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3 Message Discrepancy and Persuasion

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To be maximally persuasive, how discrepant (i.e., different from the receiver's initial position) should a message be? Should the position advocated by the source be very close to the receiver's initial position, very far from it, or moderately far from it? In discussing this question, we first consider how the relationship between discrepancy and message persuasiveness is moderated by characteristics of the source, the receiver, and the message context. Next, we examine various alternative models of the relationship between discrepancy and opinion change. We examine how discrepancy can be confused with a related variable, message *disconfirmation*, in affecting opinion change, and we show how these two variables are related. We also consider the psychological processes that are used to explain the relationship between discrepancy and opinion change. Finally, we examine the time course of opinion change to see how discrepant messages are processed over time.

Because discrepancy and opinion change are often expressed in the same metric (i.e., in the same units), the study of discrepancy has readily lent itself to seeking a mathematical function that relates these two variables. We begin with the simplest of these, the linear discrepancy model.

I. THE LINEAR DISCREPANCY MODEL

One of the oldest and simplest mathematical models is called the *linear discrepancy* or *distance proportional* model (Anderson & Hovland, 1957; see Hunter, Danes, & Cohen, 1984, for a more thorough discussion of mathematical models of attitude change). The model is as follows:

$$\Delta P = P_1 - P_0 = \alpha(Dp) = \alpha(P_A - P_0), \tag{1}$$

where ΔP is change in *position* or opinion, P_0 is the initial position of the receiver, P_1 is the receiver's position after one message, P_A is the position advocated by the source, and *discrepancy* (Dp) is defined as follows:

$$Dp = P_A - P_0. \tag{2}$$

What variables determine the value of α, the constant of proportionality? To answer this question we consider what other source, message, and receiver factors are known to affect the persuasiveness of a message.

1. Because it is well known (see, e.g., Aronson, Turner, & Carlsmith, 1963; Hovland & Weiss, 1951, Jaccard, 1981) that a more credible source produces more persuasion, we can conclude that the more credible the source, the greater is α.
2. It is also well established (see, e.g., Freedman, 1964; Jaccard, 1981; Zimbardo, 1960) that the more the message receivers are committed to (ego-involved with) their own opinions, the less opinion change; thus, the greater the commitment, the smaller is α.[1]

3. Other research shows that supportive arguments that are stronger (see, e.g., Petty & Cacioppo, 1986) and that attract more attention will also produce more opinion change and thus a higher value of α.

Another form of the linear discrepancy model that captures the aforementioned assumptions was proposed by Himmelfarb (1974) and Saltiel and Woelfel (1975) and is related to the cognitive algebra models of Anderson (1974). A fundamental equation of such an *information integration* model is:

$$\Delta P = \frac{w_A D_p}{w_0 + w_A}, \tag{3}$$

where ΔP is the change in the receiver's position (opinion) toward the object, Dp is message discrepancy, w_0 is the weight of the receiver's initial position, and w_A is the weight of the message position.

In this model the relationship between opinion change and discrepancy is a function of w_0 and w_A. In particular,

$$\frac{\Delta P}{Dp} = \frac{w_A}{w_0 + w_A}. \tag{4}$$

The parameter w_0 is expected to be an increasing function of premessage factors that inhibit opinion change, such as the strength of the initial opinion (or value relevant involvement; see Johnson & Eagly, 1989). The parameter w_A is expected to be an increasing function of message factors that facilitate opinion change, such as source credibility and argument strength.

