

Chapter 6

Attitude Formation

We are employing the term “attitude” to refer solely to a person’s location on a bipolar evaluative or affective dimension with respect to some object, action, or event. An attitude represents a person’s general feeling of favorableness or unfavorableness toward some stimulus object. In our conceptual framework, as a person forms beliefs about an object, he automatically and simultaneously acquires an attitude toward that object. Each belief links the object to some attribute; the person’s attitude toward the object is a function of his evaluations of these attributes.

Suppose that a new product is introduced on the market and that a person’s only information concerning this product is that it is a bedtime drink. On the assumption that he has a neutral evaluation of bedtime drinks, the person would be expected to hold a neutral attitude toward the product in question. Now imagine that through an advertising campaign he learns that the product is good for digestion. Since he positively evaluates things that are good for digestion, his attitude toward the product may shift in a positive direction. Note, however, that this new positive belief will not necessarily lead to the formation of a positive attitude. Because of the existing relationships among beliefs discussed in the preceding chapter, the belief that the product is good for digestion may lead to the formation of various inferential beliefs. For example, the person may infer that the product is a medicine for old people. A negative evaluation of medicine for old people may produce an overall attitude toward the product that is neutral or even negative.

As with beliefs, the distinction between attitude formation and attitude change is somewhat arbitrary. The example above implied that a positive attitude was formed when the person learned that the product was good for digestion. It could be argued, however, that a neutral attitude was *formed* as soon as the person

learned that the product was a bedtime drink and that this attitude *changed* as a result of the subsequent information.

It may be instructive to consider another example, where these processes are more readily apparent. Consider a person who holds a neutral attitude toward a stranger since he has no information about him. The person now learns that the stranger is a member of the Republican Party. Assuming that the person positively evaluates members of the Republican Party, we may expect formation of an initially positive attitude toward the stranger. This positive attitude may be further reinforced by the person's inferences that the stranger favors a balanced budget and less federal control (positions that are positively evaluated by the person himself). We can see that instead of producing a neutral attitude, as in the previous example, the initial item of information concerning the stranger's party affiliation led to the formation of a favorable attitude toward him. Clearly, any additional items of information may or may not produce changes in the attitude toward the stranger.

At the most general level, then, we learn to like (or have favorable attitudes toward) objects we associate with "good" things, and we acquire unfavorable feelings toward objects we associate with "bad" things. On a day-to-day basis we automatically acquire an attitude toward some new object when we learn its associations with other objects, attributes, or qualities toward which we already have attitudes. These attitudes (i.e., attribute evaluations) are themselves a function of beliefs linking the attribute to other characteristics and evaluations of those characteristics. The latter evaluations are again based on beliefs and evaluations, etc. It is possible to continue such an analysis indefinitely. Ultimately, however, one must probably fall back on hedonism, pleasure-pain principles, or other primary motives to account for the initial acquisition of affect. For example, for a newborn infant ingestion of milk satisfies hunger and may be viewed as giving pleasure or eliminating pain. Milk thus takes on some of the pleasurable (positive) qualities associated with hunger reduction. In this way, a positive attitude toward milk has been acquired. The evaluation of milk can now account in part for the development of attitudes toward other objects which come to be associated with milk (e.g., mother or breast).

Although it is possible in principle to trace through the development of a person's attitudes beginning with his early childhood, it will usually be sufficient to assess the evaluations of the attributes associated with the attitude object at a given point in time. Since an individual may be viewed as holding attitudes toward all discriminable aspects of his environment (even if the attitudes are neutral), whenever he learns that an object is linked to a given attribute, some of the evaluation of the attribute becomes associated with the object.

DETERMINANTS OF ATTITUDES

In the course of a person's life, his experiences lead to the formation of many different beliefs about various objects, actions, and events. These beliefs may be the result of direct observation or of inference processes. Some beliefs may per-

sist over time, others may be forgotten, and new beliefs may be formed. Beliefs about such institutions as the church, democracy, and capitalism or beliefs about national and racial groups tend to be relatively stable. Beliefs about the consequences of a behavior or beliefs about a given person, however, can vary considerably. For example, beliefs about attending church on a particular occasion may differ from beliefs about that behavior on a different occasion. It is obvious, therefore, that a person's attitude may also change as a function of variations in his belief system. Some attitudes may be relatively stable over time, and others may exhibit frequent shifts. At any point in time, however, a person's attitude toward an object may be viewed as determined by his *salient* set of beliefs about the object.

Salience of Beliefs

Although a person may hold a large number of beliefs about any given object, it appears that only a relatively small number of beliefs serve as determinants of his attitude at any given moment. Research on attention span, apprehension, and information processing suggests that an individual is capable of attending to or processing only five to nine items of information at a time (e.g., G. A. Miller, 1956; Woodworth and Schlosberg, 1954; Mandler, 1967). It can therefore be argued that a person's attitude toward an object is primarily determined by no more than five to nine beliefs about the object; these are the beliefs that are *salient* at a given point in time. It is of course possible for more than nine beliefs to be salient and to determine a person's attitude; given time and incentive, a person may take a much larger set of beliefs into account. We are here merely suggesting that under most circumstances, a small number of beliefs serve as the determinants of a person's attitude. Clearly, salient beliefs are also subject to change; they may be strengthened or weakened or replaced by new beliefs.

An important question concerns identification of salient beliefs; that is, given that a person may hold a large number of beliefs, our task is to identify the five to nine salient beliefs that determine his attitude. We mentioned in Chapter 3 that a person's beliefs about a given object or action can be elicited in a free-response format by asking him to list the characteristics, qualities, and attributes of the object or the consequences of performing the behavior. It has been argued that salient beliefs are elicited first, and thus, consistent with the considerations above, beliefs elicited beyond the first nine or ten are probably not salient for the individual (Fishbein, 1967c; Kaplan and Fishbein, 1969). It is possible, however, that only the first two or three beliefs are salient for a given individual and that additional beliefs elicited beyond this point are not primary determinants of his attitude (i.e., are not salient). Unfortunately, it is impossible to determine the point at which a person starts eliciting nonsalient beliefs. Recommending the use of the first five to nine beliefs is therefore merely a rule of thumb.

Another problem is that the elicitation procedure itself may produce changes in a person's belief hierarchy. That is, previously nonsalient beliefs may become salient once they have been elicited. This implies that mere elicitation of beliefs

may change a person's attitude. In other words, while listing his beliefs about an object, the person may recall some information he had forgotten or make a new inference on the basis of existing beliefs. The previously nonsalient beliefs may now become important determinants of his attitude. It follows that under these circumstances, the first few beliefs elicited will be highly related to the person's attitude as it existed prior to the elicitation of beliefs, but they may have a somewhat lower relationship to his attitude following elicitation. Similar problems emerge when a person responds to a standard set of belief statements, such as an attitude scale.¹ This experience may change his salient beliefs and thus affect his attitude. As with many other phenomena, attempts to assess salient beliefs may influence the phenomenon under investigation.

In conclusion, it appears impossible to obtain a precise measure of the beliefs that determine an individual's attitude since the number of salient beliefs may vary from person to person. However, a rough approximation can be obtained by considering the first few beliefs (five to nine) as the basic determinants of attitude. In many situations it may be desirable to have information about the salient beliefs in a given population (*modal salient beliefs*). For example, marketing research frequently attempts to identify the determinants of attitudes toward some product. To ascertain the modal salient beliefs within a given population, a representative sample of the population could be asked to elicit their beliefs about the product; the most frequently elicited beliefs could be considered the modal salient beliefs for the population.²

Salience and belief strength. In the preceding paragraphs we have suggested that salient beliefs can be identified by examining an individual's or a group's belief hierarchy. The first n beliefs elicited by a person are said to be his salient beliefs, and the n beliefs occurring with the greatest frequency are taken as the modal salient beliefs in a population. We noted previously that probability of elicitation can be viewed as analogous to the perceived probability of an association between object and attribute, i.e., that position in the hierarchy is related to belief strength. Thus it may appear that measures of belief strength can serve as indicants of salience. Unfortunately, this is not so. Although a high correspondence is expected between belief strength and position in the hierarchy for *salient* beliefs, the strength of nonsalient beliefs may be unrelated to their position in the hierarchy.

1. Although salient beliefs are viewed as the primary determinants of attitude, nonsalient beliefs can nevertheless be used to measure attitude. In fact, standard attitude scales comprise in large part statements concerning nonsalient beliefs. Responses to these statements are largely inferences consistent with the beliefs held by the person, and thus they, too, are likely to be predictive of his attitude.

2. One possibility is to take the 10 or 12 most frequently mentioned beliefs; this would allow for imperfect correspondence in the salient beliefs of different components of the population. Another possibility is to use those beliefs that exceed a certain frequency or to use as many beliefs as necessary to account for a certain percentage of all beliefs elicited.

As mentioned previously, a person is likely to elicit more than his salient beliefs about an object; some of the nonsalient beliefs (produced by remembering some item of information or by making an inference) may be assigned high probabilities. Further, when asked to respond to a belief statement, a person may strongly agree with the statement even though the belief involved is not salient and would not have been among the first few beliefs elicited. For example, suppose that a person is asked whether he believes that Italians have two legs. Clearly, he is likely to assign a high probability to this belief, but he would probably not have elicited it spontaneously. Thus, although one would expect to obtain a high rank-order correlation between belief strength and the position of salient beliefs (the position of the first five to nine beliefs a person elicits), one would not expect belief strength to correlate with the position of all beliefs elicited by the individual. Similarly, if one considered *only* the modal salient beliefs for a given population (the 10 or 12 most frequently elicited beliefs), a high correlation should be obtained between average belief strength and frequency of elicitation.

Considerable evidence supporting these hypotheses has been presented by Fishbein (1963) and Kaplan and Fishbein (1969). Fishbein obtained a rank-order correlation of .94 between the frequency with which a given salient attribute (e.g., dark skin) was elicited by the concept "Negro" and the average strength of the belief (e.g., the average rating of "Negroes have dark skin" on a probability scale). Similarly, Kaplan and Fishbein obtained a rank-order correlation of .90 between position and average belief strength when only the first six beliefs were considered. This correlation was reduced to .72 when the first nine beliefs were considered. Similar results were obtained when correlations were computed for single individuals. Further, when only the first six beliefs were considered, over 60 percent of the sample had perfect or near-perfect relations between hierarchical position and belief strength, and only 8 percent of the sample showed marked deviations from expectancies.

One interesting implication of these findings is that a measure of belief strength can aid the investigator in determining the number of salient beliefs in a hierarchy. So long as belief strength decreases with each successively elicited belief, it is reasonable to assume that one is dealing with salient beliefs. When the correspondence breaks down (i.e., when a high probability is assigned to a belief that is elicited late in the sequence or to a belief that has a low frequency of occurrence in a given population), one is likely to be dealing with nonsalient beliefs. However, information about belief strength alone, without information about the belief's position in the belief hierarchy, cannot be used to determine whether a belief is salient or not. As mentioned above, a nonsalient belief may be assigned a high probability; further, a salient belief may sometimes have a relatively low probability.

Importance of beliefs. In a way that is similar to our distinction between salient and nonsalient beliefs, it has sometimes been argued that some beliefs are more

important than others in determining a person's attitude. This raises the question whether it is possible to use subjective estimates of importance to identify salient beliefs. To answer this question, it is necessary to distinguish between several possible interpretations of "belief importance." We have already encountered Rosenberg's (1956) concept of "value importance," which refers to the amount of satisfaction or dissatisfaction derived from an attribute that is associated with a given object (see Chapter 2). Clearly, this definition equates importance with the evaluation of the associated attribute, and there is considerable evidence that this evaluation is not related to belief salience (e.g., Zajonc, 1954; Fishbein and Kaplan, 1969; Fishbein, 1963).

Most frequently, the term "importance" has been used to refer to (1) the perceived importance of an attribute for the person, or (2) its perceived importance as a defining characteristic of the object, or (3) its perceived importance as a determinant of the person's attitude. The first of these usages is highly related to the polarity of the attribute's evaluation; that is, highly positive and highly negative attributes will tend to be perceived as important (Feldman and Fishbein, 1963a). The perceived importance of an attribute as a defining characteristic of an object is closely related to the subjective probability of an association between object and attribute. Thus, if a person has a high probability (i.e., strongly believes) that the Republican Party is conservative, he is also likely to believe that conservatism is an important characteristic of the Republican Party.³ As was true with belief strength, this measure of importance cannot be used to determine whether a belief is salient or not.

In contrast to the interpretations of importance discussed so far, the last interpretation deals with the perceived importance of an attribute as a determinant of the person's attitude: The person is asked to estimate the relative importance of each belief as a determinant of his attitude. We saw in Chapter 5 that such subjective estimates of relative weights bear little resemblance to empirically derived weights. Specifically, studies of cue utilization have found that subjective estimates of each cue's relative importance as a determinant of a given judgment do not correspond to weights obtained in a multiple regression analysis. Of greater relevance to the present discussion, Kaplan and Fishbein (1969) found that subjective estimates of the importance of different attributes as determinants of attitude were unrelated to the positions of the beliefs in question in the belief hierarchy. Thus it appears that none of the different interpretations of belief importance can be used to derive measures that will identify salient and non-salient beliefs.

One other method of attempting to estimate importance or salience of attributes as determinants of attitude has been to correlate each belief (taking

3. Zajonc (1954) has used the term "prominence" to refer to this view of importance. Clearly, a measure of prominence can be obtained only when dealing with attributes that refer to properties of an object but not with other types of attributes, such as outcomes of an act.

evaluation of the attribute into account) with the attitude. As in any multiple regression approach, these correlations (or the regression weights) are viewed as objective indices of importance. However, it is clear that correlations (or regression weights) provide no evidence as to causality, and it is therefore inappropriate to assume that a high correlation indicates an important *determinant* of attitude or that a low correlation is evidence that the belief is *not* an important determinant of attitude. Further, there is no evidence that these empirical weights or correlations can be used to identify salient and nonsalient beliefs (i.e., that these "objective" weights are related to a belief's position in the belief hierarchy).

INFORMATIONAL BASIS OF ATTITUDE

We have argued that a person's attitude is a function of his salient beliefs at a given point in time. In previous chapters we have shown that attitude can be measured by considering a person's responses to a set of belief statements even when they involve nonsalient beliefs. The relation between a set of beliefs and attitude was described in terms of an expectancy-value model. In Chapter 2 we showed that such a model is consistent with many theoretical approaches to attitude formation and change.

Each belief associates a given object with some attribute. According to an expectancy-value model, a person's evaluation of the attribute contributes to his attitude in proportion to the strength of his belief. It is clear that this approach postulates an informational basis for the formation of attitude; a person is viewed as processing the information he has about an object in arriving at his evaluation of the object.⁴ In the remainder of this chapter we will discuss some of the evidence in support of an informational basis of attitude, and we will try to show that although other bases for attitude formation have been suggested, most can be interpreted in terms of an expectancy-value model.

Expectancy-Value Model

The model we have proposed deals with the relation between beliefs about an object and attitude toward that object. It is a descriptive model that is applicable to any set of beliefs, whether they are salient or nonsalient, new or old. Although we have argued that a person's salient beliefs *determine* his attitude, the model itself is not predicated on an assumption of causality but deals merely with the relation between beliefs and attitude. Specifically, it provides a description of the

4. This viewpoint is consistent with the notion that a person's attitude is determined by a limited number of beliefs since research has shown (e.g., G. A. Miller, 1956; Mandler, 1967) that a person is limited in his capacity to process information at a given point in time.

way in which different beliefs (and the evaluations of the associated attributes) are combined or integrated to arrive at an evaluation of the object. As we have suggested in previous chapters, the integration process is described by Eq. 6.1, in which A is the attitude toward an object, action, or event; b is the beliefs about the object's attributes or about the act's consequences; and e is the evaluations of

$$A = \sum_{i=1}^n b_i e_i, \quad (6.1)$$

the attributes or consequences. Thus, according to the model, a person's attitude toward an object can be estimated by multiplying his evaluation of each attribute associated with the object by his subjective probability that the object has that attribute and then summing the products for the total set of beliefs. Similarly, a person's attitude toward a behavior can be estimated by multiplying his evaluation of each of the behavior's consequences by his subjective probability that performing the behavior will lead to that consequence and then summing the products for the total set of beliefs. The terms "attribute" and "consequence" are used in a very general sense to refer to any aspect of an object or behavior, respectively—that is, to any characteristic, quality, object, concept, value, or goal associated with the object or behavior.⁵

It is apparent that persons holding the same beliefs may have very different attitudes and that persons holding different beliefs may have the same attitudes. Attitudes are based on the total set of the person's salient beliefs and the evaluations associated with those beliefs. When the same beliefs are held with different strength or when evaluations of associated attributes differ, attitudes will also be different. Conversely, when different beliefs are held with equal strength and when they have identical evaluative implications, the same attitudes will result. It follows that knowledge of a person's attitude provides little information about the particular beliefs he holds or about his evaluations of attributes associated with the attitude object.

One other question concerning the expectancy-value model is worth considering. Looking at Eq. 6.1, one may think that attitudes would increase indefinitely with the addition of new positive beliefs since each new $b \times e$ product is added to the existing total. However, recall that a person's attitude is determined by a limited number of *salient* beliefs that are arranged hierarchically in terms of their probabilities. Within this hierarchy, then, each additional belief contributes successively less to the total attitude, and thus the total evaluation tends to level off after five to nine beliefs. Consider, for example, a person who holds

5. Measurement procedures for beliefs and evaluations were discussed in Chapter 3. There it was also mentioned that, strictly speaking, the model deals only with associative relations between object and attribute, and thus a belief such as " O is not X " is viewed as an association between the object O and the attribute *not* X .

seven positive beliefs about some object. With the assumption that evaluation of the attributes is constant (+2), his belief hierarchy might be as follows:

Belief	<i>b</i>	<i>e</i>	<i>b</i> × <i>e</i>
1	.95	+2	1.90
2	.90	+2	1.80
3	.90	+2	1.80
4	.85	+2	1.70
5	.75	+2	1.50
6	.70	+2	1.40
7	.65	+2	1.30

Column 4 shows that each additional belief contributes less to the total attitude. Generally speaking, then, the theoretical relationship between number of positive beliefs and attitude (with evaluation of attributes held constant) is described by Fig. 6.1.

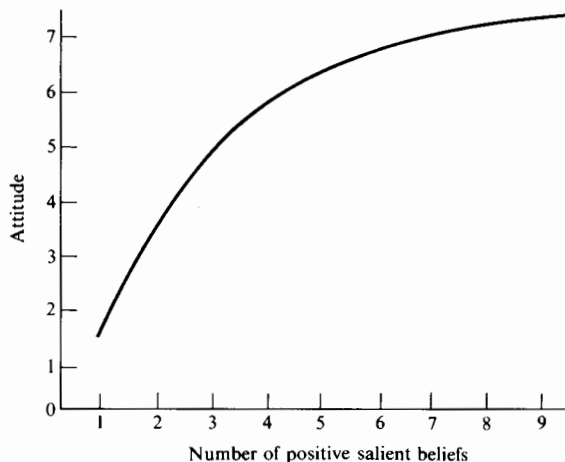


Fig. 6.1 Attitude as a function of positive number of beliefs, with attribute evaluation held constant.

