ is found to hold or is true, then we may place at least some reliance upon $A$ and consider it somewhat credible. Test situation IV is the strongest test, lending greater confirmability to hypothesis $A$ than any of the previous test situations, in that it tests many things differing from one another. Consider the following hypothesis discussed by Ostland: When high perceived risk is associated with a particular purchase decision, greater importance is attached to interpersonal communication (relative to impersonal sources, for example). Correspondence rules would be established for the concepts of perceived risk and interpersonal communication importance. If the hypothesis were substantiated with regard to a household appliance, we would establish a minimum level of confirmation or credibility. If two or more household appliances were involved and the hypothesis supported for each, we would have an even higher level of confirmation. Still stronger tests of the hypothesis would entail extending the test to durable goods other than household appliances and perhaps eventually to nondurable goods. The credibility in our hypothesis increases considerably and its range expands. This is to say that the universe of discourse to which the hypothesis has been successfully applied has increased. For example, when trying to confirm his four hypotheses about the personal characteristics of opinion leaders on consumer topics, Corey used three market studies each of a different consumer topic.

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* Stinchcombe, p. 20.

* Lyman Ostland, "Role Theory and Group Dynamics."
established or tested in isolation. The definition of constituent concepts requires the presence of some theoretical network, and so does its testing. For example, Seipel formulated the hypothesis that “the less demanded in return for a premium, the more positive the attitudes toward the company and its products” and justified the formulation and testing of such an hypothesis by the fact that it is “founded on theories of attitudinal relationships stating that attitude objects (the company and its products) which are associated with a positively evaluated concept (the premium offer) will also be viewed positively.”

It should be recognized, however, that the requirement that an hypothesis be grounded is double-edged: On one side it certainly eliminated some non-scientific propositions; on the other side it may prevent or delay revolutionary hypotheses. In fact, it may happen that a change of paradigm is necessary. In conclusion, the requirement of theoretical validation must be handled with extra care.

DEGREE OF CORROBORATION: THE EMERGENCE OF LAWS

Hypotheses may have varying degrees of corroboration. Naturally, those hypotheses commanding a high degree of corroboration have a somewhat special status in science. Those hypotheses are called “laws.” Laws, therefore, are hypotheses that are empirically corroborated to a degree regarded as satisfactory at a certain point in time. As Harvey has it: “A scientific law may be interpreted most rigidly as a generalization which is empirically universally true, and one which is also an integral part of a theoretical system in which we have supreme confidence. Such a rigid interpretation would probably mean that scientific laws would be nonexistent in all the sciences. Scientists therefore relax these criteria to some degree in their practical application of the norm. The precise degree of relaxation remains very much a matter of individual judgment. . . .” It is obvious that what is regarded as satisfactory at one time may turn out to be deficient at some later time. The levels of tolerance for “satisfactory” corroboration are dependent on whether any alternatives to the existing laws and principles exist. A slight discrepancy between predicted and observed results, which is considered as a corroborating instance in the absence of any rival hypothesis, may in other instances lead to the refutation of the same hypothesis.

11 Corey, “People Who Claim To Be Opinion Leaders,” p. 49.
12 Hempel, Philosophy of Natural Science, p. 34; for analogous arguments at the level of concepts see Donald T. Campbell, “Methodological Suggestions from a Comparative Psychology of Knowledge Processes.”
13 Hempel, Philosophy of Natural Science, p. 37.
15 Hempel, Philosophy of Natural Science, p. 45.
17 See Kuhn, The Structure of Scientific Revolutions.
18 Harvey, Explanation in Geography, pp. 105–106.
20 See Campbell, “Prospective,” and Kuhn, The Structure of Scientific Revolutions.
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