Saltiel and Woelfel's (1975) variant of this model is motivated by an explicit metaphor or analogy. They saw the receiver's opinion system as being like a torsion balance containing the various messages to which the receiver has been exposed, located at different positions and having different weights. The location of the message is the value of the position advocated, and the weight is a function of the credibility of the source (and other factors, such as the strength of the arguments and their ability to command attention). The equilibrium position of the receiver is assumed to be where the fulcrum of the torsion balance must be in order to balance such a mechanical system. Thus, this model is sometimes referred to as the *linear balance model.*

An interesting implication of this model is that the more messages one has received on a topic, the greater w_0, and therefore the more resistant receivers are to changing their opinions. Note, however, that the model does not specify whether this resistance necessarily involves a cognitive process such as counterarguing (see Himmelfarb, 1974). Although the proposition concerning resistance seems very plausible, we are not aware of any rigorous tests of it.[2]

II. NONLINEAR MODELS

Early researchers studying discrepancy and opinion change assumed that these variables are linearly related, and attempted to specify the determinants of the proportionality constant (α). Other researchers, however, concluded that the relationship is generally not linear. For example, Aronson et al. (1963) found that, for messages from a high credibility source, there was a substantial increase in opinion change when moving from a small to a moderately sized discrepancy, but there was a much smaller increase in opinion change when moving from a moderate discrepancy to a large one. When the source had only a moderate level of credibility, opinion change appears not only to be nonlinear, but nonmonotonic (i.e., opinion change initially increased with increasing discrepancy, but then it decreased with further increases in discrepancy; see Figure 3.1). Similarly, Freedman (1964) found a monotonic and approximately linear relationship between discrepancy and opinion change for the low- (ego-) involvement participants, but a significantly nonlinear and nonmonotonic relationship for high- (ego-) involvement participants.

A. Laroche's Mathematical Model

Laroche (1977) proposed a nonlinear equation in which opinion change is a function of discrepancy, credibility, and ego-involvement:

$$\Delta P = (Dp)C^{KDp}(Ni)^{K'Dp}, \tag{5}$$

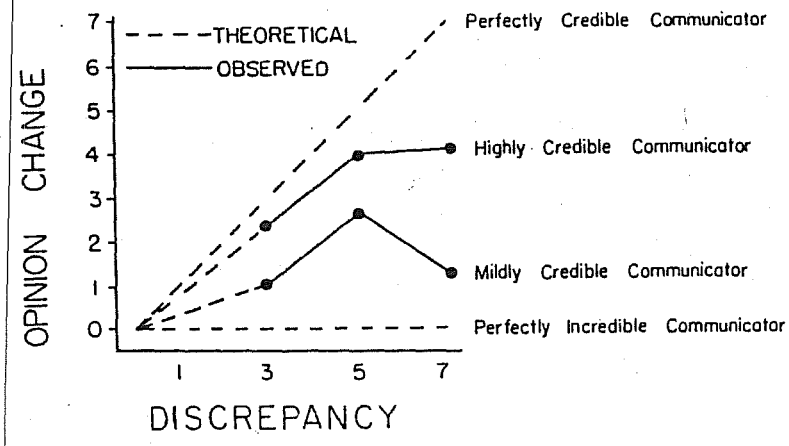

Figure 3.1. Opinion change as a function of credibility and discrepancy—theoretical and observed curves (from Aronson et al. 1963, reprinted with permission).

where Dp is discrepancy, C is credibility, and Ni is noninvolvement (the inverse of ego-involvement). Laroche (1977, p. 248) called the second term on the right side of the equation, C^{KDp}, the *derogation* of the communicator and stated that K is inversely related to the plausibility of the message. He called the third term on the right side of the equation, $(Ni)^{K'Dp}$, the *mediating effect of ego-involvement* and said that K' is "directly related to effort and inversely to distraction" (p. 248).

An alternative form of Equation 5 is

$$\Delta P = (Dp)e^{-\gamma Dp}, \tag{6}$$

where

$$\gamma = -K(\log(C)) - K'(\log(Ni)). \tag{7}$$

In Equation 6, γ determines the degree of departure from linearity. If $\gamma = 0$, then ΔP is a linear function of Dp. The larger is γ, the smaller is the value of Dp at which the slope of the graph of ΔP and Dp starts leveling off and decreases (see Figure 3.2). Equation 7 shows that the model predicts that γ is an increasing function of ego-involvement and a decreasing function of credibility. Thus, Laroche (1977) proposed that nonmonotonicity is most evident when credibility is low and involvement is high.