Considerable evidence in support of the expectancy-value model can be found throughout the attitude area. We mentioned in previous chapters that virtually all standard attitude measures can be viewed in terms of an expectancy-value formulation, and research has repeatedly demonstrated the validity of these measures. More direct attempts to test the model have also been reported. For example, Fishbein (1963) first stated his formulation of an expectancy-value model with reference to attitudes toward Negroes. He constructed a set of 10 modal salient beliefs for his subject population by taking the 10 attributes that were elicited most frequently in response to the question: "What do you believe to be the characteristics of Negroes?" The 10 attributes, ordered in terms of frequency of elicit-

tion, were dark skin, curly (kinky) hair, musical, athletic, friendly, tall, uneducated, unintelligent, hard workers, and lazy. A new sample of subjects then evaluated each attribute on five evaluative semantic differential scales; the sum over the five scales provided a measure of e in Eq. in 6.1. To provide a measure of belief strength (b), subjects rated the probability that "Negroes have dark skin," "Negroes are uneducated," etc., on a set of five probability scales in a semantic differential format (e.g., *probable-improbable*, *likely-unlikely*); again a sum over the five scales was obtained. The e and b measures could both range from -15 to $+15$, with high scores indicating positive evaluation or high probability of association. An estimate of each subject's attitude toward Negroes was obtained by multiplying each e by the corresponding b and summing the products. Finally, each subject's attitude toward Negroes was assessed directly by asking him to rate the concept "Negro" on five evaluative semantic differential scales. The sum over the responses to these five scales served as an index of attitude. A correlation of .80 was obtained between the estimate and the direct measure of attitude, providing support for the theoretical model.⁶

It may be instructive to examine two more recent experiments dealing with attitudes toward political candidates and toward behaviors (e.g., using birth control pills). In a continuing series of studies, Fishbein and his associates (e.g., Fishbein and Feldman, 1963; Feldman and Fishbein, 1963a,b; Fishbein and Coombs, 1974) have investigated the relation between beliefs about political candidates and attitudes toward those candidates. In the month prior to the 1964 presidential election, for example, over 600 residents of a small midwestern community were interviewed. The respondents, who were of voting age, expressed their agreement or disagreement with a set of 24 belief statements concerning each of the two presidential candidates, Johnson and Goldwater. In addition, they evaluated each attribute in the 24 belief statements and provided direct measures of their attitudes toward the two candidates.

The 24 belief statements were constructed on the basis of attributes elicited from an independent sample of subjects in response to the following two questions: (1) What are the characteristics, qualities, and attributes of each candidate? (2) What do you think are the relevant issues in this campaign? The 24 belief statements used in the study are shown in Table 6.1. Each belief statement was rated on a seven-point *probable-improbable* scale, and each attribute or issue was rated on a seven-point *good-bad* scale. The products of these two measures, summed over the 24 beliefs, served as estimates of attitude toward the two candidates. The estimates correlated .69 and .87 with the direct measures of attitudes toward Johnson and Goldwater, respectively. Similar results were found in several other studies dealing with attitudes toward other presidential candidates as well as candidates for the House of Representatives and the Senate; all these studies provided strong support for the expectancy-value model presented in Eq. 6.1.

6. A rank-order correlation was computed in this study ($N = 50$, $p < .001$).

Table 6.1 Belief Statements Used in Study of Attitudes Toward Presidential Candidates in the 1964 Election (from Fishbein and Coombs, 1974)

Lyndon B. Johnson (Barry Goldwater)

1. is a Republican
2. is a Democrat
3. is consistent in his views
4. is a conservative
5. is a moderate
6. is a liberal
7. is physically healthy
8. is mentally healthy
9. is a political opportunist
10. is in favor of our present foreign policy in Vietnam
11. is in favor of the antipoverty bill
12. is in favor of reducing the power of the Supreme Court
13. is in favor of allowing military personnel to make decisions about the use of nuclear weapons
14. is in favor of medicare
15. selected a well-qualified running mate for Vice President
16. is in favor of political extremism
17. is in favor of price supports for farm products
18. is in favor of using nuclear weapons in Vietnam
19. is in favor of swift enforcement of the Civil Rights Law
20. is in favor of increased social security benefits
21. is in favor of reducing the power of the federal government
22. approves of the John Birch Society
23. is in favor of the Nuclear Test Ban Treaty
24. approves of the Americans for Democratic Action

The final example extends the expectancy-value model to attitudes toward specific behaviors, as opposed to attitudes toward a class of people (Negroes) or a given individual (e.g., Goldwater). In a study by Jaccard and Davidson (1972), attitudes of women toward using birth control pills were considered. Beliefs about this behavior were elicited in private interviews with a sample of 22 women. In the course of the interviews these respondents were asked to indicate their beliefs about the consequences of using the pill, and to describe other advantages and disadvantages of using the pill. They were then asked to report if there was anything else they associated with using the pill. The 15 beliefs mentioned most frequently were used to construct a questionnaire that was given to a new sample of 73

women. The 15 consequences associated with using the pill are presented in Table 6.2. In a manner similar to the study on political candidates, measures were obtained of belief strength and evaluations of consequences; these measures were used to compute an estimate of attitude toward using birth control pills. In support of the model, the estimate was found to correlate .73 with a direct semantic differential measure of the same attitude.

Table 6.2 Consequences of Using Birth Control Pills
(from Jaccard and Davidson, 1972)

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1. leads to major side effects (e.g., blood clots)
 2. leads to minor side effects (e.g., weight gain)
 3. would affect my sexual morals
 4. is immoral
 5. is using a method of birth control that is unreliable
 6. would give me guilt feelings
 7. produces children who are born with something wrong with them
 8. would increase my sexual pleasure
 9. would enable me to regulate the size of my family
 10. would enable me to regulate time intervals between pregnancies
 11. would regulate my menstrual cycle
 12. is using a method of birth control that is convenient
 13. is using the best method available
 14. would remove the worry of becoming pregnant
 15. is using a method of birth control that is expensive
-

Many other studies have produced results in support of the expectancy-value model. They have dealt with attitudes toward persons, issues, institutions, concepts, behaviors, etc. (e.g., Rosenberg, 1956; E. R. Carlson, 1956; Fishbein, Landy, and Hatch, 1969; Ajzen and Fishbein, 1970, 1972; Insko *et al.*, 1970). For example, Rosenberg found a significant relation between a person's attitude toward the policy of allowing members of the Communist Party to address the public and beliefs as to whether that policy would facilitate or prevent the attainment of 35 values, such as "America having high prestige in other countries," "People being well educated," and "Keeping promises made to others." Several of these studies have also shown that attitudes can be estimated more accurately by considering both belief strength and evaluation of associated attributes (i.e., from $\Sigma b_i e_i$) than by using only the sum of the beliefs (Σb_i) or the sum of the evaluations (Σe_i).⁷

7. One exception occurs when the e 's are either all positive or all negative. In this case, Σb_i alone will tend to be highly correlated with the attitude.

Although virtually all studies designed to test the expectancy-value model have obtained significant results, the correlation between estimated and observed attitudes has varied considerably. Generally speaking, it may be suggested that when attitudes are estimated on the basis of salient beliefs elicited by the subjects or on the basis of belief statements that have been selected by some standard scaling procedure, the correlation tends to be high (e.g., Fishbein, 1963; Jaccard and Davidson, 1972; Ostrom, 1969). When belief statements are selected in an intuitive fashion, many beliefs will tend to be nonsalient, and they may also be unrelated to the underlying attitude. Studies using such belief statements have generally obtained lower correlations (e.g., Insko *et al.*, 1970). Most studies that have obtained low correlations, however, have usually had some methodological problem concerning the measures of beliefs, evaluations, or the attitudinal criterion (e.g., Mascaro, 1970; L. R. Anderson, 1970; Szalay, Windle, and Lysne, 1970; Kaplan and Fishbein, 1969; Bass and Talarzyk, 1972; Sheth and Talarzyk, 1972). For example, measures of perceived importance of an attribute have sometimes been substituted for evaluation of the attributes (e.g., Bass and Talarzyk, 1972; Sheth and Talarzyk, 1972; Hansen, 1969). As mentioned in our earlier discussion, this measure of importance is not equivalent to evaluation; rather, it will tend to be related to *polarity* of evaluation.

Parenthetically, it has sometimes been argued that each item of information should also be given a weight for its importance, salience, or relevance (e.g., Hackman and Anderson, 1968; Wyer, 1970c). Thus it has been suggested that in addition to obtaining measures of probability and evaluation, investigators should obtain ratings of each attribute in terms of its importance; that is,

$$A = \sum_{i=1}^n I_i b_i e_i,$$

where I is perceived importance. Despite the intuitive plausibility of this position, recent studies have consistently found that including importance as an additional factor in the expectancy-value model tends to attenuate the prediction of attitude (e.g., L. R. Anderson, 1970; Hackman and Anderson, 1968; Kaplan and Fishbein, 1969; Wyer, 1970c). In light of our discussion of importance, these results are not surprising. Attributes that are important are typically evaluated more positively or negatively (i.e., are more polarized) than attributes that are unimportant. Similarly, people usually tend to have more information about things that are important to them, and thus they tend to be more certain and to have stronger beliefs about important than about unimportant attributes. Although there is no one-to-one relation between importance, evaluation, and belief strength, there is some recent evidence suggesting a high correlation between absolute $b_i e_i$ scores and judgments of importance. Indeed, the $\Sigma b_i e_i$ formulation appears to take enough of importance into account that the addition of an independent measure of importance to the $\Sigma b_i e_i$ formulation (i.e., when the model is changed to $\Sigma b_i e_i I_i$) merely provides redundant information that tends to attenuate prediction.

Adding Versus Averaging

So far we have assumed that an estimate of attitude is obtained by summing the $b \times e$ products (that is, $A = \Sigma b_i e_i$). It is possible, however, that some other combinatorial process, such as the average or mean of the $b \times e$ products [that is, $A_0 = \Sigma b_i e_i / n$] might provide a better estimate of attitude. In most of the studies discussed thus far, the distinction between adding and averaging has no bearing on the results. In these studies a set of modal salient belief statements was constructed, and subjects were asked to indicate the strength of their beliefs (b) and their attribute evaluations (e). Estimates of attitude obtained by summing and averaging the $b \times e$ products will be perfectly correlated. That is, dividing a variable by a constant (the number of beliefs in this case) produces a new variable that has a perfect correlation with the original variable.⁸ It follows that these two variables will have the same relation to any third variable (e.g., a direct measure of attitude).

However, when the number of beliefs is not constant, adding and averaging may produce different estimates of attitude. This notion has provided the basis for experimental tests comparing summation and averaging models of attitude formation. Consider a person who holds a number of positive beliefs. Typically the prediction is that if the summation model is correct, attitude will increase with additional favorable beliefs, but that no increase will occur if the averaging model is correct. Similarly, with the assumption of an initial set of unfavorable beliefs, the addition of other unfavorable beliefs is usually expected to decrease attitude when the summation model is applied, and no change is expected under the averaging model. Note, however, that these expectations are justified only when all beliefs are held with equal strength and when all attributes have equal evaluations. For example, if all probabilities are 1.0 and all evaluations are +2, a sum of the $b \times e$ products across two beliefs results in an estimated attitude of +4, and a sum of the $b \times e$ products across four beliefs results in an estimate of +8. An averaging model would predict an attitude of +2 in both cases. Thus, under the stated assumptions, the summation model predicts a more favorable attitude as number of positive beliefs increases whereas no difference is predicted by the averaging model.

Alternatively, it has been argued that the addition of mildly favorable beliefs to highly favorable beliefs should raise attitudes according to the summation model and lower attitudes according to the averaging model. Similarly, adding mildly unfavorable beliefs to highly unfavorable beliefs should lower attitudes according to the summation model and raise attitudes according to the averaging model. These expectations are justified only when all beliefs are held with equal strength and when subjects actually evaluate the attributes in accordance with

8. Dividing a variable by a constant is a linear transformation, and linear transformations do not affect correlation coefficients.

the experimenter's design. For example, suppose that all beliefs again have a probability of 1.0 and that subjects actually evaluate two attributes as +3 and two as +1. According to a summation model, a person holding the first two beliefs should have an attitude of +6, and a person holding all four beliefs should have an attitude of +8. In contrast, computing an average would predict attitudes of +3 and +2, respectively. Thus, under the specified assumptions, adding mildly favorable beliefs will raise attitudes according to the summation model and lower attitudes according to the averaging model.

In an experimental investigation, N. H. Anderson (1965a) attempted to "get a relative test of the additive and averaging formulations based on qualitative comparisons" (p. 395). Descriptions of hypothetical persons were provided in terms of either two adjectives or four adjectives. These adjectives had previously been rated for their likability by an independent sample of 100 subjects; some adjectives were highly favorable (H), some moderately favorable (M⁺), some moderately unfavorable (M⁻), and some low in favorability (L). The subjects rated each hypothetical person by assigning a score of 50 to a person he would neither like nor dislike, lower numbers to persons he would dislike, and higher numbers to persons he would like.

Consistent with our discussion above, Anderson constructed sets of adjectives that allowed for two types of "crucial" tests between the averaging and adding formulations. First he compared sets of two highly favorable adjectives with sets of four highly favorable adjectives (HH versus HHHH), and sets of two versus four adjectives of low favorability (LL versus LLLL). The second type of comparison was concerned with the effects of adding mildly favorable or unfavorable adjectives to highly favorable or unfavorable ones, respectively (that is, HH versus HHM⁺M⁺ and LL versus LLM⁻M⁻). Examples of these different sets of adjectives might be as follows:⁹

HH	intelligent, good-natured
HHHH	intelligent, good-natured, wise, friendly
HHM ⁺ M ⁺	intelligent, good-natured, reserved, obedient
LL	hostile, conceited
LLLL	hostile, conceited, belligerent, self-centered
LLM ⁻ M ⁻	hostile, conceited, meek, withdrawing

The results of this study were rather inconclusive. According to Anderson (1965a), the additive model appeared to be supported by the first type of comparison: Four highly favorable adjectives produced a more positive attitude than two highly favorable ones, and four highly unfavorable adjectives produced a

9. These examples were constructed on the basis of Anderson's (1968b) list of 555 personality trait words; they may or may not have been part of his study. The particular examples given have been constructed for the purpose of our subsequent discussion.

more negative attitude than two highly unfavorable ones (that is, $HHHH > HH$ and $LLLL < LL$).¹⁰ In contrast, the second type of comparison appeared to favor the averaging model since adding two mildly favorable adjectives to two highly favorable ones reduced evaluation of the hypothetical person whereas adding two mildly unfavorable adjectives to two highly unfavorable ones increased evaluation (that is, $HH > HHM^+M^+$ and $LL < LLM^-M^-$).¹¹

The experimental paradigm used in this study and most others on the summation-averaging controversy varies the number of informational items used to describe a stimulus person and compares the resulting attitudes toward that person. This paradigm does not allow a crucial test between the summation and averaging models unless the two assumptions mentioned above are met: (1) All information about the stimulus person must be accepted (i.e., believed) to the same degree. (2) The adjectives used to describe the stimulus person must be evaluated in accordance with the experimental design (e.g., all H adjectives must be given the same evaluation, as must all M^+ adjectives, and the former must be more positive than the latter).

When either of these assumptions is not met, it is impossible to use the summation or averaging models to make predictions of attitudes in the experimental paradigm above. Table 6.3 illustrates predictions of the two models for attitudes based on two favorable adjectives (Set 1) versus four favorable adjectives (Set 2). Case 1 in Table 6.3 applies when both assumptions are met: All beliefs have a strength of 1.0, and all adjective evaluations are +2. As we can see, the summation model predicts that four positive adjectives produce a more favorable attitude than do two positive adjectives. In contrast, the averaging model predicts no difference.

When belief strength and/or evaluations are allowed to vary, both models can account for any obtained result. Case 2 and Case 3 in Table 6.3 show what could happen if belief strength varied (and adjective evaluations remained constant). Depending on the belief strength associated with adjectives in Sets 1 and 2, both models can predict that the four-adjective set will lead to more favorable or less favorable attitudes than will the two-adjective set. In Case 4, both belief

10. As will be seen below, Anderson (1965a) argued that this "set-size effect" could be accounted for by an averaging model.

11. With the assumption of equal belief strength and the evaluations specified by Anderson, the following predictions can be made with respect to attitudes based on the different descriptions:

Summation model:

$$(HHHH) > (HHM^+M^+) > (HH) > (LL) > (LLM^-M^-) > (LLLL).$$

Averaging model:

$$(HHHH) = (HH) > (HHM^+M^+) > (LLM^-M^-) > (LL) = (LLLL).$$

The actual findings were as follows:

$$(HHHH) > (HH) > (HHM^+M^+) > (LLM^-M^-) > (LL) > (LLLL).$$

Note that these results support neither the summation model nor the averaging model.

Table 6.3 Averaging versus Summation: A Hypothetical Example

Set 1	Case 1		Case 2		Case 3		Case 4		
	<i>b</i>	<i>e</i>	<i>b</i>	<i>e</i>	<i>b</i>	<i>e</i>	<i>b</i>	<i>e</i>	
Intelligent	1.0	+2	2.00	.60	+2	1.20	.60	+2	1.20
Good-natured	1.0	+2	2.00	.75	+2	1.50	.75	+2	1.50
$A = \sum b_i e_i$			4.00			2.70			2.70
$A = \frac{1}{2} \sum b_i e_i$			2.00			1.35			1.35
Set 2									
Intelligent	1.0	+2	2.00	.65	+2	1.30	.35	+2	.70
Good-natured	1.0	+2	2.00	.75	+2	1.50	.40	+2	.80
Wise	1.0	+2	2.00	.90	+2	1.80	.15	+2	.30
Friendly	1.0	+2	2.00	.95	+2	1.90	.25	+2	.50
$A = \sum b_i e_i$			8.00			6.50			2.30
$A = \frac{1}{4} \sum b_i e_i$			2.00			1.63			.58
Summation model	Set 1 < Set 2		Set 1 < Set 2			Set 1 > Set 2			Set 1 < Set 2
Averaging model	Set 1 = Set 2		Set 1 < Set 2			Set 1 > Set 2			Set 1 > Set 2

strength and evaluations vary; in the particular example provided, the summation model predicts an increase in attitude, and the averaging model predicts a decrease.

These examples should make it clear that there is no systematic relation between number of beliefs and attitude. Depending on the effects of new information on prior beliefs, the formation of new beliefs on the basis of this information may raise, lower, or have no appreciable effect on a person's attitude. This is true irrespective of whether a summation or an averaging model is employed. Unfor-

unately, this simple fact has usually not been recognized, and most studies on the summation-averaging controversy have employed the experimental paradigm described earlier without testing the assumptions that must be met before this paradigm can be used to provide a test between the competing models.

The examples in Table 6.3 demonstrate that by speculating about belief strength and evaluations one can account for any finding both in terms of an averaging model and in terms of a summation model. Table 6.3 also suggests, however, that it is possible to provide a more adequate test between averaging and summation by obtaining measures of belief strength and attribute evaluations. When this is done, it may often be found that means and sums over the $b \times e$ products make conflicting predictions about the effects of adding new items of information (for example, see Case 4 in Table 6.3). Unfortunately, most investigations concerning the adding-averaging controversy have obtained no measures of belief strength and have usually assumed that mean evaluations of attributes provided by an independent sample can serve as estimates of the subjects' actual evaluations of the attributes.

Perhaps the most basic problem with the research paradigm used in this area is that the subject's salient beliefs about the hypothetical person are not assessed. Instead it is assumed that the subject accepts the information he receives about the hypothetical person (i.e., that all beliefs are held with equal strength) and that his attitude toward the person is a function of these beliefs, and only these beliefs. From our perspective, however, a person's attitude is determined by his salient beliefs. It follows that a subject's attitude toward a hypothetical stranger described by a set of adjectives may or may not be based on the particular items of information he was given. The subject may believe that some but not all of the adjectives are descriptive of the person in question, and he may hold these beliefs with different strengths. Further, because of the implicative structure among trait adjectives discussed in the preceding chapter, he may form inferential beliefs about the hypothetical person on the basis of the description provided by the experimenter. Thus, in order to predict a person's attitude, it is not sufficient to know what information he has been given; rather, it is necessary to assess the beliefs he actually holds, i.e., his salient beliefs.

Redundancy and inconsistency. We can use the sets of two and four adjectives given above to illustrate this problem. Suppose that a hypothetical person has been described as *intelligent* and *good-natured* and that the subject has accepted this information. If he was asked to describe the person, he would elicit the beliefs that the person is *intelligent* and *good-natured*. On the basis of an inference process, however, he might also report that the hypothetical person has various other characteristics, perhaps that he is *wise* and *friendly*. Thus, even though he was given only two items of information, his attitude would be a function of four beliefs. (The inferential beliefs are perhaps held with less certainty.) Clearly, if the subject was given additional information indicating that the hypothetical person is *wise* and *friendly*, this information would be *redundant* with the earlier information and might merely strengthen the inferential beliefs. As a consequence,

adding the two new adjectives would be expected to produce only a small increment in attitude.

Consistent with this argument, a number of studies have shown that addition of nonredundant information leads to a greater shift in attitude than addition of redundant information (Dustin and Baldwin, 1966; Wyer, 1968, 1970b; Schmidt, 1969). For example, Wyer (1968) described a hypothetical person in terms of two adjectives that were either the same (maximal redundancy), highly redundant (i.e., the conditional probability of Adjective A_2 , given Adjective A_1 , was high), or low in redundancy [that is, $p(A_2|A_1)$ was low]. It was found that for two favorable adjectives, the lower the redundancy the more positive the attitude. Similarly, given two unfavorable adjectives, the lower the redundancy, the more unfavorable the attitude.

Rather than being redundant, new information may sometimes be *inconsistent* with prior beliefs. Suppose that after accepting the information that a hypothetical person is *hostile* and *conceited*, a subject is told that the person is also *meek* and *withdrawing*. Since the subject may perceive that it is inconsistent for a person to be both *hostile* and *meek*, he may lower his confidence that the person is hostile, he may be unwilling to completely accept that the person is meek, or both effects may occur to some degree. In addition, the new information may affect inferential beliefs formed on the basis of the initial information (e.g., that the person is *belligerent* and *self-centered*). Again, we cannot assume that attitude is simply a function of the information provided. In fact, the present example shows how the addition of two moderately unfavorable items of information (meek and withdrawing) might actually increase attitude (in apparent contradiction to a summation model). Some evidence for effects of inconsistency has been provided by Wyer (1970b), Anderson and Jacobson (1965), and Hendrick and Costantini (1970) in studies of "discounting" of information. These studies will be discussed below.

In conclusion, most research comparing the summation and averaging models has used the research paradigm described previously, and results have therefore been inconsistent and inconclusive. Indeed, we know of only one study in which the expectancy-value model was used to set up situations in which the averaging and summation formulations would actually make differential predictions (Fishbein and Hunter, 1964). Unfortunately, even this study did not provide an adequate test since only limited information about a subject's beliefs was obtained and belief strength was not measured. Fishbein and Hunter described a hypothetical person in terms of one, two, four, or eight favorable adjectives and obtained a measure of attitude toward the person on five evaluative semantic differential scales. The following descriptions were used.¹²

12. These descriptions were part of a more complex design in which each subject received information about four different hypothetical persons (described by one, two, four, and eight adjectives). They represent the descriptions of the first stimulus described in four different experimental conditions.

1. honest
2. honest, loyal
3. honest, loyal, determined, successful
4. honest, loyal, determined, successful, kind, protective, friendly, helpful

Prior to receiving the description of the stimulus person, each subject rated each of 25 adjectives (including the traits used to describe the stimulus person) on the same five evaluative semantic differential scales. These ratings provided measures of attribute evaluations (e). Following his evaluation of the stimulus person, the subject was asked to write down the characteristics that had been attributed to the person. Fishbein and Hunter assumed a belief strength of 1.0 for each characteristic listed. Note, however, that an adequate measure of salient beliefs would require each subject to list *his beliefs* about the hypothetical person (not to *recall* the adjectives attributed to the person) and to indicate the strength of those beliefs. Despite these inadequacies in the belief measure used by Fishbein and Hunter, their study provided interesting data concerning the adding-averaging controversy.

Each subject's evaluation of the adjectives he reported as having been attributed to a given hypothetical person (whether or not they appeared in the actual description provided to him) were used to compute two predictions of his attitude toward that person. One predicted score was computed by taking the sum of the evaluations, a second score by averaging the evaluations. The investigators found that the averaging and adding formulations made conflicting predictions: The summation model predicted an increase in attitude with number of adjectives presented whereas the averaging model predicted a slight decrease (see Fig. 6.2). The obtained attitudes toward the hypothetical persons could therefore be used to test the two formulations. As Fig. 6.2 shows, the obtained results were very close to the predictions made on the basis of the summation model; attitudes increased with number of adjectives presented. These results in support of the additive model, however, are restricted to a situation in which beliefs are assumed to be held with equal strength; they may not be generalizable to an expectancy-value model which allows belief strength to vary.

Information Integration

We have discussed the expectancy-value formulation as a model of information integration. According to this model, a person's attitude toward some object is a function of the information (beliefs) he has about the object. The model describes how this information is integrated or combined in the formation of attitude. In the preceding chapter we discussed the multiple regression approach to inferential belief formation, which assumes a linear model of information integration. Although there are some similarities between an expectancy-value model and a simple linear model, one important difference has sometimes been overlooked. Let c

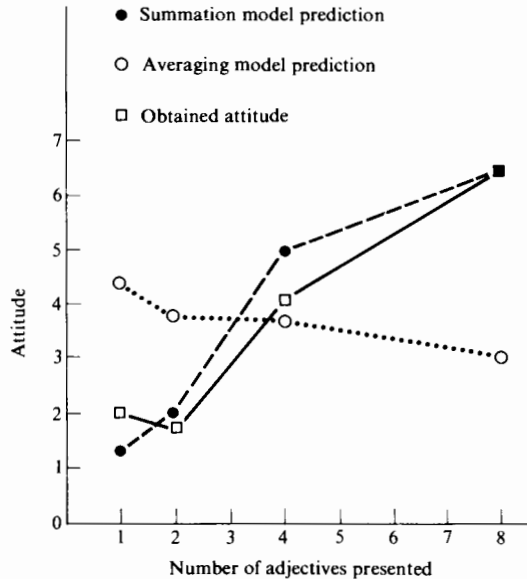


Fig. 6.2 Predicted and obtained attitudes as a function of number of adjectives presented. (Adapted from Fishbein and Hunter, 1964.)

be a constant and x , y , and z variables that can take on different values. The linear model in this case can be expressed as follows:

$$A = c_1x + c_2y + c_3z.$$

Each variable is given a constant weight in the linear model. For example, suppose that different stimulus persons are described in terms of three variables: physical attractiveness, intelligence, and conservatism. These variables will take on different values for different stimulus persons. However, for a given subject, the weight of a given variable remains constant across stimulus persons. Thus, in studies on cue utilization, each variable or cue is given a constant weight such that maximally accurate predictions of a subject's judgments can be made.

For any number of variables (v), the linear model can be written in the form

$$A = \sum_{i=1}^n c_i v_i, \quad (6.2)$$

where c_i is the weight associated with variable v_i and the sum is taken over n variables. Although this formula appears to be similar to the expectancy-value model, the latter is not a simple linear model since both b and e are considered to

be variables. Letting x and v stand for two variables, the expectancy-value model can be expressed in the form

$$A = \sum_{i=1}^n x_i v_i, \tag{6.3}$$

where x is the expectancy that the object has some attribute, v is the value of that attribute, and n is the number of attributes.¹³

According to Eq. 6.2, attitude is a *linear* function of v whereas according to the expectancy-value model (Eq. 6.3), attitude is a *nonlinear* function of v . A numerical example may help clarify this distinction. Suppose that stimulus persons are described in terms of three variables. Table 6.4 illustrates the distinction between the linear and the expectancy-value models for this situation. For example, stimulus person A may have been described as *slightly attractive, extremely intelligent, and quite liberal*, and the subject may place evaluations of 4, 7, and 5 on these traits, respectively. Similarly, Person C may have been described as *extremely unattractive, slightly intelligent, and extremely conservative*, with respective evaluations of 1, 5, and 1. According to a linear model, the weight placed on each variable is constant across stimulus persons. In our hypothetical example, the subject placed most weight on the third variable (liberalism), less on the first (attractiveness), and least on the second variable (intelligence) in forming his attitudes toward the stimulus persons. According to the expectancy-value model, however, the “weights” (i.e., expectancies) can vary across stimulus persons. For example, the subject strongly believed the information about B’s attractiveness and intelligence, but not the information about his liberalism. With respect to Stimulus Person D, he accepted the information about D’s liberalism but tended not to accept the information about his attractiveness or intelligence.

Figure 6.3 depicts the difference between the linear model and the nonlinear expectancy-value model for this example. Note that for the linear model the pre-

Table 6.4 Comparison of Linear and Expectancy-Value Models

Stimulus person	Linear model								Expectancy-value model							
	c_1	c_2	c_3	v_1	v_2	v_3	Σv_i	$\Sigma c_i v_i$	x_1	x_2	x_3	v_1	v_2	v_3	Σv_i	$\Sigma x_i v_i$
A	2	1	3	4	7	5	16	30	1	3	5	4	7	5	16	50
B	2	1	3	7	3	2	12	23	7	7	1	7	3	2	12	72
C	2	1	3	1	5	1	7	10	6	4	2	1	5	1	7	28
D	2	1	3	7	6	6	19	38	2	3	7	7	6	6	19	74

13. The expectancy-value model may be classified as a bilinear model when the $b \times e$ products are viewed as the variable and the weights are assumed to be equal across all of its values.

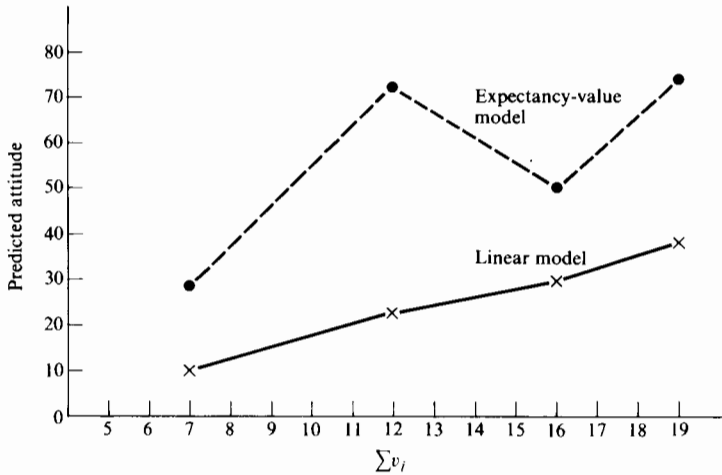


Fig. 6.3 Predicted attitude as a function of $\sum v_i$ according to linear and expectancy-value models for hypothetical values in Table 4.1.

dicted attitude ($\sum c_i v_i$) is linearly related to the evaluations of the attributes (that is, to $\sum v_i$) but that no linear relation exists between $\sum x_i v_i$ and the evaluations of the attributes ($\sum v_i$) according to the expectancy-value model. Clearly, then, although on the surface Eqs. 6.2 and 6.3 appear very similar, they do not represent the same model, and a linear model may make quite different predictions than the expectancy-value model.¹⁴

Anderson's Weighted Averaging Model

N. H. Anderson and his associates have made extensive use of a weighted linear model in their research on information integration and impression formation (for reviews, see Anderson, 1970, 1971a). Anderson has been a vigorous proponent of this weighted averaging formulation, as opposed to a weighted sum, and he has claimed considerable empirical support for the averaging model. In its most general form, Anderson's weighted averaging model has been expressed as follows:

$$R = \frac{\sum w_i s_i}{\sum w_i}, \quad (6.4)$$

where R is a response on any judgmental dimension, s is the scale value of a given item of information on the same dimension, and w is the weight or importance

14. In light of this discussion, one may argue that the Fishbein and Hunter (1964) study discussed above represents a comparison of *linear* adding versus averaging formulations (where equal weights are assumed for each item of information) rather than a comparison in terms of the expectancy-value model. That is, the two predicted attitudes $\sum x$ and $\sum x/n$ both describe a linear relation between the predicted attitude and the evaluations of the attributes.

placed on that item of information. It is usually assumed that the weight associated with a given variable remains constant over all values of that variable (cf. Anderson, 1970). Thus, in most of its applications, the weighted averaging formulation is a linear model.¹⁵ The weights in this linear model serve the same function as, and are comparable with, the regression weights obtained in a multiple regression analysis. When the weighted averaging model is applied to the attitude area, the response refers to the attitude toward an object, the scale value refers to the evaluation of a given attribute ascribed to the object, and w is the weight or importance of that attribute in the judgment.

In Chapter 5 we saw that a linear model has been found to lead to quite accurate predictions of a variety of inferential judgments. That is, the linear model accounts for much of the variance in these judgments even when there is evidence for a nonlinear or configural combinatorial process. Similar results have been obtained with respect to attitudinal judgments. In contrast to most work on cue utilization and inferential belief formation which has used a multiple regression approach, research in attitude formation has usually employed the analysis of variance approach. For example, in an early attempt to test his linear model, Anderson (1962) used sets of three adjectives to describe 27 hypothetical persons. A basic set of nine adjectives was used to describe all 27 persons; the nine adjectives were split into three subgroups containing one adjective each of low, medium, and high evaluation (as established by an independent sample of subjects). The 27 descriptions were created by forming all possible combinations in a $3 \times 3 \times 3$ analysis of variance design. Thus, one hypothetical person was described by three highly favorable adjectives, another by two highly favorable adjectives and one moderately favorable adjective, etc.¹⁶ Twelve subjects rated the likeableness of each of the 27 stimulus persons on five different occasions and a separate analysis of variance was computed for each subject.¹⁷

In terms of the linear model, each subgroup of adjectives constitutes a variable with a set of scale values (high, medium, and low) and this variable is given a constant weight. In support of the linear model, most of the variance in each subject's attitudes was accounted for by the main effects of the three variables;

15. Parenthetically we note that Eq. 6.4 is equivalent to Eq. 6.2 when the weights sum to unity (i.e., when $\sum w_i = 1$).

16. When the subgroups of adjectives are viewed as cues and their high, medium, or low favorableness as the cue values, this design is similar to that used by Himmelfarb and Senn (1969), which was discussed in Chapter 5.

17. This application of Anderson's weighted averaging model "rests on two independence assumptions. First, it is assumed that there are no contextual effects; that is, the subjective value of any stimulus is assumed independent of what other stimulus it is paired with. Second, it is assumed that w_1 is the same for each row stimulus and w_2 is the same for each column stimulus" (Anderson, 1970; p. 155). Thus the weighted averaging model is a linear model in this application as in most of its applications.

that is, the more favorable an adjective describing a given person, the more likeable that person tended to be. Further, as would be predicted by the linear model (see Chapter 5), the interaction between the three variables was not significant for nine of the twelve subjects in the study. However, deviations from linearity did reach statistical significance for the remaining three subjects. Thus, although the linear model provided a reasonably good fit to the data, it could not account for all the obtained results.

Functional measurement. Anderson (1970, 1971a) has argued that the analysis of variance approach can be used not only to provide a test of the linear model but also to estimate weights and scale values. For example, once it has been shown that the linear model holds (i.e., that there are no significant interactions), the marginal means can serve as estimates of scale values if one assumes that each variable has a constant weight.

To illustrate, consider a 2×2 design in which four hypothetical persons are described in terms of two sets of two adjectives. Further, suppose that each set is associated with a different source, as shown below:

		Source A		
		Adjective 1	Adjective 2	
Source B	Adjective 3	4	6	5
	Adjective 4	3	5	4
		3.5	5.5	

Thus a given hypothetical person is described in terms of two traits, one coming from Source A, the other from Source B. The values in the cells of the design represent attitudes toward the four hypothetical persons measured on a seven-point scale. Now assume that each source is given a constant weight, i.e., that the weight placed on Adjective 1 is equal to that placed on Adjective 2 and that Adjectives 3 and 4 also have equal weights. The marginal means can then serve as estimates of the scale values of the corresponding adjectives. Adjective 1 would have an estimated scale value of 3.5, Adjective 3 a scale value of 5, etc.¹⁸

Anderson (1970, Weiss and Anderson, 1969) has shown that when certain additional assumptions are made, weights can also be estimated, once estimates of scale values are available.¹⁹ However, when the levels of a variable can take on different weights as well as different values (i.e., when w and s can vary from row to row, from column to column, or from cell to cell in the ANOVA design), neither the weights nor the scale values can be estimated on the basis of the analysis of variance procedure.

18. Actually, the marginal means should be viewed as linear transformations of the subjective scale values.

19. For the ANOVA design above, weights can be estimated if it is assumed that $(s_1 - s_2) = (s_3 - s_4)$. An obtained inequality must then reflect differences in weights.

Comparing his weighted averaging model to the expectancy-value formulation, Anderson (1971a) has treated his scale values as the equivalent of attribute evaluation, and he has suggested that his weights may be analogous to subjective probabilities. That analogy seems unwarranted since in most applications of the weighted averaging formulation a linear model is used and the weights in a linear model are constants whereas the subjective probabilities in the expectancy-value model are variables. Although it may be reasonable to assume that different values of a given variable may be equally important in describing a person's attitude, there is no reason to assume that these different values are equally believable. For example, it is possible that information about a person's intelligence will be weighted in the same manner whether he is described as high or low in intelligence, but one cannot assume that these items of information will always be accepted to the same degree.

Similarly, it is not clear that scale values established in an analysis of variance design are equivalent to attribute evaluations. In terms of an expectancy-value model, attitude toward a stimulus person is determined by the products of belief strength and attribute evaluation (that is, $A = \sum b_i e_i$). If this model is correct, the marginal means that serve as estimates of scale values may actually represent estimates of $b \times e$ (for the different levels of a variable) rather than estimates of e . The analysis of variance can be used to test the accuracy of a linear model; in itself, however, it provides no information about the nature of the scale values. The expectancy-value formulation may also be viewed as a linear model (see note 13) in which the $b \times e$ products are the variable, and this variable is given a constant weight (w):

$$A = \sum_{i=1}^n w_i (b_i e_i).$$

In our discussions of the expectancy-value model, we have essentially assumed that the weight is 1.0 and can thus be neglected. We have further mentioned that adding a measure of importance, that is, adding a weight to the $b \times e$ products, has usually impaired rather than improved prediction. Nevertheless, when an expectancy-value model is viewed in this linear fashion, it can be seen that the scale value in Anderson's linear model may actually be equivalent to the $b \times e$ product.

Set-size effect. Just as an analysis of variance is insensitive to the nature of the scale values, it usually does not distinguish between a linear averaging model [$A = (1/n) \sum c_i v_i$] versus a linear summation model ($A = \sum c_i v_i$). In the experiment described above, the prediction of nonsignificant interactions would be made on the basis of both models and could be taken as evidence in favor of either an additive or an averaging process.

The research paradigm employed in most studies of the summation-averaging controversy uses adjectives that have previously been scaled for their likableness. Even if one assumes that these ratings are accurate estimates of the subjects' actual scale values, and if measures of the subjective weights are *not* available, almost

any obtained result can be interpreted as supporting either an additive or an averaging model by making appropriate post hoc assumptions about these weights (see Table 6.3). For example, we saw above that four highly favorable adjectives led to a more positive attitude than two highly favorable ones, and that four highly unfavorable adjectives led to a more negative attitude than two highly unfavorable ones (Anderson, 1965a). Under the assumption of equal weights, these findings provide evidence in favor of the summation model. However, Anderson (1965a, 1967, 1968a) has argued that this *set-size effect* can be accounted for by an averaging model. In order to explain the set-size effect, Anderson argued that prior to receiving information about a hypothetical person, subjects have an initial impression of that person which is usually assumed to be neutral.

To see how this notion might account for the set-size effect, consider the predicted difference in attitudes based on two versus four favorable adjectives with scale values of +2. With equal weights assumed, an averaging model would predict equal attitudes (that is, $(2 + 2)/2 = (2 + 2 + 2 + 2)/4 = 2$). However, when a neutral impression (with a scale value of 0) is taken into consideration, the larger set would result in a higher attitude (that is, $(2 + 2 + 0)/3 = 1.33 < (2 + 2 + 2 + 2 + 0)/5 = 1.60$). The qualitative prediction that is now derived from the averaging model is consistent with obtained results. A fairly precise quantitative fit to the data can be obtained by assuming that the initial impression is given a different weight than are the adjectives; the greater the weight placed on the initial impression, the stronger the set-size effect that would be predicted. Thus a set-size effect of almost any magnitude can be explained by making post hoc assumptions about differential weights. Clearly, the demonstration that weights *can* be found which will provide a reasonable fit between the data and a linear averaging model does not provide evidence for that model over some other model. Indeed, as we have shown earlier, it is possible to find weights that will make the data appear to support a linear summation model, or to find subjective probabilities that will fit the expectancy-value model. Without a clear a priori demonstration that averaging and summation models, whether they are linear or nonlinear (expectancy-value) models, make different qualitative predictions in a given situation, no crucial test of the two competing combination rules is possible.