Laroche (1977) tested and estimated his model using the condition means of many previously published studies, treating each opinion issue and each combination of credibility and involvement as a separate study. He found that γ was never negative and was usually positive, indicating a curve whose slope decreases as discrepancy increases. Furthermore, as predicted, γ was generally higher for low-credibility sources than for high-credibility sources and higher for conditions with high involvement than for those with low involvement.

B. Statistical Estimation and Functional Form

Although the goal of estimating the coefficient of nonlinearity, γ, is a worthy one, and Laroche's (1977) findings are reasonable, the techniques to estimate this relationship are more difficult than what one might initially assume. According to Laroche, nonmonotonicity (i.e., a change from a positive to a negative slope in the curve relaying ΔP (y) to Dp (x)) is only predicted for $\gamma > 1$. This prediction is true, however, only given the assumption that "all variables have been normalized and have values between 0 and 1" (Laroche, 1977, p. 247). If the variables are not restricted to the range of zero to one, not only do the estimated values of parameters change, but the fit of the sample means to the model changes drastically as well.[3]

Laroche's (1977) normalization assumes that we can specify a maximum possible value of discrepancy. This assumption is reasonable when the scale being used is bounded (as in Aronson et al., 1963), which may reflect our use of

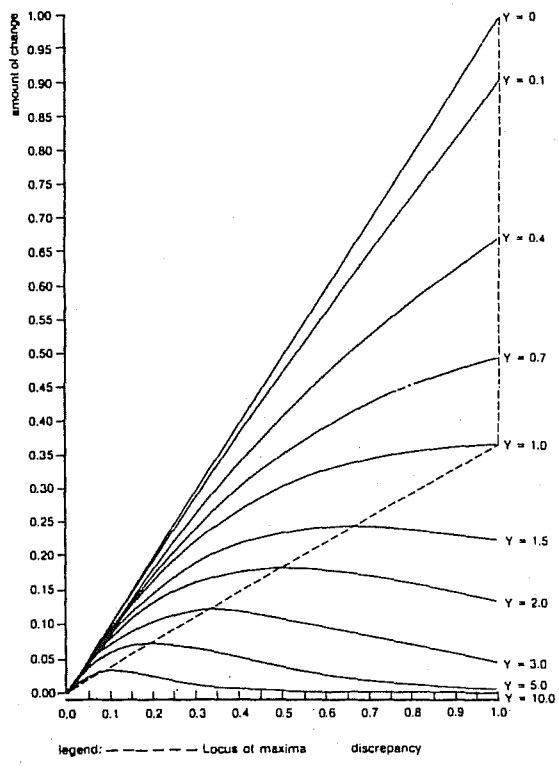

Figure 3.2. Graphical representation of Laroche's proposed model for different values of the parameter γ (from Laroche 1977, reprinted with permission).

attributes of phenomena that are themselves bounded (e.g., the number of hours in a day). For example, Bochner and Insko's (1966) study used as the dependent variable the number of hours of sleep per night the participants deemed appropriate for the average young adult. Both the positions advocated in a message as well as the participant's opinion are bounded between 0 and 24 hrs. But in other situations, such as for the appropriate increase in the tuition rate, there may not be such natural endpoints. This idea suggests two things: (a) Applying the recommended normalization is sometimes theoretically problematic; and (b) despite Laroche's model, when the discrepancy of a message is sufficiently large, there may be downturns in the curve relating discrepancy to opinion change, even with high source credibility and low ego-involvement.