Discounting effects. In the studies discussed so far, Anderson has claimed support for the averaging model on the assumption that different variables are given constant weights. In several studies, however, he has claimed support for the averaging model by assuming *unequal* weights (e.g., Weiss and Anderson, 1969; Anderson and Jacobson, 1965; Anderson, 1959; Anderson and Barrios, 1961). The basis for assuming equal or unequal weights is often not clear. For example, in the context of comparing linear adding and averaging models, Anderson (1965a) predicted that under the assumption of equal weights, attitudes toward a person described by two highly and two mildly favorable adjectives (HHM⁺M⁺) should be equal to the average of the two attitudes produced by four highly favorable adjectives (HHHH) and four mildly favorable ones (M⁺M⁺M⁺M⁺). Similarly, he

predicted that the attitude toward a person described as LLM-M⁻ is equal to the average of the two attitudes toward persons described as LLLL and M-M-M-M⁻.²⁰ Although the results supported the first hypothesis, attitudes based on the (LLM-M⁻) set were significantly lower than predicted.

In contrast to his initial assumption of equal weights, Anderson suggested that "the discrepancy is in the direction that would be predicted by [the weighted averaging model] if the M⁻ adjectives had lower weights than the L adjectives" (Anderson, 1965a, p. 399). Note, however, that this assumption about unequal weights is merely a post hoc attempt to explain a finding inconsistent with the hypothesis. In a later study, Anderson and Alexander (1971) attempted to demonstrate that L adjectives are indeed given greater weight than M⁻ adjectives by asking subjects to rate the importance of these adjectives. Consistent with expectations, subjects reported that L adjectives were more important than M⁻ adjectives in determining their attitudes. However, an additional finding that H adjectives were rated as more important than M⁺ adjectives was inconsistent with Anderson's (1965a) earlier assumption that these adjectives are given equal weights. Thus, even if ratings of importance can be taken as estimates of weights, the findings do not fully support Anderson's interpretation.

Further, the assumption that L adjectives are given greater weight than M⁻ adjectives is also inconsistent with Anderson's (1962) test of the linear model (see p. 239), in which he assumed that H, M, and L adjectives are given equal weights. In fact, in a later study Anderson and Jacobson (1965) argued that adjectives varying in evaluative implications should not always be given equal weights. They described stimulus persons by three adjectives that were either highly favorable or highly unfavorable. Each adjective may be viewed as a variable that can take on a positive or negative scale value. Using a 2 x 2 x 2 analysis of variance design, they described eight stimulus persons. They hypothesized that an adjective inconsistent with the other two would be *discounted*, i.e., would be given lower weight. Thus, since an H adjective tends to be inconsistent with two L adjectives, it should be discounted. In one condition of the experiment, subjects were told that "one of the adjectives did not actually apply, that they should decide which one was inapplicable, and base their impression on the other two" (p. 534). In this condition, a significant interaction was obtained. Since a linear model that assumes equal weights would predict no interaction, this finding was taken to mean that different weights must have been applied to the adjectives, i.e., that discounting must have taken place.

It is interesting to note that in another experimental condition subjects were given Anderson's standard instructions, which emphasize that "all three words are accurate and each word is equally important" (Anderson and Jacobson, 1965, p. 534). Even under these instructions, which had previously been assumed to

20. Under the assumption of equal weights, the same predictions are made by linear averaging and summation models. These predictions do not follow when weights are unequal, as in the expectancy-value model, for example.

ensure equal weights, a significant interaction was obtained. Thus it appears that even under standard instructions, the assumption of equal weights may not be warranted.

More important, note that a significant interaction does not necessarily provide evidence for different weights or discounting. Instead, the interaction may be produced by interacting scale values. That is to say, when two or more adjectives are paired, one adjective may influence not only the weight of the other but also its scale value. Either effect would lead to an interaction. Unfortunately, the experiment reported by Anderson and Jacobson (as well as other experiments on the discounting effect) does not permit a distinction between change in weights and change in scale values. This distinction has become a major focus of investigation in research on order effects in impression formation.

Order Effects

In Chapter 5 we discussed Asch's (1946) work on impression formation. Among other things, Asch examined the effects of order of presentation and found evidence for a *primacy effect*. That is, adjectives appearing early in a list were found to exert a stronger influence on the formation of beliefs about the person described than adjectives presented later in the list. The same paradigm has been employed in research on order effects in attitude formation. In an early study, Anderson and Barrios (1961) used several lists of six adjectives each to describe different stimulus persons. Among the lists was that used by Asch (1946), in which adjectives were arranged in terms of their favorability: *intelligent, industrious, impulsive, critical, stubborn, and envious*. The order of presentation was reversed for half the subjects. Attitudes toward the stimulus person were measured on an eight-place scale ranging from *highly favorable* to *highly unfavorable*. Consistent with results reported by Asch, a primacy effect was obtained such that attitudes were more positive when favorable adjectives appeared at the beginning of the list than when the list was presented in reverse order.²¹

Similar results have been reported in several subsequent investigations that have used a variety of stimulus lists (e.g., Anderson and Hubert, 1963; Stewart, 1965; Hendrick and Costantini, 1970). Although the primacy effect is not always significant (e.g., Anderson and Norman, 1964), whenever a stimulus person is described by several adjectives and subjects are asked for their evaluation of the person following complete presentation of the list, adjectives presented early tend to have a stronger effect on attitudes than do adjectives presented late in the list.²² Much of the recent research has attempted to test proposed explanations for this primacy effect.

21. The study used 61 different lists of adjectives; Asch's list was presented either first or last. The primacy effect was obtained only when the list was presented first.

22. The primacy effect is not found with very short lists of adjectives (e.g., Anderson and Barrios, 1961), and it tends to disappear with practice (Anderson and Barrios, 1961; Anderson and Hubert, 1963).

Change in meaning. One explanation was offered by Asch (1946) in terms of "directed impression" or "change in meaning." Asch suggested that adjectives presented early in a list may set up an initial impression that influences interpretation of later adjectives. However, Asch also pointed out that a primacy effect will not always be found, because an adjective in any position may for some reason play a "central" role and thus direct the overall impression. This explanation has been interpreted as suggesting that the meaning of a word in isolation may change when the word is placed in a certain context. With respect to the primacy effect, this implies that early adjectives influence the "meaning" of later ones, i.e., that the evaluations placed on later adjectives depend in part on the adjectives that have appeared earlier in the list.

Indirect evidence for a change in meaning interpretation has been obtained in studies of context effects. For example, Osgood and Tannenbaum's (1955) *congruity principle* was developed to explain the emergent meaning of a stimulus complex. In Chapter 2 we described the model for two items of information. In its more general form, the congruity principle can be expressed as follows:

$$A = \frac{|e_{n-1}|e_{n-1} + |e_n|e_n}{|e_{n-1}| + |e_n|} \quad (6.5)$$

In Eq. 6.5, e_{n-1} is the evaluation of a stimulus complex comprising $n-1$ items of information, e_n is the evaluation of the n th item of information, and $|e_{n-1}|$ and $|e_n|$ are the absolute values or polarities of these evaluations. As each new item of information is provided, it is essentially averaged with the attitude based on the preceding information. The congruity principle predicts how evaluations of words in isolation should change when combined in a stimulus complex. The predicted point of resolution is the person's attitude toward the stimulus complex, and according to the congruity principle, the evaluation of each word in the complex is the same as the overall attitude. Depending on the evaluations of prior and new information, either a primacy or a recency effect may be obtained.

Although most research on the congruity principle has been conducted in the area of communication and persuasion, the model has also been used in research on impression formation by predicting attitudes toward a person on the basis of information provided about the person (e.g., Osgood and Ferguson, 1957; Triandis and Fishbein, 1963; L. R. Anderson and Fishbein, 1965). Two of these studies compared the predictive accuracy of the congruity principle and other information integration models. Triandis and Fishbein compared the congruity principle with a simple sum of evaluations (that is, Σe_i), and Anderson and Fishbein compared it against the expectancy-value model.²³ Both alternative models were found to make more accurate predictions than the congruity principle

23. Triandis and Fishbein's study was designed to test the expectancy-value model under the assumption that subjects accept each item of information (that is, b was assumed to be 1.0). However, this assumption may not have been warranted.

made. It thus appears that the congruity model is not a very effective formulation in the context of impression formation.

Several investigators have attempted to provide an explicit test of the notion that a word changes its meaning when it is placed in different contexts. For example, Heise (1969, 1970) and Gollob (1968) found that evaluations of words in isolation differed from their evaluations in the context of a sentence. More directly relevant to impression formation, several investigators (Anderson and Lampel, 1965; Anderson, 1966; Wyer and Dermer, 1968; Wyer and Watson, 1969; M. F. Kaplan, 1971) have shown that evaluation of an adjective in the context of a stimulus list differs from the evaluation of that adjective in isolation. The general finding is that evaluation of an adjective in context is displaced toward the evaluations of the other adjectives in the list. To illustrate, Anderson (1966) placed H, M⁺, M⁻, and L adjectives in HH, M⁺M⁺, M⁻M⁻, and LL contexts. Evaluations of the test adjectives are shown in Fig. 6.4.

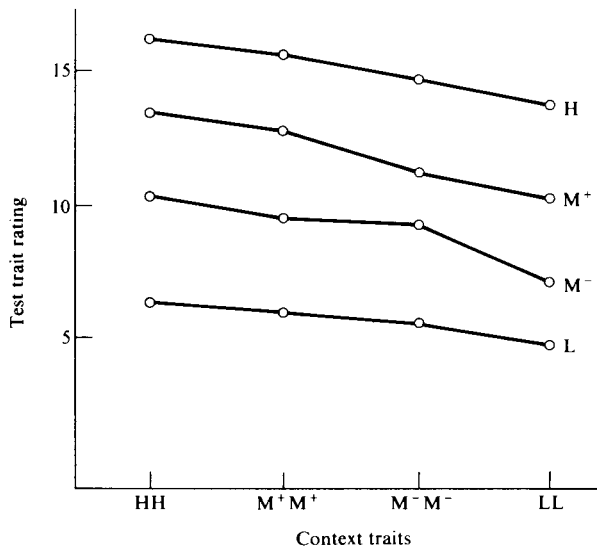


Fig. 6.4 Evaluations of adjectives in different contexts. (Adapted from Anderson, 1966.)

Although these context effects appear to support the hypothesis regarding change in meaning, Anderson (1966) challenged that interpretation. He argued in effect that an attitude toward a stimulus person who is described by several adjectives is based on the evaluation of each adjective in isolation. Once the attitude has been formed, however, the evaluation of a given adjective in the list may be influenced by the overall impression. Thus, "if this view is correct, the positive context effect would be a generalized halo effect rather than change of meaning" (Anderson, 1971b, p. 76). In keeping with his general integration theory, Anderson suggested that the evaluation of an adjective in context is a weighted average of its evaluation in isolation and of the overall attitude toward the stimulus per-

son. Although several studies have been conducted to test some of these notions (e.g., Anderson, 1966; 1971b; M. F. Kaplan, 1971), the weighted averaging model has not been directly tested with respect to context effects, and the research generated to date by Anderson's interpretation cannot be taken as evidence for or against a change-in-meaning hypothesis.

Chalmers (1969) has proposed a change-in-meaning explanation of order effects which relies on changes in weights rather than changes in scale values. According to Chalmers, the weight of a given adjective in a trait set is determined by the affective value of the preceding adjectives. Thus the weight of a given adjective will be greater when it is preceded by similar adjectives than when it is preceded by different adjectives.²⁴ Therefore a shift from positive to negative adjectives, or vice versa, will lead to a reduction in weights and will thus result in a primacy effect. Chalmers showed that this hypothesis could account for data which had previously been interpreted as supporting an attention-decrement explanation of primary effects.

Attention decrement. Explanations of the primacy effect centering on change in weights have usually proposed that early adjectives are given more weight than later ones. One account of this process is based on the notion of an *attention decrement* (e.g., Anderson and Hubert, 1963; Anderson, 1965b; Stewart, 1965; Anderson and Norman, 1964; Hendrick and Costantini, 1970). According to this notion, subjects pay less attention to later adjectives; that is, they place lower weights on each successive adjective. Specifically, the hypothesis is that weights are a linear decreasing function of an adjective's serial position in a stimulus list.

To test this hypothesis, Anderson (1965b) systematically varied the serial order position of three highly unfavorable adjectives relative to a set of highly favorable adjectives. Similarly, a set of three highly favorable adjectives were interpolated within a set of highly unfavorable adjectives. The design for one experimental condition is illustrated in Table 6.5. The adjectives were read in the order illustrated, and subjects evaluated each stimulus person on an eight-point scale. As Table 6.5 shows, a primacy effect was obtained: The attitude formed was increasingly more positive as the unfavorable adjectives moved into later positions. Results were parallel for the interpolation of favorable adjectives among unfavorable ones. That is, the impression became less favorable as the serial position of the favorable adjectives decreased. Anderson argued that these results are consistent with the attention-decrement hypothesis if one assumes that weights decrease with serial order positions.²⁵

24. This hypothesis, as well as Anderson's (1971b) weighted average explanation of context effects mentioned above, are conceptually related to the congruity-principle interpretation of context effects discussed above.

25. Anderson also argued that these results are consistent with his weighted averaging model. However, recall that Chalmers (1969) similarly argued that these results are consistent with his "change in meaning" model, which assumes that the weights are a function of the evaluation of previous adjectives, rather than a decreasing function of serial position.

Table 6.5 Adjective Arrangements and Obtained Attitudes (Adapted from Anderson, 1965b)

Arrangement of adjectives	Obtained attitudes
LLLHHHHHH	5.10
HLLLHHHHH	5.20
HHLLLHHHH	5.25
HHHLLLHHH	5.40
HHHHLLLHH	5.50
HHHHHLLLH	5.55
HHHHHHLLL	5.60

However, Anderson did not provide a direct test of the attention-decrement hypothesis. For a direct test, it would be necessary to obtain estimates of each adjective's weight and to show that weights decrease with serial position. Most other studies also provide only an indirect test of the attention-decrement hypothesis by creating conditions which should induce subjects to pay attention to all adjectives in the list. This tactic is expected to eliminate attention decrement and thus reduce or eliminate the primacy effect. For example, subjects have been instructed that they would have to recall the adjectives presented (Anderson and Hubert, 1963), they have been asked to evaluate the stimulus person after each successive adjective (Stewart, 1965); and they have been asked to pronounce each adjective as it is presented (Anderson, 1968a; Hendrick and Costantini, 1970).

All these studies appear to support the attention-decrement hypothesis in that the usual primacy effect disappears when subjects are induced to pay attention to each adjective. In fact, some of the studies (e.g., Anderson and Hubert, 1963) reported a *recency* effect; i.e., later adjectives had a greater impact on the final evaluation than earlier adjectives. Note that the attention-decrement hypothesis cannot explain the emergence of these recency effects. If subjects pay equal attention to all adjectives, no order effect should be obtained. To account for a recency effect, one would have to assume that attention *increases* with serial position, although the psychological basis for such an assumption is not readily apparent.

Strong evidence against the attention-decrement hypothesis was reported by Anderson and Hubert (1963). In addition to obtaining evaluations of the stimulus person, these investigators asked subjects to recall the adjectives used to describe that person. Some subjects were told in advance that they would have to recall the adjectives, but others were not so informed. Attention decrement was expected for subjects who were not told that they would be asked to recall the adjectives. Those subjects should therefore have paid less attention to later adjectives.

tives and should have been less likely to recall them. Contrary to this hypothesis, recall increased (rather than decreased) with serial position.

Discounting. Another possible explanation is the previously discussed notion that inconsistent information will be *discounted* (i.e., given lower weight). Under the assumption that negative adjectives appearing late in the list are inconsistent with positive adjectives appearing early in the list, or vice versa, a primacy effect is expected if the later adjectives are discounted (e.g., Anderson and Jacobson, 1965; Anderson, 1968a).

On purely logical grounds, inconsistency resolution could be achieved equally well by discounting either the early or the late adjectives. It has been argued, however, that it is easier to discount the later information than to change the impression created by the initial information (Hendrick and Costantini, 1970). If this assumption holds, discounting would lead to a primacy effect.

Studies that have been viewed as supporting the attention-decrement hypothesis can also be viewed as supporting the discounting hypothesis if it is assumed that discounting of inconsistent information is less likely when subjects are induced to pay attention to all adjectives in a stimulus list (Anderson and Jacobson, 1965).

Attempts to provide tests between the competing hypotheses have yielded inconclusive results. For example, Anderson (1968a) constructed lists including H and M⁺ adjectives or L and M⁻ adjectives. He argued that attention decrement could occur with these lists, but little discounting would be expected since the adjectives in a given list were not affectively inconsistent. Anderson thus proposed that a primacy effect should be observed if the attention-decrement hypothesis holds whereas no primacy effect would be expected under the discounting hypothesis. The data showed no effect of order of presentation for favorable adjectives and a recency effect for unfavorable adjectives. These findings were taken as support of the discounting principle.

Hendrick and Costantini (1970) noted, however, that Anderson's subjects had been asked to pronounce each adjective as it was presented, a procedure that tends to eliminate the primacy effect (see our earlier discussion), and they argued that Anderson's results were therefore consistent with both the attention-decrement and the discounting hypothesis. In their test of the discounting principle, Hendrick and Costantini used different lists of six (three H and three L) adjectives varying in consistency. (The lists varied in terms of perceived likelihood that a person possessing the H traits could also possess the L traits.) Subjects simply listened to the list of adjectives and then evaluated the stimulus person on an eight-point scale. Under the discounting hypothesis the prediction would be that the greater the inconsistency between H and L adjectives in a given list, the more discounting should occur and hence the stronger the primacy effect should be. Contrary to the discounting hypothesis, all adjective lists produced primacy effects, and the effect was no greater for highly inconsistent than for highly consistent lists. Thus they argued that their results supported an attention-decrement explanation.

To summarize briefly, research on order effects indicates that when a stimulus person is described in terms of a set of adjectives and subjects evaluate the person after all adjectives have been presented, a primacy effect is usually obtained. Various explanations have been offered to account for this effect, including change in meaning, attention decrement, and discounting. Studies designed to test the explanations have found that when subjects are induced to pay attention to all adjectives in the list, the primacy effect tends to disappear and is sometimes replaced by a recency effect. This finding, however, does not appear to provide clear evidence in favor of one explanation as opposed to another.²⁶

Expectancy-Value Analysis of Order Effects

From our point of view, the finding that order of presentation influences attitude implies that when a given list of adjectives is presented in different orders, different belief systems are formed. In other words, order of presentation may result in the formation of different beliefs, may influence belief strength, or may affect evaluations of the adjectives. Which of these processes is responsible for a given order effect can be determined only when measures of beliefs and attribute evaluations are available. One possible interpretation of order effects from the point of view of an expectancy-value formulation is related to the recall of information presented. In most research in impression formation, subjects have no prior beliefs about the hypothetical stimulus person, and it seems reasonable to assume that the beliefs they come to hold are primarily determined by the information they can recall about the person. This does not mean that they will believe everything they recall or that the beliefs they do form will be held with equal strength. Moreover, subjects may form additional inferential beliefs about the stimulus person on the basis of these initial beliefs.

In our discussion of serial order learning in Chapter 5 we noted that items appearing at different positions in a list are not equally likely to be recalled. Now assume that for some reason subjects are better able to recall adjectives appearing early in the list. If the informational and inferential beliefs they actually form are based on the adjectives they can recall, a primacy effect will obtain. A similar argument can be made for a recency effect. When early and late adjectives are recalled equally well, neither primacy nor recency are expected. Research on serial order learning has shown that words at the beginning and end of a list tend to be better recalled than words in the middle. Further, there is usually a slight tendency for words at the beginning to be recalled better than words at the end, suggesting

26. Results supporting the attention-decrement or discounting principles have often been taken to rule out the change-in-meaning explanation. This conclusion does not necessarily follow, since increased attention to later information may influence the degree to which a change in meaning takes place. When subjects are induced to pay attention to all information, the items received first may no longer direct the overall impression; in fact, it is possible that an item appearing toward the end of the list will now become central and thus produce a recency effect.

that a primacy effect may often be obtained. However, it is also found that many other factors may influence serial order learning, such as transition from positive to negative adjectives or vice versa, the uniqueness or novelty of a word, its familiarity, etc. Thus no general predictions concerning recency or primacy effects can be made.