In addition to this normalization problem we see that Laroche's (1977) model specifies a coefficient, γ, that determines nonmonotonicity, but it does not specify a parameter of linear proportionality such as found in the linear discrepancy model. As a consequence, Laroche's model predicts that at very small discrepancies, the slope of opinion change as a function of discrepancy is approximately 1.0 regardless of the level of credibility. To modify the model so that it has the potential for nonmonotonicity one could modify either Equation 1 or 3 and obtain either:

$$\Delta P = \alpha(Dp)e^{-\gamma Dp}, \tag{8}$$

or

$$\Delta P = \frac{(Dp)w_A e^{-\gamma Dp}}{w_0 + w_A e^{-\gamma Dp}}. \tag{9}$$

Both Equations 8 and 9, however, are intrinsically nonlinear. Although they can be estimated via nonlinear regression, there are some rather formidable problems in doing so.[4]

Instead of employing Equation 6, Laroche (1977) chose to analyze the following linearizable equation:[5]

$$\Delta P = (Dp)^{\beta}e^{-\gamma Dp}. \tag{10}$$

This equation is equivalent to Equation 6 only when $\beta = 1$, which is important to note because Laroche assumed that Equation 6 is theoretically correct.

There are several problems that were found in Laroche's attempt to fit Equation 10. First, although Laroche found that β was usually close to 1.0, it was not always very close to 1.0; this finding provides indirect evidence that Equation 6 is incorrect. Second, if β is not equal to 1, then the value of γ (the coefficient of nonlinearity) is no longer a clear indicator of nonmonotonicity. (Recall that nonmonotonicity was predicted only for $\gamma > 1$). Finally, Laroche's linearizabe equation (here, Equation 10) is unable to show if a simple linear relationship between discrepancy and opinion change exists: If there were a perfect linear relationship between discrepancy and opinion change, with $\alpha < 1.0$ (see Equation 1), applying Laroche's Equation 10 would find a nonlinear relationship with $\beta > 1$ and $\gamma > 0$.

C. Nonlinearity without Nonmonotonicity

Laroche proposed that with a high credibility source and low ego-involvement, even the most extreme discrepancy will not induce nonmonotonicity. On this

point the evidence is inconclusive. There are some examples of nonmonotonicity with a high-credibility source (e.g., Bochner & Insko, 1966), but these data do not show significant curvilinear trends.

But we agree with Laroche that it is quite common to have nonlinearity (in particular, negatively accelerated increases) without nonmonotonicity. In fact, we

Table 3.1. Position Advocated, Discrepancy, Position Change, and Message Effectiveness for Various Message Conditions from Different Studies

Position Advocated (% increase)	Discrepancy (*Dp*; % increase)	Position Change (ΔP)	Message Effectiveness ($\Delta P/Dp$)
(a) Recommended Tuition Increase: Data from Fink, Kaplowitz, and Bauer (1983)			
15% ("moderate")	14.55	.51	.035
50% ("extreme")	49.55	1.21	.024
(b) Recommended Tuition Increase: Data from Kaplowitz, Fink, Armstrong, and Bauer (1986)			
15% ("moderate")	14.92	.25	.017
50% ("extreme")	49.92	.48	.010
Position Advocated (years imprisonment)	**Discrepancy (*Dp*; years imprisonment)**	**Position Change (ΔP)**	**Message Effectiveness ($\Delta P/Dp$)**
(c) Recommended Sentence for Convict: Data from Kaplowitz and Fink, with Mulcrone, Atkin, and Dabil (1991), Experiment 1			
17	6.09	2.96	.486
30	19.09	6.72	.352
50	39.09	11.51	.294
(d) Recommended Sentence for Convict: Data from Kaplowitz and Fink et al. (1991), Experiment 2			
22.5	11.87	6.58	.554
50	39.37	13.80	.351

Note: For panels a and b, initial position and final position are estimated from the geometric mean of the condition. For both tuition studies initial position is estimated from the control group. For Fink et al. (1983) the initial position is estimated as 0.45%. For Kaplowitz et al. (1986) it is estimated as 0.08%. Sample sizes are approximately 59 per cell in Fink et al. (1983), and 56 per cell in Kaplowitz et al. (1986). For panels c and d: Sample size is between 102 and 109 per discrepancy level for a total of 318 participants in panel c (Experiment 1). There are between 88 and 96 participants per discrepancy level (for a total of 184 participants) in panel d (Experiment 2). Those who received the message advocating a 10-year sentence (where $\Delta P = 0$) are not included, because for these participants it would not be possible to compute message effectiveness. The mean initial position is estimated as the geometric mean of the initial position for all subjects in those conditions (10.91 years in Experiment 1 and 10.63 years in Experiment 2). The participant's final position for each condition is adjusted for initial position and the other experimental factors such as disconfirmation.

observed this pattern in Fink, Kaplowitz, and Bauer (1983), in Kaplowitz, Fink, Armstrong, and Bauer (1986), and in Kaplowitz and Fink, with Mulcrone, Atkin, and Dabil (1991).

Table 3.1 presents summaries of data from these studies using the geometric mean as our measure of central tendency.[6] Table 3.1 shows that as discrepancy increases, the ratio $\Delta P/Dp$ (*message effectiveness*, which is the ratio of change achieved to change advocated) always decreases, thus demonstrating a negatively accelerated curve.[7]

Although the data displayed in Table 3.1 make it easy to distinguish a linear function from a negatively accelerated one, the most common and traditional statistical techniques are much less successful in doing so. For example, the correlation between discrepancy and position (opinion) change found in Table 3.1 (panel c) is .9986. As a result we see that the correlation cannot help us distinguish random departures from linearity from those that are quite systematic.

Transformations change not only the degree to which the data are skewed, but also the functional relationship between the variables. Discrepancy is ordinarily viewed as the simple difference between the position advocated and the initial position. But if people are more sensitive to ratios than to differences, then it makes sense to conceptualize discrepancy as the logarithm of the *ratio* of those positions.[8] In Kaplowitz and Fink et al. (1991), transforming discrepancy in this way, and similarly transforming the dependent position measure, we find much less evidence for negative acceleration: Message effectiveness ($\Delta P^*/Dp^*$ in Table 3.2) is almost constant (see Table 3.2). Thus, the scale of measurement can affect the form of the functional relationship between our key variables.

D. When Does Nonmonotonicity Occur?

The fact that opinion change was found to be a monotonically increasing function of discrepancy in the criminal scenario used in Kaplowitz and Fink et al.

Table 3.2. Position Advocated, Discrepancy, Position Change, and Message Effectiveness for Kaplowitz and Fink et al. (1991), Experiment 1 (Discrepancy and Opinion Change Logarithmically Transformed)

Position Advocated (years imprisonment)	Discrepancy (Dp^*)	Position Change (ΔP^*)	Message Effectiveness ($\Delta P^*/Dp^*$)
17	.444	.24	.541
30	1.012	.48	.474
50	1.522	.72	.473

Note: $Dp^* = \ln(P_A) - \ln(P_0)$ and $\Delta P^* = \ln(P_1) - \ln(P_0)$, where P_A = position advocated, P_0 = initial position, and P_1 = postpersuasion position. The values of P_A, P_0 and P_1 are all the same as the values used in Table 3.1, panel c.

(1991) is somewhat surprising, because the highest sentence advocated seemed rather extreme to us and because the source (allegedly a judge) was only moderately credible. This monotonicity was also found in studies using a tuition scenario (Fink et al., 1983; Kaplowitz et al., 1986). This finding was even more surprising, given that the source was not given high credibility in these studies: No information, other than initials for a name, was given about the source. Yet we had data from a pilot study that showed that the message we labeled as extremely discrepant was perceived as such by our sample. And in the tuition studies the issue of tuition was likely to have high ego-involvement (the participants were college students), which should provoke great resistance to the message.

The absence of high credibility and the presence of high ego-involvement clearly had some of the predicted effects. As can be seen in Table 3.1 (panels a and b), participants changed very little in response to either message. But why did they change more in response to the recommendation of an extreme increase than to the moderate increase? Because of our pilot study data, we know that the message advocating a 50% increase in tuition was extremely discrepant. But perhaps an even more extreme message (say recommending a 500% increase) would have produced a downturn.