These considerations, based on findings in the area of serial order learning, should not be accepted uncritically, because research in this area has been concerned primarily with *accuracy* of recall; reports of information not contained in the list are usually treated as errors and are excluded from the analysis. (For an example in impression formation research, see Anderson and Hubert, 1963). Within our conceptual framework, these "errors" may constitute beliefs about the stimulus person that influence the subject's attitude.²⁷

That order of presentation can influence inferential belief formation is shown by Asch's (1946) findings concerning order effects, which were reported in Chapter 5. Recall that Asch presented a list of adjectives in ascending or descending order of favorability and asked his subjects to indicate their beliefs about the stimulus person on 18 bipolar adjective scales. The inferential beliefs formed on the basis of the two orders of presentation differed greatly, and the expectancy-value formulation suggests that attitudes should differ accordingly. Specifically, presenting the list in a descending order of favorability led to the formation of more positive inferential beliefs than did presenting it in ascending order. Thus the former presentation should produce a more favorable attitude toward the stimulus person than the latter; i.e., a primacy effect is expected. This expectation was confirmed in a study by Anderson and Barrios (1961), in which Asch's original list was employed.

More direct support for these notions was obtained in a study by Jaccard and Fishbein (1975), who used six positive and six negative adjectives to construct the four lists shown in Table 6.6. Each list was read to a different group of subjects, who indicated their attitudes toward the stimulus person on a seven-point scale ranging from *like* to *dislike*. By comparing the effects of List 1 versus List 2 and List 3 versus List 4, one can see that this measure of attitude revealed a strong primacy effect.

To account for order effects in the framework of the expectancy-value formulation, Jaccard and Fishbein obtained several additional measures. Each subject was asked to recall the adjectives used to describe the stimulus person, as well as to list any other adjectives (i.e., infer traits) that "you think might characterize the person described." The subject then indicated how certain he was that each adjective listed was in fact an attribute of the stimulus person (on a four-point *not at all certain*–*extremely certain* scale), and evaluated each adjective on a seven-

27. Support for this argument was provided by Fishbein and Hunter (1964), who showed that subjects "recalled" many adjectives that were not included in the stimulus list and that it was possible to predict attitudes toward the stimulus person by considering all adjectives reported. Unfortunately, no direct comparisons were made between predictions based on total and correct adjectives recalled.

Table 6.6 Descriptive Adjectives and Order of Presentation (from Jaccard and Fishbein, 1975)

List 1	List 2	List 3	List 4
Loving	Critical	Ugly	Quiet
Sincere	Stout	Rude	Rich
Ambitious	Nervous	Boring	Musical
Musical	Boring	Nervous	Ambitious
Rich	Rude	Stout	Sincere
Quiet	Ugly	Critical	Loving
Ugly	Quiet	Loving	Critical
Rude	Rich	Sincere	Stout
Boring	Musical	Ambitious	Nervous
Nervous	Ambitious	Musical	Boring
Stout	Sincere	Rich	Rude
Critical	Loving	Quiet	Ugly
<i>A</i>	4.55	3.45	3.43
$\Sigma b_i e_i$	14.72	6.16	-1.53
			8.70

point *good-bad* scale. Finally, embedded within a longer list of traits, the 12 adjectives originally used to describe the stimulus person were each rated on the certainty and evaluative scales.

The measures of certainty (*b*) and evaluation (*e*) were used to compute $b \times e$ products, and three different estimates of attitude (that is, three $\Sigma b_i e_i$ scores) were derived for each subject: (1) based only on traits correctly recalled; (2) based on all traits recalled plus traits inferred (i.e., on all traits listed); (3) based on the 12 traits used to describe the stimulus person (whether recalled or not).

From our point of view, the second index, that based on *all* of the subject's salient beliefs about the stimulus person (whether provided by the experimenter or not), should serve as the best estimate of attitude. As Table 6.6 indicates, this estimate showed a primacy effect, just as did the direct measure of attitude. Further, consistent with expectations, this estimate had a significantly higher correlation with the direct measure of attitude ($r = .67$) than did either the first estimate based on recall ($r = .47$) or the third estimate based on adjectives provided ($r = .48$).

Since Jaccard and Fishbein obtained independent measures of belief strength, attribute evaluations, and recall with respect to each of the 12 adjectives presented, they could test the different explanations of the primacy effect discussed above. Specifically, the attention-decrement hypothesis suggests that recall should decline gradually with the adjective's serial position in the list. A discounting effect would be observed if adjectives in the second half of the list (which were inconsistent with those in the first half) were believed less than adjectives in the

first half. Finally, the directed impression-hypothesis predicts that positive adjectives appearing first in the list should be evaluated more favorably than the same positive adjectives presented after a set of negative adjectives. The reverse effect should hold for negative adjectives appearing before and after a set of positive adjectives.

The results gave partial support to the discounting hypothesis, but there was no evidence for attention decrement or a directed impression. Although adjectives presented in the first quarter of a list were recalled better than later adjectives, there was no gradual decline. In fact, in some conditions the recall again increased toward the end of the list, as might be expected on the basis of the serial order effect in learning. With respect to discounting, there was an overall tendency to accept adjectives in the first half of the list more than those that followed. The tendency was not consistent across lists, however, and for at least two lists there was little evidence of discounting.

Conclusions Concerning the Informational Basis of Attitude

We have discussed theories and research based on the notion that attitudes are determined by information about the attitude object. Evidence was reviewed in support of an expectancy-value model according to which a person's attitude toward an object is a function of his beliefs about the object's attributes and his evaluation of those attributes. We noted that the expectancy-value formulation is not a linear model of information integration, despite its apparent similarity to such a model in terms of its algebraic expression. Although not necessarily a linear model at the conceptual level, Anderson's weighted averaging model assumes linearity in most of its research applications. Anderson's integration theory and, in particular, his linear weighted averaging model have stimulated many interesting lines of research, and attempts have been made to explain various research findings in terms of variations in weights and scale values (see Anderson, 1971a).

Since our conceptual framework assumes that the expectancy-value model is descriptive of attitude formation, it is instructive to reexamine research based on the linear model from the perspective of our conceptual framework. One major difference between these two approaches concerns the information that is assumed to determine attitudes. In research in impression formation the general assumption is that subjects form their attitudes toward a stimulus person on the basis of the adjectives attributed to that person. According to the linear model, each item of information is given some weight (which may be zero), and attitude toward the stimulus person is a function of the weighted scale values of these items of information and the initial impression (i.e., the initial attitude, which is often assumed to be neutral). In contrast, from our point of view, attitudes are determined by the salient beliefs that a subject comes to hold about the stimulus person as a result of the information presented to him. Clearly, he may not believe all the information he is given, and at the same time he may form additional inferential beliefs that can also influence his attitude. Thus the salient beliefs that a subject

actually comes to hold about the stimulus person may not directly correspond to the information provided.

This distinction between information provided and formation of salient beliefs may help explain some of the inconsistent findings in research on impression formation. For example, we have noted that adding a new item of positive information about a person can produce either an increment, a decrement, or no change in the attitude toward that person. These apparently conflicting findings can be understood when one realizes that a new item of information may have several effects. (1) It may lead to the formation of an informational belief (i.e., it may be accepted to varying degrees). The strength of the informational belief may depend in part on the subject's prior beliefs about the stimulus person. (2) It may lead to the formation of inferential beliefs. (3) It may influence some of the prior beliefs. (4) It may affect evaluations of attributes associated with any of these beliefs. The standard research paradigm used to test between adding and averaging models has not been concerned with these possible effects. We have therefore argued that this paradigm is inappropriate and can yield only inconsistent and inconclusive results.

Similar considerations apply to an analysis of order effects. We have seen that different orders of presentation may influence the beliefs that are formed and hence may produce primacy or recency effects. Experimental variations are expected to influence attitudes to the extent that they have an effect on these beliefs or on the evaluations of the associated attributes. For example, manipulations designed to induce subjects to pay equal attention to all adjectives presented are likely to influence recall and hence to have an effect on the beliefs formed by the subjects. Thus, much of the research on order effects can be understood in terms of an expectancy-value formulation. Note, however, that many of the considerations above are ad hoc explanations of phenomena investigated in research on impression formation. By the same token, Anderson's (1971a) attempt to account for findings in this area in terms of his weighted averaging model and Chalmers's (1969) attempt to account for the data in terms of his "change in meaning" model are also ad hoc explanations that have to be substantiated in future research. We have repeatedly noted that conclusive evidence for any model can be provided only when estimates of its parameters are available. Despite the elegance of Anderson's analysis of variance approach, and despite the fact that his integration theory has generated a considerable number of interesting studies, the absence in most studies of direct estimates of the weight and scale value parameters makes it impossible to reach unequivocal conclusions.²⁸

In contrast, our conceptual framework provides clear definitions of beliefs and evaluations, and it suggests how these variables can be measured. This feature makes it relatively easy to test the expectancy-value model in various con-

28. Further, even when estimates of weights have been obtained, they have not usually been cross-validated. Since these weights are least-squares estimates, cross-validation is required to demonstrate their reliability.

texts by computing estimated attitudes that can be compared with obtained results. Evidence to date tends to support the expectancy-value formulation as a model of the attitude-formation process.

INTERPERSONAL ATTRACTION

Up to this point we have made no distinction between the formation of attitudes toward objects, persons, issues, actions, or events. We have suggested that attitudes toward any stimulus are based on information about that stimulus, and that the expectancy-value model describes the information integration process whereby attitudes are formed. Most research on attitude formation, however, has dealt with attitudes toward other persons, and several noninformational bases of interpersonal attraction have been suggested: similarity of beliefs, interests, or personality traits; complementarity of need systems; reciprocity of liking; high ability, competence, etc. In this section we will review some of the research on these noninformational bases of attitude formation. We shall see, however, that all research findings in this area are compatible with an information-processing approach.

Similarity and Attraction

Perhaps the most systematic program of research on interpersonal attraction is the work of Byrne and his associates on the relationship between similarity and attraction (for reviews of this literature see Byrne, 1969, 1971). The original hypothesis underlying this research can be summarized as follows: The more similar another person's opinions, interests, or personality characteristics to those of a perceiver, the more will the perceiver come to be attracted to the person. This hypothesis has been investigated in numerous studies using a standard research paradigm involving several steps. The subject is first asked to respond to a standard questionnaire, which may be an opinion survey, a personality inventory, a self-rating scale, an interest inventory, etc. At a later point in time the subject is shown the same questionnaire ostensibly completed by another person, who is a stranger to the subject. The stranger's responses are varied systematically in terms of the degree to which they are similar to the subject's own responses. After receiving this information, the subject rates the stranger's attractiveness on a standard instrument, the Interpersonal Judgment Scale (IJS).

In his initial experiment using this paradigm, Byrne (1961) gave college students a 26-item opinion survey early in the semester. All items were bipolar and presented in a six-alternative multiple-choice format. The following two items may serve as examples.

1. One true religion (check one)

- _____ I strongly believe that my church represents the one true religion.
 _____ I believe that my church represents the one true religion.
 _____ I feel that probably my church represents the one true religion.

- I feel that probably no church represents the one true religion.
 I believe that no church represents the one true religion.
 I strongly believe that no church represents the one true religion.

2. Situation comedies (check one)

- I dislike situation comedies very much.
 I dislike situation comedies.
 I dislike situation comedies to a slight degree.
 I enjoy situation comedies to a slight degree.
 I enjoy situation comedies.
 I enjoy situation comedies very much.

In a later session, each subject was given a questionnaire and was told that it had been filled out by another student of the same sex, who was not in their psychology class and whom the subject did not know. For half the subjects, the questionnaires were prepared in such a way that the stranger responded to all 26 of the issues exactly as the subject had done. Each of the remaining subjects received a questionnaire prepared in such a manner that it was a mirror image of his own responses. "For example, if the subject was strongly against integration and mildly in favor of smoking, the stranger was strongly in favor of integration and mildly against smoking." (Byrne, 1971, p. 51)

After reading the questionnaire, subjects were asked to respond to the Interpersonal Judgment Scale. The IJS consists of six seven-point bipolar items in multiple-choice format. The first four items deal with the stranger's intelligence, knowledge of current events, morality, and adjustment. These items have usually been treated as filler items, and responses to the remaining two questions have served as the dependent measure of interpersonal attraction.²⁹ Specifically, the sum over the following two items has been used as an index of attraction; this index can vary from 2 to 14.

1. Personal feelings (check one)

- I feel that I would probably like this person very much.
 I feel that I would probably like this person.
 I feel that I would probably like this person to a slight degree.
 I feel that I would probably neither particularly like nor particularly dislike this person.
 I feel that I would probably dislike this person to a slight degree.
 I feel that I would probably dislike this person.
 I feel that I would probably dislike this person very much.

29. Responses to the four filler items were viewed as inferential beliefs in Chapter 5, where results concerning these items were discussed.

2. Working together in an experiment (check one)

- _____ I believe that I would very much dislike working with this person in an experiment.
- _____ I believe that I would dislike working with this person in an experiment.
- _____ I believe that I would dislike working with this person in an experiment to a slight degree.
- _____ I believe that I would neither particularly dislike nor particularly enjoy working with this person in an experiment.
- _____ I believe that I would enjoy working with this person in an experiment to a slight degree.
- _____ I believe that I would enjoy working with this person in an experiment.
- _____ I believe that I would very much enjoy working with this person in an experiment.

Consistent with expectations, the mean attraction toward the similar stranger (13.00) was significantly greater than the mean attraction toward the dissimilar stranger (4.41). This positive relation between similarity and attraction has been repeatedly replicated in a large number of subsequent investigations.

Although Byrne and Nelson (1965a) reported a high correlation ($r = .85$) between the two items that constitute the IJS attraction measure, our conceptual framework suggests that these items measure two different attitudes: The first question serves as a general measure of attitude toward the stranger and the second as a measure of attitude toward working with him in an experiment. Consistent with this argument, Mascaro and Lopez (1970) reported somewhat different results for these two items. Similarly, Ajzen (1974) found that although the two items correlated significantly ($r = .69$), results obtained with one item were not identical to results obtained with the other. Further, Ajzen (1974) as well as others (e.g., Gormly, Gormly, and Johnson, 1971) have reported different results for the IJS and a semantic differential measure of attraction. Despite these problems, it appears reasonable in many situations to regard Byrne's interpersonal-attraction measure as an index of attitude toward the stimulus person.

Degree of similarity. In Byrne's (1961) initial experiments, descriptions of the stranger were either in complete agreement or complete disagreement with the subject's opinions. In subsequent studies the *degree* of similarity was also manipulated. For example, Byrne (1962) constructed eight descriptions of a stranger using seven opinion items. The extent to which the stranger agreed with the subject was systematically manipulated (see Table 6.7, which also presents the obtained results). Consistent with expectations, attraction increased with degree of similarity. However, Byrne and Nelson (1965a) noted that these results could be due either to the *number* of similar items, the *number* of dissimilar items, or the

Table 6.7 Degree of Similarity and Attraction (Adapted from Byrne, 1962)

Experimental condition	Attraction
7 Similar, 0 dissimilar	12.15
6 Similar, 1 dissimilar	11.15
5 Similar, 2 dissimilar	11.43
4 Similar, 3 dissimilar	9.07
3 Similar, 4 dissimilar	8.69
2 Similar, 5 dissimilar	8.47
1 Similar, 6 dissimilar	7.71
0 Similar, 7 dissimilar	7.00

proportion of similar to dissimilar items since these two variables (i.e., number and proportion) are confounded.

In order to clarify this issue, Byrne and Nelson conducted an experiment in which they attempted to separate number and proportion of similar items. The design for this experiment is shown in Table 6.8. If the similarity-attraction relation were attributable to the number of similar or dissimilar opinions, a significant difference between column means should be obtained. Since the only significant effect in this study was the difference between row means (see Table 6.9), Byrne and Nelson concluded that attraction is a function of the *proportion* of similar items, regardless of the total number of items involved.³⁰

In a later study, Rosenblood (cited in Byrne, 1971) presented subjects with sets of one, two, three, four, and six opinion items describing different strangers.

Table 6.8 Byrne and Nelson's Experimental Design (Adapted from Byrne and Nelson, 1965a)

Proportion of similar opinions	Number of similar opinions		
	4	8	16
1.00	4-0*	8-0	16-0
.67	4-2	8-4	16-8
.50	4-4	8-8	16-16
.33	4-8	8-16	16-32

* The first value refers to the number of similar opinions, the second to the number of dissimilar opinions.

30. Byrne (1971) noted that these findings appeared inconsistent with Anderson's (1965a) notion of a set-size effect. If the set-size effect had been operative, a significant interaction between number and proportion of similar opinions should have been obtained.

Table 6.9 Attraction Toward Strangers with Varying Numbers and Varying Proportions of Similar Opinions (Adapted from Byrne and Nelson, 1965a)

Proportion of similar opinions	Number of similar opinions			
	4	8	16	Total
1.00	11.14	12.79	10.93	11.62
.67	10.79	9.36	9.50	9.88
.50	9.36	9.57	7.93	8.75
.33	8.14	6.64	6.57	7.12
Total	9.86	9.59	8.73	

Each set was either completely similar to or completely dissimilar from the subject. Thus proportion was held constant while the number of similar opinions varied. In contrast to the Byrne and Nelson study, the Rosenblood study found a relation between attraction and number of similar opinions.³¹

The findings concerning degree of similarity thus suggest that both proportion and number of similar items influence attraction. Although the proportion of similar items appears to be of primary importance, the number of similar items also plays a significant role, at least up to six or eight items.

Order effects. As in the area of impression formation, the possibility has been raised that different orders of sequential presentation of similar and dissimilar opinions may influence interpersonal attraction in the Byrne paradigm. To study this problem, Byrne and London (1966) prepared tape recordings in which a stranger verbalized his response to each of 56 opinion items. Four experimental conditions were created.

1. *Similar condition:* Stranger agrees with subject on all 56 opinion items.
2. *Similar-dissimilar condition:* Stranger agrees with subject on 28 opinion items in the following descending order: 8/8, 7/8, 6/8, 4/8, 2/8, 1/8, 0/8. Thus the stranger's responses progressed from complete agreement (8/8) to complete disagreement (0/8).
3. *Dissimilar-similar condition:* Stranger agrees with subject on 28 opinion items in an ascending order, the reverse of Condition 2. Here the stranger's responses progress from complete disagreement to complete agreement.
4. *Dissimilar condition:* Stranger disagrees with subject on all 56 items.

Mean attraction scores obtained in each condition can be seen in Table 6.10. Attraction decreased from the similar to the dissimilar condition. The key com-

31. Although Byrne (1971) argued that this difference in results was due to Rosenblood's use of a within-subjects design, Rosenblood's data also permit a between-subjects analysis which again shows the relation between attraction and number of similar opinions.

parison, however, is between Conditions 2 and 3. The results indicate a primacy effect since the similar-dissimilar order produced greater attraction than the reverse order, but the difference was not significant.

Table 6.10 Order Effects on Attraction (Adapted from Byrne and London, 1966)

Condition	Attraction
Similar	11.90
Similar-dissimilar	8.20
Dissimilar-similar	7.30
Dissimilar	5.50

The tendency toward a primacy effect when subjects are asked to evaluate the stimulus person only after all information has been presented is consistent with research on impression formation. In a later study, Byrne, Lambirth, Palmer, and London (1969) found that a recency effect is obtained when subjects are asked to evaluate the stranger either after each opinion item is presented or after every fourth opinion item. The findings of Byrne and his associates on order effects, therefore, are quite consistent with the work on impression formation discussed above.

Importance of opinion items. Byrne and Nelson (1964) proposed that topic importance was likely to be a major determinant of an item's effect on attraction. It stands to reason that a stranger's agreement or disagreement with respect to an important issue should have a greater impact on attitudes toward him than would his response on an issue of little importance. To test this hypothesis, four sets of 14 opinion items each were constructed on the basis of importance ratings supplied by an independent sample of subjects. The first list comprised the 14 items that had been rated as most important, the second list the 14 next most important items, etc. Each subject responded to one of these lists and was later given the responses of a stranger on the same list; the stranger either agreed or disagreed completely with the subject. Contrary to predictions, topic importance had no effect on attraction. Although the similar stranger was always evaluated more favorably than the dissimilar stranger, the difference was not greater for similarity of important opinions than it was for similarity of unimportant opinions.