Another possible explanation for the absence of a downturn may have to do with the presence of arguments in the message. The data reported in Table 3.1 were all based on a procedure in which a supportive argument (the same one for all conditions) was presented prior to the statement of the numerical position advocated. We attempted to make these arguments coherent and persuasive, and, at least for the criminal sentencing scenario, we have evidence that we succeeded.[9] But in the same experiment reported in Fink et al. (1983), we also had conditions in which the message advocating increased tuition was presented without any supportive arguments. Our unpublished results (Fink, Kaplowitz, & Bauer, 1979) show that in these conditions the message advocating an extreme tuition increase induced a lower tuition recommendation than did the moderate message (and in fact, it induced a lower tuition recommendation than the control condition—see the following).

With this finding in mind we reexamined prior studies that found nonmonotonicity to see whether supportive arguments had been used (see Eagly & Chaiken, 1993, p. 373, for their views on this issue). In most cases it appears that supportive arguments were not used (Freedman, 1964; Insko, Murashima, & Saiyadain, 1966; Whittaker, 1965, 1967). Aronson et al. (1963) indicated that participants were given an essay along with the position advocated, but they did not indicate whether the essay was a general discussion of the issue or an argument that had direct relevance to the position advocated. In Bochner and Insko (1966), essays were used with the position advocated, but we do not know how strong the arguments were. In conclusion, it seems that strong supportive arguments may increase the effectiveness of an extremely discrepant message from a mildly credible source and thus inhibit nonmonotonicity.

E. Boomerang Effects

Laroche (1977) contrasted his model with Whittaker's (1967) assertion that "as discrepancy increases, positive opinion change increases up to a maximum point and then diminishes until finally negative change occurs" (p. 175). By contrast, Laroche's model never predicts negative opinion change (i.e., a boomerang effect—change in the opposite direction from the position advocated). Our own nonlinear model (Fink et al., 1983) also disallows boomerang effects.

Examination of all of the studies reviewed by Laroche shows no evidence of a boomerang effect. In an examination of more recent studies (e.g., Jaccard, 1981), including our own work, we find only one example of a boomerang effect. In the *no supportive arguments* conditions in Fink et al. (1979), we find that participants given an extremely discrepant message from an unknown source recommended a significantly smaller increase in tuition than did control participants measured at the same time ($p < .03$, two-tailed).

Is this boomerang real, or was it a chance effect made more likely by the multiple conditions and therefore multiple possibilities for a significant finding? If we want to dismiss this finding we have statistical grounds for doing so: The analysis of variance utilizing all five experimental conditions is not significant, and the difference previously referred to is not significant when we use the Scheffé procedure. Moreover, data on a similar control condition were gathered from the same population within a few days of this study (see Kaplowitz et al., 1986), and this second group of control participants were notably less receptive to a tuition increase. In fact, their mean response was similar to the response of the group that received the extreme message with no supportive arguments.[10] Thus, we have no compelling evidence that this effect was genuine.

III. DISCREPANCY AND RELATED VARIABLES

We next examine how discrepancy combines with two other variables that are related to it and sometimes confounded with it. They are psychological (perceived) discrepancy and disconfirmation.

A. Psychological Discrepancy and Context Effects

Fink et al. (1983) proposed the nonlinear model that appears as Equation 9. This model starts with the information integration model (see Equation 3), but adds the assumption that the effective weight of a persuasive message is a negative exponential function of discrepancy. The 1983 article further distinguishes between two kinds of discrepancy. *Positional discrepancy* is the difference between a receiver's position and the position advocated by message (see Equation 2), in consensual ("objective") units (e.g., miles, dollars, years). In contrast,

psychological discrepancy is the receiver's perception of the size of the positional discrepancy.