In a second study, Byrne and Nelson (1965b) had each subject rate four strangers, each of whom was described by one of the four lists used in the previous study. The results again showed no significant effect of importance. A third study was then designed (Byrne, London, and Griffitt, 1968) in which opinions varying in importance were attributed to the same stranger, rather than to different strangers. Four experimental conditions were employed. In the first two conditions, the stranger agreed with the subject on 32 out of 56 opinion items (75

percent); in the remaining two conditions he agreed with 14 out of 56 items (25 percent). Within the 75 percent similarity groups, the stranger agreed on either the 32 most important or the 32 least important opinions. Similarly, within the 25 percent similarity groups, the stranger agreed on either the 14 most or the 14 least important opinions. Thus, in this "intra-stranger" design, the stranger agrees with the subject on the important items and disagrees with him on the unimportant ones or vice versa. The results of this study showed a significant effect of importance: In addition to the usual effect of degree of similarity, the stranger's agreement on important items (and disagreement on unimportant ones) led to greater attraction than did his agreement on unimportant opinions (and disagreement on important ones).

Similar findings were reported by Clore & Baldridge (1968), who varied interest value of opinion items instead of importance. Using a similar intra-stranger design, they found that subjects were more attracted to strangers who agreed with them on interesting issues and disagreed on uninteresting ones than to strangers who exhibited the reverse pattern. In a later study, Clore and Baldridge (1970) found the same pattern of results when opinion statements attributed to a stranger were treated as unimportant items of information and personal evaluations of the subjects, ostensibly made by the stranger, were treated as important items.

Byrne's attraction model. Based on the research above (and many other studies), Byrne and his associates (Byrne and Nelson, 1965a; Byrne and Rhamey, 1965; Byrne, 1971) have proposed a model of the similarity-attraction relationship. In its simplest form, the model states that attraction is a linear function of the proportion of similar opinion items,

$$A = cX + b, \quad (6.6)$$

where A is attraction, X is the proportion of similar opinions, and c and b are constants. If S and D stand for number of similar and dissimilar opinions, respectively, X can be written as $S/(S + D)$, and

$$A = c \left[\frac{S}{S + D} \right] + b. \quad (6.7)$$

Since agreement or disagreement on some opinion items may carry more weight in the determination of interpersonal attraction than agreement or disagreement on others, this model could be extended by including weighting parameters. The weighted formulation may then be written as follows:

$$A = c \left[\frac{\sum_{i=1}^S W_i}{\sum_{i=1}^S W_i + \sum_{j=1}^D W_j} \right] + b. \quad (6.8)$$

In Eq. 6.8, W_i is the weight of the similar opinion i , and W_j is the weight of the dissimilar opinion j . The other terms are defined as in Eq. 6.7.

Although Eq. 6.8 implies that each opinion expressed by the stranger can be given differential weight, the model has not been applied in this fashion. Instead, Byrne and Rhomey (1965) proposed that one weight be given to similar opinions and another to dissimilar ones. With the weight for similar opinions denoted by W_s and that for dissimilar opinions by W_d , Eq. 6.8 then takes on the following form.³²

$$A = c \left[\frac{W_s S}{W_s S + W_d D} \right] + b. \quad (6.9)$$

Note that when similar and dissimilar opinions are given equal weights (that is, $W_s = W_d$), the weights cancel and Eq. 6.9 reduces to Eq. 6.7. In that case, the weights placed on similar and dissimilar opinions will have no effect on attraction.

Clore and Baldrige (1968, 1970) noted that Eq. 6.9 can explain the findings concerning effects of importance on attraction. Although important items may be given more weight than unimportant items, importance will influence attraction only when similar and dissimilar opinions are not equally important, i.e., when they are not given equal weights. In the first two studies dealing with this issue (Byrne and Nelson, 1964, 1965b), a given stranger was described in terms of opinion items that had been rated as equally important. By way of contrast, in the three studies that obtained a significant effect of importance (Byrne, London, and Griffitt, 1968; Clore and Baldrige, 1968, 1970), all similar opin-

32. In many studies, similar items vary in degree of similarity, and dissimilar items vary in degree of dissimilarity. For example, on similar opinions the stranger's positions could be removed 0, 1, or 2 scale points from the subject's own positions whereas on dissimilar items the distance could be 3, 4, or 5 scale points. To take degree of similarity or dissimilarity into account, Eqs. 6.7, 6.8, and 6.9 could be written as follows:

$$6.7: A = c \left[\frac{\sum_{i=1}^n S_i}{\left(\sum_{i=1}^n S_i + \sum_{j=1}^m D_j \right)} \right] + b.$$

$$6.8: A = c \left[\frac{\sum_{i=1}^n W_i S_i}{\left(\sum_{i=1}^n W_i S_i + \sum_{j=1}^m W_j D_j \right)} \right] + b.$$

$$6.9: A = c \left[\frac{W_s \sum_{i=1}^n S_i}{\left(W_s \sum_{i=1}^n S_i + W_d \sum_{j=1}^m D_j \right)} \right] + b.$$

In these equations, S and D stand for the degree of an opinion's similarity or dissimilarity, respectively (in the example above, S and D might be scored from 1 to 3), and W is the weight of a similar or dissimilar opinion.

ions were important and dissimilar ones unimportant, or vice versa. This intra-stranger design allows weights of similar and dissimilar opinions to vary, and hence importance becomes a relevant variable.

In sum, Byrne's research program has conclusively demonstrated a positive relation between similarity and attraction. Although our discussion has been primarily concerned with the degree of similarity between *opinions* held by two persons, Byrne, Clore, and Worchel (1966) proposed that any aspect of similarity-dissimilarity affects attraction in the same manner. In search of support for this contention, Byrne and his associates have asked subjects to complete a large variety of questionnaires and have provided feedback concerning a hypothetical stranger's responses to the same questionnaires. As expected, manipulations of similarity on the basis of these questionnaires have consistently shown a positive relation between similarity and attraction. Among other things, attraction was found to be influenced by similarity with respect to personality inventories, such as a repression-sensitization scale, masculinity-femininity scale, dominance-submissiveness scale, and an introversion-extroversion scale; ability and intelligence tests; information about spending habits; and various self-descriptions in terms of personality characteristics or behavioral patterns. (For a review of this literature, see Byrne, 1971.) Thus there seems to be little question about the empirical relationship between similarity and attraction. The following sections will be concerned with the basis for this relationship.

Expectancy-Value Analysis of the Similarity-Attraction Relation

The reader has probably noted some obvious similarities between Byrne's research paradigm and studies of impression formation. In both areas of research, subjects receive information about a stimulus person, and their attitudes toward that person are measured. This parallel is most apparent when responses to a self-descriptive personality inventory are used in the Byrne paradigm. As in impression formation, subjects in these studies are shown a number of adjectives describing the stimulus person. The major difference between the two approaches involves the basis for selecting the descriptive adjectives: In the Byrne paradigm, the adjectives are selected such that the stimulus person appears similar or dissimilar to the subject whereas in studies of impression formation they are usually selected on the basis of their affective values.

From our point of view, however, the basis for selecting particular items of information about another person is largely irrelevant for an understanding of attitude formation in these situations. As in research on impression formation, subjects in Byrne's paradigm are provided with information about a hypothetical stranger (in the form of his opinions, personality traits, abilities, etc.) which is likely to lead to the formation of beliefs about the stranger's attributes. According to the expectancy-value formulation, the subject's attitude toward the stranger will be a function of those beliefs and the evaluation of the attributes. Consider, for example, a subject's attitude toward a political candidate. At the beginning

of this chapter we described some of the research on political attitudes conducted by Fishbein and his associates, and we noted that beliefs about a political candidate, including beliefs about his positions on various issues, strongly influenced attitudes toward the candidate. That is, the attitudes could be predicted with great accuracy by considering the subject's beliefs about the candidate's positions on various issues and the subject's evaluations of those positions (i.e., by estimating $\sum b_i e_i$). These estimates of attitude are obtained without reference to the degree to which the candidate's positions are similar to those of the subject. Clearly, however, a measure of similarity of political opinions could be obtained, and Byrne's research suggests that such a measure of similarity would correlate with attitude toward the candidate. Indeed, Byrne, Bond, and Diamond (1969) reported a positive relation between similarity and attraction toward a political candidate when the candidate's positions on six issues varied in their degree of similarity to the subject's positions.

Two interpretations can be offered for the observed relation between similarity and attraction. In the first, similarity as such is an important determinant of attitude. According to this position, attraction toward another person is directly determined by the degree to which he is similar to the perceiver. This point of view has been characteristic of most research on the similarity-attraction relation. Another interpretation, one that is consistent with our conceptual framework, focuses on the information about the other person that is available to the subject. According to this view, favorably evaluated items of information lead to the formation of a favorable attitude. Similarity enters the picture only indirectly, and without causal effects on attraction. To return to attitudes toward a political candidate, it stands to reason that a subject will have favorable evaluations of positions with which he agrees and will negatively evaluate positions with which he disagrees.³³

The same argument can be made for other types of information about a person, such as his opinions concerning nonpolitical issues or his personality characteristics. With respect to the latter, Stalling (1970) asked subjects to rate 121 personality traits (e.g., aggressive, honest, introverted) as "pleasant" or "unpleasant" and as "like me" or "unlike me." Most subjects perceived traits to be both positive and similar or negative and dissimilar; the correlation between perceived similarity and evaluation was .88. It can thus be argued that similarity may not have a direct effect on attraction. Instead, it is possible that attribute similarity is related to attraction only indirectly as a result of its association with attribute evaluation. That is, similarity may be related to attribute evaluation, which influences attraction.

These arguments suggest that if it were possible to separate attribute similarity and attribute evaluation, the former would have little or no effect on attraction.

33. A similar interpretation of attraction in the Byrne paradigm has been offered by Kaplan and Anderson (1973) in the framework of Anderson's theory of information integration. However, see the rejoinder by Byrne *et al.* (1973).

a score of +2 was assigned. This value was multiplied by the subject's evaluation of selfishness. The products for all 12 traits were summed to provide the estimate of attitude. The correlation between this estimate and the direct measure of the subject's attitude was .48 when the IJS attraction measure was used and .57 for a semantic differential measure of attitude toward the stranger. Although these correlations are statistically significant, they are of relatively low magnitude. This finding should not be too surprising since no measure of the subject's own beliefs about the stranger were available. That is, attitudes were estimated by assuming that subjects believed the information provided. An adequate application of the expectancy-value model would require that subjects indicate their subjective probabilities that the stranger had each of the traits in question. Further, subjects may form inferential beliefs about the stranger, and these beliefs would also have to be assessed.

We have repeatedly made reference to research showing that information about another person's personality traits often leads to the formation of inferential beliefs about the stranger's personality. By the same token, information about another person's opinions may also produce inferential beliefs. Knowing that a person holds certain opinions may lead to the inference that he holds other opinions as well. Further, such knowledge may also lead to inferences about the person's personality attributes. For example, if a subject is told that a stranger believes in God, he is likely to infer that the stranger is religious. Similarly, if a subject is told that a stranger is opposed to racial integration in public schools and opposed to birth control, he may infer that the stranger is prejudiced and conservative. Attitudes toward a stranger may be based in part on such inferential beliefs.

Support for this notion was provided in a second study in which Ajzen (1974) described a stranger in terms of his responses to 12 opinion items similar to those used by Byrne and his associates; these items dealt with various social and political issues. The responses attributed to the stranger were randomized across subjects; that is, each subject received a different response profile, which had been constructed by placing check marks on the response scales at random. Thus no attempt was made to manipulate the similarity between opinions of stranger and subject. After viewing the stranger's responses, subjects were asked to rate him on the IJS and on a semantic differential scale. In addition, they were given a list of 100 adjectives for which Anderson (1968b) had previously reported mean likability ratings. Subjects indicated whether each of the 100 personality traits was descriptive of the stranger (+1) or not descriptive (-1), or whether they were undecided (0). The ratings for each trait were multiplied by Anderson's likability ratings for the same trait; the resulting products were summed as an estimate of the subject's attitude toward the other person.³⁴ This

34. Again, this estimate does not meet all the requirements of the expectancy-value model; measures of the subject's own evaluations and the strength of his beliefs would be required.

estimate correlated significantly with the IJS measure of attraction ($r = .68$) as well as with the semantic differential measure ($r = .66$).

In sum, Ajzen's (1974) study indicated that attraction toward a stranger is determined in large part by beliefs about the stranger's attributes and by evaluations of those attributes. Descriptions of a stranger in terms of his opinions or personality characteristics provide information which can serve as the basis for the formation of those beliefs. Further the study showed that attraction was determined by the evaluation of another person's attributes rather than by their similarity to the subject's own attributes. Our discussion above suggests, however, that similarity may be related not only to evaluations of attributes contained in the description of the stranger, but also to the evaluations of attributes assigned to the stranger on the basis of inference processes. Without measures of inferential beliefs, it may be impossible to completely separate attribute similarity from attribute evaluation, and even in studies that attempt to provide an experimental separation, a relation between similarity and attraction may sometimes be found—although the relation should be weak. In support of this argument, McLaughlin (1970) found no significant relation between similarity and attraction when he statistically controlled for attribute evaluation, and Tesser (1969) found a low, though significant, relation using the same procedure.³⁵ In a more recent study, McLaughlin (1971) obtained a significant effect of similarity when he experimentally separated attribute similarity and evaluation. In contrast to these inconsistent findings concerning the effects of similarity, attribute evaluations were always found to have a strong effect on attraction.

Evidence that inferential beliefs are formed about the stranger's personality characteristics on the basis of information about his opinions may provide an explanation for the finding that beyond approximately six opinion items, the number of items has no effect on attraction (see p. 259). We have argued that attitude is determined by a small number of a person's salient beliefs. When a subject is given information about one or two opinions held by a stranger, he is likely to make only a few inferences about his personality characteristics and perhaps to hold these inferential beliefs with low certainty. By the time he has received information on the stranger's responses to four or five opinion items, a larger set of salient beliefs will have been formed, and these beliefs are likely to be held with greater confidence. Information about additional opinions, so long as it does not lead to inferences inconsistent with prior beliefs, will not have much effect on the belief system and hence will not be expected to influence attraction.

Similarity and Reinforcement

We have argued that the frequently observed relation between similarity and attraction is not due to the direct effects of similarity on attraction but rather to the

35. These investigations examined the relation between similarity and attraction when attribute evaluation was held constant by computing a partial correlation (Tesser, 1969) or by conducting an analysis of covariance (McLaughlin, 1970).

tendency for similar opinions or personality characteristics to be favorably evaluated. For different reasons, Byrne and his associates (Byrne, 1969, 1971; Byrne and Lamberth, 1971; Clore and Byrne, 1974; Byrne and Clore, 1970) have also taken the position that similarity in and by itself does not determine attraction. Consistent with other theorists (e.g., Newcomb, 1956), Byrne suggested that people are attracted to others who reward them and dislike those who punish them. Byrne and Nelson (1965a) proposed a "law of attraction" according to which "attraction toward x is a positive linear function of the proportion of positive reinforcements received from x " (p. 662). The Byrne paradigm was developed on the assumption that agreement concerning some issue is positively reinforcing and disagreement has negative reinforcement value. To explain these effects of opinion similarity, Byrne borrowed from Festinger (1950, 1954), Newcomb (1953, 1956), and other theorists and suggested that

the expression of similar attitudes by a stranger serves as a positive reinforcement because consensual validation for an individual's attitudes and opinions and beliefs is a major source of reward for the drive to be logical, consistent, and accurate in interpreting the stimulus world. In an analogous way, the expression of dissimilar attitudes by a stranger provides consensual invalidation, is therefore frustrating, and acts as a negative reinforcement. (Byrne, 1971, p. 338)

This notion that opinion similarity is reinforcing was generalized to similarity of any kind, including personality characteristics, abilities, etc. (Byrne, Clore, and Worchel, 1966). Further, Byrne and Clore (1970) and Clore and Byrne (1974) attempted to account for the development of interpersonal attraction within a more general learning theory framework. They suggested that reinforcing events elicit positive implicit responses whereas punishing events elicit negative affect. These implicit affective reactions become conditioned to the stimuli with which they are associated. "Thus, one likes others who reward him because they are associated with one's good feelings." (Clore and Byrne, 1974) It follows that each time a stranger agrees with the subject or exhibits traits or abilities that correspond to those of the subject, a positive implicit reaction may be elicited which becomes conditioned to the stranger. The more similar the stranger, the more he will tend to be liked. However, similarity may not always be positively reinforcing. For example, being similar to someone who is described in a negative fashion may not be particularly rewarding, and similarity will not be expected to produce attraction. These considerations are consistent with the finding that attribute similarity does not have a strong effect on attraction when attribute evaluation is held constant.

Unfortunately, as with most reinforcement notions, these arguments lead to circular reasoning since it is difficult to arrive at an independent definition of reinforcement (see Levinger, 1972). Specifically, similarity is said to lead to attraction because of its reinforcement value, and we know that it has reinforcement value when it produces attraction. Reinforcement value is therefore solely

defined in terms of observed attraction, and it is impossible to know in advance whether similarity should or should not lead to attraction. Despite this limitation, the reinforcement explanation places the study of attraction in a broader theoretical framework that provides specific testable implications. For example, learning theory specifies that the amount of attraction should be a function of the *number* of reinforced trials. Byrne's (1971) conclusion that attraction is only a function of proportion and not of number of similar opinions is in direct opposition to most reinforcement theories.³⁶

A second major implication is that some events are more reinforcing than others and hence should produce greater attraction. We have seen above that under appropriate experimental conditions, agreement on important issues led to greater attraction than agreement on unimportant issues. Similarly, personal evaluations received from a stranger had a greater effect on attraction than did his agreement or disagreement on opinion items. Byrne and his associates have interpreted these results as supporting the notion that more important items of information have greater reinforcement value. It is equally plausible, however, that agreement on an important issue is evaluated more favorably than agreement on an unimportant issue. Similarly, evaluations of praise may be more favorable than evaluations of a person's position on an issue. This interpretation is consistent with an expectancy-value formulation.

In a similar fashion, the reinforcement position implies that a given event (e.g., agreement on an issue) may be more reinforcing for some subjects than for others. Specifically, the reinforcement value of a given event should depend in part on the motivational state of the subject. For example, food is likely to be more reinforcing to a hungry person than to a person who has just eaten. Of greater relevance to attraction, agreement on opinion items should have greatest reinforcement value for persons with a high need for consensual validation or with a high need for approval. Thus the effect of similarity on attraction should interact with personality variables of this kind: The difference in attraction toward similar and dissimilar strangers should be greater for subjects on one side of the personality dimension (e.g., high need for approval) than for subjects on the other side of the dimension (low need for approval). Byrne (1971) reviewed studies that have attempted to test this hypothesis by examining personality variables such as authoritarianism, dogmatism, repression-sensitization, self-ideal discrepancy, cognitive complexity, test anxiety, manifest anxiety, need for approval, and need for affiliation. He concluded that "not only have perfectly reasonable personality variables failed to show any relationship to attraction responses but those variables for which positive results are obtained often show no effects in subsequent experiments or only in seemingly random subsequent experiments" (Byrne, 1971,

36. In defense of a reinforcement interpretation, it might be argued that conditioning of affect to the stranger reaches an asymptote after five or six reinforced trials. The finding that number of similar opinions has an effect on attraction up to about six opinion items is consistent with this argument. However, it appears unlikely that an asymptote is reached after so few reinforced trials.

p. 213). The evidence concerning personality variables, therefore, seems to argue against a reinforcement interpretation of the similarity-attraction relation.

A third implication of the reinforcement position can be stated as follows: If similar opinion items, personality traits, or abilities have positive reinforcement value and elicit positive affect, it should be possible to use such information as unconditioned stimuli in classical conditioning experiments or as reinforcers in operant conditioning (see Chapter 2). Byrne and his associates have tested these implications in a number of investigations (e.g., Golightly and Byrne, 1964; Byrne, Young, and Griffitt, 1966; Sachs and Byrne, 1970). This research will be reviewed below in the context of our discussion of conditioning as a basis for attitude formation. Suffice it to note here that although there is abundant evidence that similar and dissimilar opinion items can be used successfully in learning situations, our discussion in Chapter 4 has made it clear that such learning does not occur without awareness. As we shall see below, this implies an informational rather than a reinforcement basis for attitude formation.