Fink et al. (1983) stated two fundamental hypotheses about the relationship of psychological discrepancy, positional discrepancy, and opinion change. First, just as a perceivers' sense of how hot an object is depends on the actual temperature of that object as well as on what they have just touched, so the psychological discrepancy of the position advocated in a message depends on the positional discrepancy as well as on the context. In particular, prior consideration of a more extreme message can make a given message less psychologically discrepant (Hypothesis 1). This is somewhat analogous to, and may reflect the same psychological dynamics as the door-in-the-face technique (Cialdini et al., 1975), whereby a large request may be rejected but may induce the target to be more favorable to a subsequent smaller request. An application of this principle is John Stuart Mill's (1969) conclusion that if he wanted to help a proposal get enacted, he could best help it by proposing something more radical, thereby making the original proposal seem moderate.[11] Furthermore, social judgment theory suggests that psychological discrepancy is also a function of whether a discrepancy is within the latitude of acceptance, the latitude of rejection, or the latitude of noncommitment. And Lange and Fishbein's (1983) work suggests that discrepancies in which the position advocated and the receiver's initial position are within the same category should be less psychologically discrepant than those in which these positions are in different categories.

The second fundamental hypothesis concerning psychological discrepancy discussed in Fink et al. (1983) is that discrepant messages should be discounted (assigned less weight, w_A) because of their psychological discrepancy, rather than because of their positional discrepancy (Hypothesis 2). Thus, a message with a large positional discrepancy that does not seem very psychologically discrepant will be more effective than the same message in a context that makes it seem more psychologically discrepant. This hypothesis implies that psychological discrepancy should replace positional discrepancy in the negative exponential parts of Equation 9. (Positional discrepancy, however, remains as the first term of the numerator.)

Fink et al. (1983) gave participants one or more persuasive messages advocating a tuition increase. Some participants received a single message advocating either a moderately discrepant or extremely discrepant message. Others received two different messages—and all four possible combinations of the two messages just mentioned were used. Although the moderately discrepant position was designed to be considerably less discrepant than the extremely discrepant one, it was also designed to be sufficiently discrepant so that it might seem extreme, unless it were presented in conjunction with an even more highly discrepant message.[12]

Fink et al. (1983) measured opinion change as well as psychological discrepancy. If we consider statements that contained two discrepant messages, we have a quite strong result. Adding psychological discrepancy to the information integration model (similar to Equation 9) increased the explained variance in opinion change over an equation without any discounting (similar to Equation 3) from 6% to 29%. Not all of this improvement in fit can be attributed to the validity of the two hypotheses previously specified; individual differences may account for some of the explained variance, because the people who were initially more receptive to a higher tuition increase would have found a given message to be less psychologically discrepant.

Nevertheless, Fink et al. (1983) found empirical support for two other important findings that cannot be as readily attributed to individual differences. First, the psychological discrepancy of the moderate message was less if it were preceded by the extreme message than if it were not so preceded. Second, the condition in which an extreme message precedes a moderate message produced more opinion change than the condition with the messages in the reverse order. This latter finding was replicated in Kaplowitz et al. (1986). Thus, we see that psychological discrepancy, representing the context in which messages are evaluated, has a significant effect on the way messages are processed.

B. Discrepancy Versus Disconfirmation

A number of studies (e.g., Eagly & Chaiken, 1976; Eagly, Wood, & Chaiken, 1978; Walster, Aronson, & Abrahams, 1966; Wood & Eagly, 1981) have shown that a message in which the source takes a very unexpected position (i.e., a *disconfirming* message) is more persuasive than one in which the source takes an expected one. These findings have been explained by considering the attributional process used by the receiver. Kelley's (1971) discounting principle states that "the role of a given cause in producing a given effect is discounted if other plausible causes are presented" (p. 8). Thus, Eagly et al. (1978) proposed that when sources take an expected position (i.e., one consistent with situational pressures and/or their predispositions), their position could be attributed to this situation or predisposition, rather than to the merits of the case. In contrast, a message with an unexpected position would be attributed to "a particularly compelling external reality" (see Eagly et al., 1978, p. 425) and would therefore be more persuasive.