A final implication of the reinforcement position is that any event that has reinforcement properties should influence attraction. Thus situations have been created in which another person behaves favorably or unfavorably toward the subject, evaluates him positively or negatively, rewards or punishes him by using bonus points or shocks, etc. Consistent with a general reinforcement hypothesis, these manipulations have usually been found to influence interpersonal attraction. However, these results do not provide direct evidence that *similarity* has reinforcement value.

In conclusion, there is little support for the reinforcement interpretation of the observed similarity-attraction relation. It appears more reasonable to suggest that this relation is due to the differential evaluations of similar and dissimilar items of information rather than to the reinforcement value of such information. This implies that attitude formation in the Byrne paradigm, as in other studies of impression formation, is based on information about the other person. This information enables the subject to form beliefs about the person, and these beliefs determine the subject's attitude, as described by an expectancy-value model.

Minitheories of Attraction

Many studies on interpersonal attraction have been isolated attempts to investigate the effects of one or more variables on the formation of attitude toward another person. For the most part, variables have been selected for study on the basis of some vague intuitive notion. Thus it has been hypothesized that another person will be liked if he is competent, if he praises the subject, if he performs a favor for the subject, if he maintains eye contact with the subject, if he commits a blunder, if he asks for help, etc. (see Aronson, 1970). Aronson, Willerman, and Floyd (1966), for example, conducted an experiment on the effects on attraction of competence and a pratfall. Subjects listened to a tape recording purportedly

of a student who was a candidate for a university team in an intelligence competition. The candidate responded to a series of knowledge questions. In one condition, he exhibited great competence but in another condition he failed to answer even simple questions. For half the subjects in each condition, the tape ended with the candidate sipping a cup of coffee. For the other half, he spilled the coffee and exclaimed, "Oh my goodness, I've spilled coffee all over my new suit!" According to Aronson, Willerman, and Floyd (1966, p. 227)

A near perfect or superior individual who shows that he is capable of an occasional blunder or pratfall may come to be regarded as more human and more approachable; consequently he will be liked better *because* of this pratfall. On the other hand, if a mediocre or average person commits an identical blunder, he will not undergo an increase in attractiveness. Indeed, since it would suggest only that he is *very* mediocre, it should lower his attractiveness.

Before one considers the results of this study, it is important to examine the implications of an intuitive hypothesis of this kind. Although this particular hypothesis may be of substantive interest, its theoretical import is negligible. This can best be seen by considering the implication of a failure to find support for the hypothesis. If the blunder did not raise attraction toward the superior person, the conclusion would simply be that this variable does not influence attraction. Disconfirmation of the hypothesis would have no theoretical importance and would merely suggest that the experimenters' intuition had been mistaken. Nobody would be particularly surprised or upset by the disconfirmation.

Suppose, on the other hand, that the blunder did increase attraction toward the superior individual. The experimenters might then conclude that "humanization" is an important determinant of attraction. Additional studies could be conducted to test this "minitheory" of attraction by looking for other variables that might serve to humanize a person. Thus the concept of humanization becomes a major focus of research. Note, however, that these research efforts are unlikely to appreciably advance our understanding of processes underlying interpersonal attraction or attitude formation. At best we might learn that humanization constitutes one of the myriad of factors that may be related to attraction, and we would still be left with a notion of little theoretical import. Such an approach is not likely to provide a cumulative body of knowledge concerning the formation of interpersonal attitudes.

Perhaps more damaging to such an approach is the fact that more often than not our intuition tends to be misleading, and no firm conclusions can be reached concerning the effects of a given variable on attraction. In the study by Aronson, Willerman, and Floyd (1966) the results provided only tentative support for the humanizing effect of a pratfall. As Table 6.12 shows, spilling the coffee tended to increase the attractiveness of the competent candidate, but it reduced attraction toward the incompetent candidate. Although the interaction between pratfall and competence was significant, the effect of the pratfall was

Table 6.12 Effects of a Pratfall on Attraction
(Adapted from Aronson, Willerman, and
Floyd, 1966)

	Pratfall	No pratfall
Competent candidate	30.2	20.8
Incompetent candidate	-2.5	17.8

significant only for the incompetent candidate. Thus, there seemed to be a tendency for the pratfall to humanize the competent individual, but the tendency was not significant.

Despite this lack of significance, a number of subsequent investigations have attempted to demonstrate that spilling a cup of coffee serves to humanize a competent person and to increase attraction toward that person. None of the subsequent investigations have found support for the predicted effect of humanization. Kiesler and Goldberg (1968) found that a pratfall had no effect on attraction toward a competent other. Helmreich, Aronson, and LeFan (1970) found that a pratfall tended to lower attraction toward another person irrespective of his competence. Finally, contrary to the humanization hypothesis, Mettee and Wilkins (1972) reported that in at least one condition a pratfall lowered attraction toward a *competent* person whereas it had no effect on liking for an incompetent person. Taken as a whole, these studies fail to provide support for the intuitive hypothesis that a blunder may serve to humanize a superior individual. In fact, despite a concentrated effort at investigating this "minitheory," we are left with no viable conclusion and little information concerning the factors that determine interpersonal attraction.

This series of studies on the effects of a pratfall exemplifies much recent research on interpersonal attraction. Although the research is based on intuitive notions and is conducted in a largely unsystematic manner, the basic research paradigm employed is in many ways similar to the more systematic investigations of impression formation and interpersonal attraction discussed earlier. As in studies on impression formation, subjects are exposed to a situation that provides information about another person, and their attitudes toward that person are measured. Usually, a factorial analysis of variance design is employed. In the studies on effects of a pratfall, for example, subjects listened to tape-recorded interviews that were designed to provide two items of information: (1) that the candidate has either high or low competence and (2) that he did or did not commit a blunder. In contrast to an impression-formation experiment in which a subject might simply be told that the candidate is competent and spilled his coffee, these items of information were conveyed to subjects in the context of a complex situational manipulation. An attempt is usually made to construct situations that will lead subjects to form appropriate inferences about the other person. To test the success of their competence manipulation, Aronson, Willerman, and Floyd

(1966) included a measure of the candidate's intelligence which confirmed that the competent individual was perceived as more intelligent than the incompetent one.

Within the framework of this approach, then, the assumption is that, with the exception of the two items of information concerning the person's competence and pratfall, everything is constant across conditions. Differences in attraction are therefore expected to be solely a function of these two items of information. One pervasive feature of much of this research is worth noting. Almost without exception, the basic hypotheses in these studies concern interaction effects. That is, the effect on attraction of one item of information is expected to depend on the other items of information that have been provided.

An investigator usually selects some variable that should clearly have an effect on attraction. For example, a similar person is usually liked better than a dissimilar person, praise usually leads to greater attraction than derogation, an individual who succeeds on a task is usually more attractive than one who fails or commits a blunder, etc. The investigator then speculates about the conditions under which these effects might not be found or even reversed. He might argue that opinion similarity will *not* produce attraction toward a stimulus person who is emotionally disturbed (Novak and Lerner, 1968) or that a pratfall will *increase* attraction for a highly competent individual (Aronson, Willerman, and Floyd, 1966). Essentially, then, these studies are designed to show that the information conveyed by a given manipulation or event takes on different *meaning* under different conditions. Similarity with respect to a normal person is supposed to be reinforcing whereas it may change its meaning and become punishing with respect to an emotionally disturbed person (Byrne and Lamberth, 1971). Similarly, a pratfall may take on different meaning when committed by competent and incompetent individuals.

Expectancy-Value Analysis of Factorial Experiments on Attraction

The research paradigm described above is readily interpretable within our conceptual framework. After exposure to the experimental situation, a subject will have formed a number of beliefs about the stimulus person. In fact, the complex experimental manipulations provide an array of information that is likely to lead to the formation of diverse descriptive and inferential beliefs. An expectancy-value formulation would suggest that the subject's attitude toward the stimulus person is determined by those beliefs about the person's attributes and by the subject's evaluations of the attributes. In contrast, investigators performing these experiments on attraction have singled out a small number of beliefs (e.g., *O* is competent, *O* spilled his coffee) and have assumed that differences in attitudes are determined only by differences in those beliefs.

Our discussions of research on impression formation and on the similarity-attraction relation have made it clear that the formation of attitudes in a given situation can be understood only by considering all of the subject's salient beliefs

about the stimulus person. An experimental manipulation can be expected to have an effect on attraction only when it influences belief strength or attribute evaluations. For example, in the Aronson, Willerman, and Floyd (1966) experiment, subjects listened to a tape recording of a candidate responding to a series of questions. Inferences were probably made about the candidate's intelligence, competence, and ability, and perhaps about other attributes, such as his confidence, poise, pleasantness, etc. These inferences should differ for the competent and incompetent candidates. Introduction of a pratfall toward the end of the recording can have many different effects. First, it may itself lead to the formation of certain beliefs, such as that the candidate is clumsy, nervous, etc. The nature of these inferences based on the blunder may depend on the prior beliefs about the candidate. If he is believed to be competent and poised, the subjective probability that he is clumsy may be lower than if he is believed to be incompetent. Further, the evaluation of spilling a cup of coffee may differ when that blunder is committed by persons of high and low competence. That is, a blunder may take on different meaning in different contexts. Second, the pratfall may influence the strength of beliefs formed prior to the pratfall: Information that the candidate spilled his coffee may lower the subjective probability that he is poised or that he is competent. All these effects would contribute to the final evaluation of the candidate.

Without knowing which of these effects actually occurred, one cannot predict the attitudes that will be formed in the different experimental conditions. In order to understand the effects of a given manipulation on attraction, it is necessary to specify its locus of effect: whether it leads to the formation of new beliefs, whether it changes existing beliefs, or whether it influences evaluations associated with those beliefs. Clearly, without such information it is impossible to make accurate predictions about the effects of a given variable on attraction, and inconsistent findings are to be expected.

Gain-Loss Effect

It may be instructive to examine another series of studies which exemplify some of these problems. Aronson and Linder (1965) proposed a minitheory of attraction according to which "a gain in esteem is a more potent reward than invariant esteem and similarly a loss of esteem is a more potent 'punishment' than invariant negative esteem" (p. 156). In order to test this gain-loss theory of attraction, Aronson and Linder created a situation in which the subject was evaluated by a confederate seven times during the experiment. Subjects participated in one of four experimental conditions:

1. *Invariant high esteem.* The successive evaluations of the subject made by the confederate were all highly positive. On each occasion, the confederate described the subject in terms of positive attributes such as "a good conversationalist," "very intelligent," "probably having a lot of friends," etc.

2. *Invariant low esteem.* The successive evaluations of the subject made by the confederate were all very negative (e.g., "dull conversationalist," "rather ordinary person," "not very intelligent," etc.)
3. *Gain in esteem.* The evaluations in the first three periods were very negative (as in Condition 2) but then became gradually more positive such that in the seventh period they were equal to the evaluations in Condition 1.
4. *Loss in esteem.* The first few evaluations were positive but gradually became negative, leveling off at a point equal to the evaluations in Condition 2.

After the last period, subjects were asked to evaluate the confederate on a 21-point scale ranging from *like her extremely* to *dislike her extremely*. The results of the study showed a significant gain effect. That is, a gain in esteem led to greater attraction toward the confederate than invariant high esteem. However, the loss effect was not significant. There was only a tendency for loss in esteem to produce less liking than invariant low esteem. These findings in partial support of the gain-loss model are shown in Table 6.13.

Table 6.13 Attraction Toward
Confederate (Adapted from
Aronson & Linder, 1965)

Condition	Attraction
Gain in esteem	7.67
Invariant high esteem	6.42
Invariant low esteem	2.52
Loss in esteem	.87

Despite these inconclusive results, Aronson and Linder (1965) suggested several possible bases for the gain-loss effect, and several studies have been designed to test the proposed explanations (e.g., Landy and Aronson, 1968; Sigall and Aronson, 1969; Sigall, 1970). Overall, results of these studies have not been very consistent, nor have they identified the basis for the gain-loss effect (cf. Fishbein and Ajzen, 1972). This should not be surprising since, as we saw above, the original Aronson and Linder (1965) experiment provided only limited support for the existence of a gain-loss phenomenon. More important, a number of subsequent investigations have failed to find any support for the gain-loss hypothesis. For example, in a second study Sigall and Aronson (1967) reported neither a gain nor a loss effect on attraction, thus failing to replicate the earlier Aronson and Linder study. Further, in discussing research on the similarity-attraction relation, we noted a study by Byrne and London (1966) which can also be viewed as a direct test of the gain-loss hypothesis (see Table 6.10). In that study, a hypothetical stranger agreed continuously (invariant reward), disagreed continuously

(invariant punishment), or gradually shifted from complete agreement to complete disagreement (loss) or from complete disagreement to complete agreement (gain). As Table 6.10 shows, neither a gain nor a loss effect was obtained. Similar results were recently reported by Hewitt (1972). At least three additional studies have also failed to support the gain-loss hypothesis (Taylor, Altman, and Sorrentino, 1969; Mettee, 1971; Chaikin, 1971).

Interestingly, one of the few studies providing clear evidence for any kind of gain-loss phenomenon examined the effects of gain and loss on the running speeds of rats. Giving rats one trial a day under constant drive conditions (22 hours' food deprivation), Crespi (1942) measured the running times for traversing a straight runway. A *constant-reward group* always received 16 units of food at the end of each trial, whereas in four other groups incentive magnitude was changed after the rats reached a specified performance level. In two *gain groups*, incentives were shifted upward from low reward (1 or 4 units) to the same level as the constant reward group (16 units). In the *loss groups*, incentives were shifted downward from high reward (256 or 64 units) to the constant reward level (16 units). Consistent with a gain-loss hypothesis, the finding was that after the shift, the gain groups traversed the runway at significantly higher speeds and the loss group ran at significantly lower speeds than did the constant-reward group. However, even with rats, this gain-loss effect appears to be unreliable. Zeaman (1949), reporting a study similar to Crespi's, found only a significant gain effect. As in the Aronson and Linder (1965) study, the loss was not significant.

In conclusion, a considerable number of studies have failed to demonstrate the gain-loss effect in interpersonal attraction. There is no evidence at all for a loss effect, and there is only very limited evidence for a gain effect. This research makes it clear once more that we cannot expect consistent and theoretically meaningful findings to be obtained when studies are designed merely to test intuitive propositions about the factors influencing attraction. In order to understand the effects on attraction of variations in evaluations received from another person, it is necessary to examine how those variations influence beliefs about the evaluator. Once the effects on beliefs are known, an expectancy-value model can be used to predict attitudes toward the evaluator in the various conditions of the experiment. Our conceptual framework, then, provides the foundation for identifying factors which may influence the formation of interpersonal attitudes. Only factors that have systematic effects on beliefs about another person are expected to influence attitudes toward that person.

Although our conceptual framework does not explicitly state what those factors are, it allows the investigator to understand why a given manipulation has an effect on attraction in some situations but not in others. Further, it explains why minor variations in procedures from experiment to experiment may produce different results: These procedural variations are likely to lead to the formation of somewhat different beliefs. For example, subjects in the Aronson, Willerman, and Floyd (1966) experiment listened to a tape recording of a person being interviewed, whereas in the study by Helmreich, Aronson, and LeFan (1970) they

watched a videotape. Although the experimenters assumed that the crucial variables manipulated by both procedures were the candidate's competence and whether or not he committed a blunder, it should be obvious that a videotape provides different information about the candidate than does a tape recording. At the very least, a videotape allows beliefs to be formed about the candidate's physical attractiveness, his way of dressing, his mannerisms, etc. These beliefs may influence the effects of the competence and pratfall manipulations.

In recent years, a great deal of time and energy has been devoted to explorations of the bases for interpersonal attraction. Much of this research has tested isolated hypotheses based on the investigator's intuition. A review of the voluminous literature shows that the results have been no more consistent or illuminating than have those obtained in the research described above on the effects of a pratfall and on the gain-loss phenomenon. Indeed, these efforts have provided little in the way of a consistent and integrated body of knowledge concerning interpersonal attraction.

CONDITIONING OF ATTITUDE

We have tried to show that all the research discussed up to this point can be interpreted in the framework of an expectancy-value model. One implication of this conclusion is that information provides the basis for attitude formation. In our discussion of Byrne's explanation for the observed similarity-attraction relation, however, we encountered a different approach, which suggests that affect is directly conditioned to a stimulus object. Since it has been assumed that conditioning of affect to a stimulus object can occur without acquisition of information about the object, this process appears to contradict an informational basis of attitude formation. In order to illustrate the differences between these approaches, let us consider some of the research on conditioning of affect.

Classical Conditioning of Attitude

Most behavior theory accounts of attitude formation ultimately rely on the classical conditioning process. In our discussion of the development of attribute evaluations at the beginning of this chapter, we noted that in the final analysis such evaluations must be accounted for by assuming that affect somehow comes to be associated with the attribute. The classical conditioning paradigm describes this process. (See also Chapter 2.)

Perhaps the best-known study attempting to demonstrate classical conditioning of attitude was performed by Staats and Staats (1958). Subjects were told that they were to learn two lists of words simultaneously. One list containing six national names (German, Swedish, Italian, Dutch, French, and Greek) was projected on a screen. As each national name appeared on the screen, the experimenter read a word from the second list, and the subject was asked to pronounce it aloud. The second list consisted of 108 words such as gift, bitter,

chair, happy, and twelve. Each national name was presented visually 18 times in random order, and each time it was paired with a different word from the second list. Of the 108 words in the second list, 18 had positive evaluations (e.g., gift, sacred, happy), 18 had negative evaluations (e.g., bitter, ugly, failure), and the remainder had “no systematic meaning” (e.g., chair, with, twelve). In one condition, the national name *Swedish* was paired with the 18 positive words, and *Dutch* was paired with the 18 negative words. In a second condition, *Dutch* was paired with the positive and *Swedish* with the negative words. The other four national names were paired with the neutral words on the second list. In behavior theory terminology, *Swedish* and *Dutch* served as conditioned stimuli (CS) and the positive and negative words as unconditioned stimuli (UCS). In a second experiment, six proper names (Harry, Tom, Jim, Ralph, Bill, and Bob) were substituted for the national names; *Tom* and *Bill* served as CS. The assumption is that on the basis of prior learning, a given UCS elicits an implicit positive or negative reaction (i.e., an attitude), which becomes conditioned to the CS with which it is paired (see Chapter 2).

At the end of the conditioning procedure, subjects were asked to evaluate each national or proper name on a seven-point scale ranging from *pleasant* to *unpleasant*. Consistent with expectations, the national and proper names that had been paired with positive words were evaluated more positively than the names that had been paired with negative words.

Many other studies using this paradigm have consistently obtained evidence for the “conditioning of attitudes.” These studies have shown that attitudes can be conditioned not only to names but also to nonsense syllables (Staats and Staats, 1957), photographs of persons (Byrne and Clore, 1970), geometrical nonsense figures (Sachs and Byrne, 1970), and other stimuli. The paradigm has also been used to test other hypotheses derived from principles of learning theory. For example, Staats, Staats, and Heard (1960) explored the effects of partial reinforcement on conditioning of attitudes. They paired nonsense syllables with positive or negative words. One condition replicated the Staats and Staats (1958) procedure described above in that each CS was consistently paired either with positive or negative UCS words (100 percent reinforcement). In a 50 percent reinforcement condition, each nonsense syllable was paired with either positive or negative words on half of the trials, and on the other half it was paired with neutral words; the *number* of reinforced trials, however, was the same as in the 100 percent reinforcement group. A third condition paired nonsense syllables only with neutral words (0 percent reinforcement). The results showed that attitudes toward the nonsense syllables became more polarized as the percentage of reinforcement increased. These findings are consistent with Byrne’s (1969, 1971) argument that attraction is a linear function of the *proportion* of positive reinforcements.

In another study, however, Staats and Staats (1959) found that *number* of reinforcements (i.e., conditioning trials) also had a significant effect on attitudes. In this study, subjects received either 0, 2, 4, 6, 8, 10, 12, 14, 16, or 18 con-

ditioning trials. A significant linear relation between number of trials and attitudes was found for pairings with positive UCS words, and the relation approached significance for pairings with negative UCS words. Evidence for effects of number of trials on conditioning of positive and negative attitudes was also reported by Burgess and Sales (1971). These findings are inconsistent with Byrne's (1969, 1971) position that attraction is a function of the proportion of positive reinforcements and not of the number of reinforcements.

Byrne and Clore (1970) used the Staats and Staats paradigm in an attempt to demonstrate that similar and dissimilar opinion statements have positive and negative reinforcement value. They paired photographs of strangers with tape recordings of opinion statements that were either similar to or different from the subject's own views. Following the conditioning trials, attitudes toward the stranger were measured on six evaluative semantic differential scales. The stranger whose photograph had been paired with similar opinion statements was found to be more attractive than the stranger whose photograph had been paired with dissimilar statements. Recognizing the fact that these findings may have been obtained because subjects attributed the opinion statements to the strangers, Sachs and Byrne (1970) replicated the study pairing opinion statements with geometrical figures as well as photographs. Results comparable to the Byrne and Clore study were obtained for both types of conditioned stimuli.

The question of awareness. Although there seems to be little doubt that attitudes toward a stimulus object can be influenced by pairing that object with other stimuli of known positive or negative evaluation, the assumption of an automatic conditioning process is open to question.

If, as is implied by the classical conditioning paradigm, conditioning occurred without awareness, a noncognitive or noninformational basis for attitude formation would be identified. On the other hand, the presence of awareness would indicate that subjects had knowledge of the systematic pairings between the stimulus object and various attributes. Specifically, subjects could realize that the object was paired either with positive or with negative attributes. This contingency awareness could have one of two consequences. First, subjects might come to actually *believe* that the object in question has some of the attributes with which it was paired. Depending on the evaluation of those attributes, the subject could form a positive, negative, or neutral attitude toward the object. Second, contingency awareness might allow subjects to make inferences about the experiment's purposes or the experimenter's expectations. Thus, they might become aware that the experimenter was trying to establish a positive or negative attitude toward the stimulus object ("demand awareness"). Under the assumption that the subject wanted to please the experimenter or was otherwise motivated to comply with the perceived demands, his responses to the attitude measure would exhibit the expected "conditioning" effects.

The question of awareness has therefore been a major focus of concern in studies of conditioning. For example, in their first study, Staats and Staats (1958)

asked their subjects to “write down anything they had thought about the experiment, especially the purpose of it, and so on, or anything they had thought of during the experiment” (p. 38). Of the 93 subjects who participated in the two experiments, 17 reported awareness of the systematic name-word relationship and were excluded from the analysis. “This was done to prevent the interpretation that the conditioning of attitudes depended upon awareness” (p. 38). Staats and Staats thus concluded that it was possible to condition the implicit evaluative responses elicited by the UCS words to the CS names without subjects’ awareness. However, as we have repeatedly noted in previous chapters, a considerable number of studies have shown that verbal conditioning (classical or operant) is not obtained without awareness (e.g., Dulany, 1961, 1964; Page, 1969, 1970b; DeNike and Leibovitz, 1969; Lichtenstein and Craine, 1969). For example, Page (1969) used the Staats and Staats classical conditioning paradigm. In addition to going through the usual procedure, subjects were given at the end of the experiment a detailed questionnaire attempting to assess contingency and demand awareness.³⁷ It should first be noted that a detailed post-experimental inquiry (such as that used by Dulany or Page) reveals many more aware subjects than does a simple question about the purpose of the experiment. For example, although Staats and Staats (1958) reported that only 18 percent of their subjects showed awareness, Page (1969) reported 36 percent aware subjects. Page found no conditioning effects for subjects without awareness. Further, the amount of “conditioning” increased with the degree of awareness ($r = .67$ with contingency awareness and $.81$ with demand awareness).

We can thus conclude that there is little support for the notion that classical conditioning provides a noninformational basis for attitude formation. Instead, the findings of classical conditioning studies can readily be interpreted within an information processing framework. Although attitudes may be formed in a classical conditioning situation, they do not seem to be the result of automatic conditioning processes; rather, they appear to be determined by beliefs that are formed about the attitude object.

When subjects form beliefs about the attributes of some object, or when they form the belief that some person has rewarded or punished them, their attitudes toward that object or person will be influenced. However, we have also seen that responses to an attitude scale can be influenced by demand awareness. Although such changes are informationally based, they occur without the formation of beliefs about the attitude object. For example, a number of studies have demonstrated that responses to items on an attitude scale can also be influenced by conditioning (e.g., Singer, 1961; Insko, 1965; Insko and Cialdini, 1969). These studies have used an operant conditioning paradigm in which subjects may be rewarded for agreeing with favorable and disagreeing with unfavorable statements on an attitude scale. Rewards are usually administered in the form of verbal comments, such as “good,” “um-hum,” “right,” “OK,” etc. Such studies have

37. The questionnaire used is reproduced in Page (1969, p. 181).

consistently shown an increase in the reinforced response, but the effect is not obtained without awareness that a given class of responses is being reinforced by the experimenter. That is, subjects may indicate favorable or unfavorable attitudes simply because they perceive such a response to be desirable or correct in the situation. The role of demand awareness as a factor influencing a person's responses will be considered in subsequent chapters.

FREQUENCY OF EXPOSURE AND ATTITUDE FORMATION

One final area of research on attitude formation seems worth considering since it has attracted increased interest in recent years. In an impressive monograph, Zajonc (1968b) proposed that "mere repeated exposure of the individual to a stimulus is a sufficient condition for the enhancement of his attitude toward it. By 'mere exposure' is meant a condition which just makes the given stimulus accessible to the individual's perception" (p. 1). A similar hypothesis has played a major role in research on the effects of interracial contact on prejudice toward minority group members. However, Zajonc noted that in studies concerning the attitudinal effects of social contact and interaction, "mere exposure" is confounded with a multitude of other variables, and the results of these studies therefore provide little information about the frequency of *mere* exposure on attitude formation.

In order to isolate the effects of mere exposure, Zajonc and his associates employed a procedure first reported by R. C. Johnson, Thomas, and Frincke (1960). Subjects are exposed to novel stimuli, such as nonsense words, Chinese characters, facial photographs, or nonsense syllables. The frequency with which the stimuli are presented is varied systematically, and order of presentation is randomized. Thus each subject is exposed to several novel stimuli, each of which appears a different number of times. Following exposure, subjects are asked to evaluate each stimulus on a seven-point *good-bad* scale. Initial studies demonstrated that these evaluations become more favorable as frequency of exposure increases (e.g., Johnson, Thomas, and Frincke, 1960; Zajonc, 1968b; Matlin, 1970). The effect of exposure, however, becomes less with successive trials. Although a small number of exposures may greatly increase evaluation of a *novel* stimulus, the more familiar the stimulus, the greater the number of additional exposures necessary to produce the same increase in evaluation.³⁸ This relation between frequency of exposure and attitude is shown in Fig. 6.5 for two studies reported by Zajonc (1968b).

One implication of this relationship is that frequency of exposure will have little effect on meaningful English words since subjects are likely to have been exposed to the words on innumerable occasions in the past. Consistent with this notion, Amster and Glasman (1966) found no significant effect of exposure frequency on evaluation of meaningful words. The same general conclusion follows

38. According to Zajonc (1968b), attitude is a linear function of the logarithm of frequency.

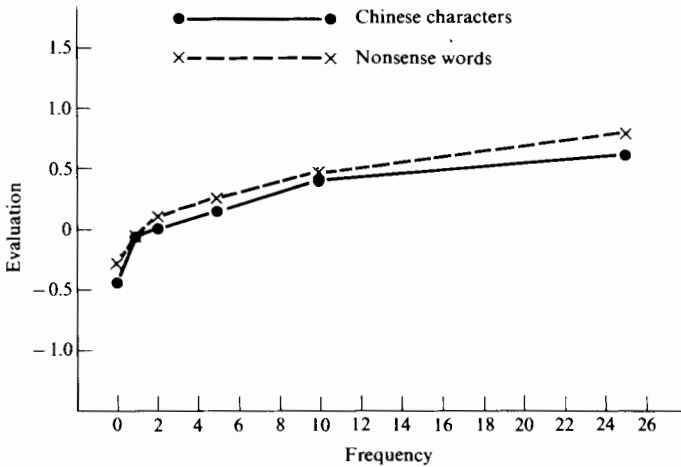


Fig. 6.5 Relation between frequency of mere exposure and attitude. (Adapted from Zajonc, 1968.)

from a series of early studies on music appreciation. Exposure to familiar works of music tends to have no effect on liking for the works, but exposure to unfamiliar works tends to enhance the listener's appreciation of them (e.g., Meyer, 1903; Moore and Gilliland, 1924; Downey and Knapp, 1927).

To account for the relationship between attitude and frequency of exposure found in the initial experiments, Harrison (1968) suggested a *response competition* hypothesis. According to this hypothesis, a novel stimulus elicits a variety of responses, many of which are incompatible. This response competition is assumed to be unpleasant. Repeated exposure to the stimulus eliminates some of the competing responses, thus reducing unpleasantness and leading to more favorable ratings of the stimulus. Several studies have attempted to support this hypothesis by showing that response competition decreases with frequency of exposure and that this decrease in response competition is accompanied by an increase in attitude (Harrison, 1968; Matlin, 1970). Following the exposure procedure, Harrison asked his subjects to give the first association that came to mind for each stimulus. Using latency of associations as an index of response competition, he found that response competition decreased with frequency of exposure. Matlin (1970) replicated this finding and, in another part of her study, asked subjects to give their first association to a list of 60 words that varied in their frequency of usage in the English language. She again found that response latency was greater for low-frequency words than for high-frequency words and, further, that the number of different responses to a given stimulus word decreased with the word's frequency of usage. These findings were again interpreted as evidence that there is more response competition with unfamiliar stimuli. As expected, both Harrison and Matlin also found a negative relation between evaluations of stimulus words and the various measures of response competition.

Although these data appear to support the response competition hypothesis, more recent studies (e.g., Zajonc *et al.*, 1971, 1972; Brickman *et al.*, 1972; Suedfeld *et al.*, 1971; Burgess and Sales, 1971) have reported findings that not only question this hypothesis but also the frequency-affect relation itself. Zajonc *et al.* (1971, 1972) have demonstrated that the positive relation between frequency and affect seems to hold only in a within-subjects design (i.e., when the *same* subjects experience different frequencies of exposure) and only for some novel stimuli but not for others. Perhaps most problematic is a study by Brickman *et al.* (1972) in which subjects first rated 20 abstract paintings on a seven-point evaluative scale. On the basis of these evaluations, three conditions were established such that subjects in one condition were exposed to the four paintings they had rated most favorably, in the second condition to four neutral paintings, and in the third condition to the four most negative paintings. In each condition, one painting was presented once and the others were presented two, five, and ten times. A significant interaction between initial evaluations and frequency of exposure indicated that attitudes *increased* with exposure in the first two conditions but *decreased* with exposure in the third. The latter finding is clearly inconsistent with the response competition hypothesis since, according to that hypothesis, evaluation of a stimulus should increase with frequency of exposure even when the stimulus has an initially negative evaluation.

In conclusion, early research on the relation between mere exposure and affect appeared to demonstrate that evaluation of novel stimuli increased with frequency of exposure. Later studies, however, have imposed severe limitations on the generality of this effect. More than that, they have shown that evaluations may be unaffected by or may even decrease with frequency of exposure. It appears that no single explanation has been offered to account for these inconsistent findings.

Within our conceptual framework, such inconsistent findings are not altogether unexpected. One should first realize that in terms of attitude formation, mere exposure constitutes a relatively minor factor. Zajonc (1968b) has noted that in most situations mere exposure is confounded with a variety of other variables, which are clearly more important determinants of attitude. Research on conditioning of attitudes, for example, has shown that when exposure to an object is accompanied by positive or negative stimuli, attitudes toward that object will be determined primarily by the evaluations of the accompanying stimuli, and frequency of exposure will not always have a positive effect on attitude. However, even when mere exposure can be isolated and separated from other variables, our conceptual framework suggests that inconsistent findings may be obtained. Frequency of mere exposure is really no different from any other manipulation of an independent variable. In order to understand its effects on attitude, one must first examine the ways in which it affects a person's salient beliefs about the attitude object. Perhaps a novel stimulus initially elicits few strong beliefs. As a result of repeated exposures, a person may form various associations and make inferences about the stimulus object. It is thus possible that his attitude toward the object will be influenced by frequency of mere exposure. Whether his attitude will

change at all, and if so, whether it will change in a positive or negative direction depends on the nature of the beliefs he forms. If most beliefs associate the object with positively evaluated attributes, the person's attitude will become more positive. If most beliefs associate the object with negative attributes, his attitude will shift in a negative direction. In contrast, mere exposure to a *familiar* object should have little effect on attitudes toward that object since it is unlikely to change the person's prior beliefs.³⁹

CONCLUSION

This chapter has reviewed several lines of research dealing with processes of attitude formation. We have discussed research based on expectancy-value models, on linear information-integration models, on reinforcement principles, as well as on more specific hypotheses. We have tried to show that all this research is consistent with the notion of an informational basis for attitude formation. In Chapter 5 we showed that a person forms descriptive and inferential beliefs about objects in his environment. These beliefs represent the information he has about the objects. An informational basis for attitude simply implies that the person's attitude toward any given object is determined by this information. In a typical experiment, a subject is exposed to a variety of objects, and he may form many beliefs about them. His attitude toward only one or two of them is of focal concern to the investigator. Usually, different experimental conditions are created by manipulating some of the observable stimuli in the situation. The manipulations are expected to influence the subject's attitude. However, throughout this chapter we have noted that the effects of a given manipulation on attitude can be understood only if its effects on the person's beliefs are known.

Our conceptual framework suggests that upon entering the experimental situation, a subject may hold certain prior beliefs about the particular object in question. Exposure to the experimental manipulations may lead to the formation of new descriptive and inferential beliefs about the object. By the time that attitudes are assessed, the subject will have considerable information about the attitude object. Since this information will determine his attitude, we have argued that attitude formation cannot be understood when its informational base is ignored.

A schematic illustration of these notions is presented in Figure 6.6. The broken arrow between stimulus conditions and the informational base indicates that the effects of a given stimulus manipulation are not invariant. That is, its effects on beliefs depend on the context in which it appears and on other manipulations with which it is combined. The solid arrow indicates that attitudes are determined by the person's information about the stimulus object. Inconsistent findings in the literature on attitude formation reflect the lack of a constant relation between a given manipulation and the informational base.

39. Support for some of these arguments has been reported by Grush (1974).

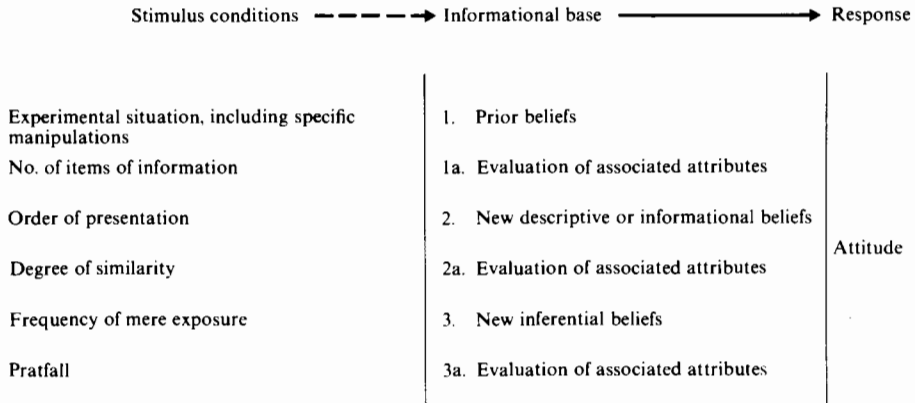


Fig. 6.6 Schematic representation of effects of stimulus variables on attitudes.

In contrast to the approach suggested by our conceptual framework, most research on attitude formation has examined the effects of a given manipulation on attitudes without examining its effects on beliefs. We have seen, however, that some of this research has been based on a systematic conception of intervening processes. N. H. Anderson's (1970, 1971a) work on impression formation, for example, assumes that each item of information presented by the experimenter has a certain scale value and weight; attitudes are affected by manipulations that influence these variables. Similarly, Byrne (1969, 1971) and others have suggested that various stimulus manipulations influence interpersonal attraction and attitudes by influencing the magnitude or proportion of reinforcements associated with an attitude object.

The majority of studies on interpersonal attraction, however, have not proposed any systematic intervening process. Instead, they have usually postulated different hypothetical processes to account for the effects of different manipulations. We have considered only two of these "minitheories": those dealing with effects of a pratfall and of gain and loss in esteem. We have not attempted to provide a full review of this literature since it deals with studies that have tested isolated and intuitive hypotheses and that have made little contribution to our understanding of attitude formation. Most of the studies have produced inconsistent and inconclusive results.

Although the systematic research programs generated by Anderson, Byrne, and their associates have at least been able to identify some stable phenomena, inconsistent findings here, too, have frequently been obtained. We have suggested that these apparent inconsistencies are attributable to the lack of concern for those variables that we believe to be the primary determinants of attitude, namely, a person's salient beliefs linking the stimulus object to various attributes and his evaluations of those attributes. We have tried to show how consideration of these variables would allow an investigator to determine why a given manipulation has

different effects on attitude under different conditions. Since it is possible to obtain direct measures of beliefs and attribute evaluations, the explanations we have offered (as well as additional hypotheses) can easily be verified.

Anderson (1970, 1971a) has argued that his integration theory can also account for the disparate findings concerning attitude formation. Relying on his weighted averaging model, he has repeatedly demonstrated that a subject's attitude can be predicted with considerable accuracy by assigning appropriate weights to the different items of information provided by the experimenter. Similarly, it would probably be possible to account for attitudes toward a person who committed a blunder or pratfall by assigning appropriate weights to the two variables manipulated in experimental investigations, namely, the pratfall itself and the person's competence. For that matter, almost any phenomenon can be explained by a weighted linear model.⁴⁰

The mere fact that appropriate weights can be found, however, provides little in the way of understanding a phenomenon. It is only when these weights can be given a meaningful psychological interpretation—and when they can be shown to be replicable—that they provide a mechanism for explaining observed relationships. Unfortunately, these conditions have often not been met in research on attitude formation. We have seen that Anderson's weighted averaging model has been used primarily in conjunction with an analysis of variance approach in studies of impression formation. In these studies, weights have usually not been estimated; instead, certain assumptions are made about the weights in order to account for a given phenomenon. For example, to explain primacy effects it has been assumed that words appearing in sequence have successively smaller weights. The analysis of variance design is then used to test these assumptions. Results conforming to expectations are taken as evidence for the linear model, as well as for the assumptions about the weights. We have seen, however, that different assumptions about the weights (or about the scale values) can account for the results equally well. Further, when results do not conform to expectations, it is always possible to make post hoc revisions in the assumption about the weights in order to account for the obtained results. It follows that, used in this manner, the analysis of variance approach does not provide conclusive evidence about weights and thus contributes little to our understanding of the processes underlying attitude formation. This problem could be overcome if the analysis of variance approach, like multiple regression, were used to obtain estimates of weights and if it could be shown that the weights were consistent with the assumptions and that they were replicable.

We have suggested an alternative approach based on the expectancy-value formulation. According to the expectancy-value model, a person's attitude toward

40. A good illustration of the way in which appropriate weights can be found for a given set of data is provided by Lopes (1972). Recall also that a weighted linear model can accurately predict almost any judgment based on a set of cues (see Chapter 5).

an object is related to the strength of his beliefs linking the object to various attributes multiplied by his evaluations of the attributes. Attitudes are predictable from the sum of the resulting products ($A = \Sigma b_i e_i$). Since it is possible to obtain measures of beliefs and attribute evaluations, it is possible to provide a direct test of the effects of any given manipulation on these mediating variables. Further, if one obtains a direct measure of attitude, it is also possible to test the predictive accuracy of the expectancy-value model. We have presented and discussed considerable evidence in support of this model and shown that the different lines of research on attitude formation can be interpreted within an expectancy-value framework. We have tried to show not only that this model is consistent with the findings in impression formation, interpersonal attraction, and conditioning, but that it can also account for some of the apparently inconsistent results in these and other areas of investigation. Whereas the expectancy-value model merely describes the *relations* between beliefs and attitudes, our conceptual framework suggests a causal link. Throughout this chapter we have emphasized that a person's attitude is determined by his salient beliefs about the object's attributes and by his evaluations of those attributes. At any point in time, a person holds a limited number of salient beliefs about any given object, action, or event, and those beliefs serve as the primary determinants of his attitude toward that object, action, or event.