Disconfirmation may be defined formally by analogy to discrepancy. *Discrepancy* (*Dp*) is defined by Equation 2 as,

$$Dp = P_A - P_0;$$

and the analogous equation for disconfirmation (*Df*) is,

$$Df = P_A - P_E, \tag{11}$$

where P_A is the position advocated by the source, P_E is the position expected from the source, and P_0 is the initial position of the receiver.

Kaplowitz and Fink et al. (1991) argued that even when information about the source does not make the expected position salient, the receiver may still have an expectation of the source's position. In particular, the receiver may assume that the source's position is the modal position within the source's social environment. In the absence of direct knowledge of this modal position, the false consensus effect (see, e.g., Ross, Greene, & House, 1977) suggests that the receiver will assume that the modal position, and hence the source's position, is the receiver's own position.

In their seminal work on attitudes, Eagly and Chaiken (1993) commented that the interest in research on discrepancy has recently declined, partly because of the experimental difficulties of avoiding confounding discrepancy with other variables. In fact, Kaplowitz and Fink et al. (1991) argued that discrepancy is typically confounded with disconfirmation.

If we vary the position advocated (P_A) while holding the expected position (P_E) constant, we vary both discrepancy and disconfirmation. For example, Bochner and Insko (1966) manipulated discrepancy by telling some participants that the recommended number of hours of sleep was from 8 hrs (low discrepancy) to 0 hrs (high discrepancy). We can expect that, for almost any source to whom they might attribute the message, the low-discrepancy message was not very disconfirming and the high-discrepancy message was very disconfirming. Thus, in their study the discrepancy value of the message and the disconfirmation value of the message were highly or perfectly correlated. This example is typical of the confounding of these two variables in prior experimental research.

To disentangle their effects, we designed a study in which discrepancy and disconfirmation are orthogonal (Kaplowitz & Fink et al., 1991).[13] In the 1991 article, we proposed four different models that could relate discrepancy, disconfirmation, and opinion change. The first model begins by noting the confounding of discrepancy and disconfirmation previously described, and therefore proposes that *the apparent effect of discrepancy on opinion change is spurious,* merely resulting from its correlation with disconfirmation. This model implies that a message that is totally nondiscrepant, but is disconfirming, will produce opinion change, whereas a discrepant but nondisconfirming message will not.

Our second model suggests that greater disconfirmation increases the credibility of the source and the weight of the source's position in a modified information integration model (similar to Equation 9). In this case opinion change would be an *interactive* function of discrepancy and disconfirmation.

A third model proposes that both discrepancy and disconfirmation have additive effects on opinion change. In this model the weight of each variable depends on the degree to which the receiver is focusing on the issue (increasing the effects of discrepancy) and on the source's bias (increasing the effects of disconfirmation). (See Arkin & Duval, 1975, for a discussion of the effect of focus of attention on attribution.)

Our fourth model, which we call the *two-opinion model,* distinguishes positional measures of opinion (which are in the same metric as the possible positions taken by the persuasive message) from other measures, and suggests that discrepancy directly affects the position adopted by the participant, whereas disconfirmation directly affects nonpositional measures of attitude. Although the effect of discrepancy is derived from the basic tenets of information integration theory, the effect of disconfirmation is derived from an attributional framework.

In the 1991 study, we used a criminal sentencing scenario in which participants were told about a hypothetical defendant and previous sentences by the judge in the case and then asked what they deemed an appropriate sentence to be. The persuasive message is the speech given by the judge when he imposes the sentence on the convicted criminal. The *position advocated* is the sentence imposed by the judge, and the participant's own position is his or her view of the proper sentence. The *expected position* is the average sentence for this crime that participants believe the judge has previously imposed.

The results do not provide support for any of the first three models just specified, but do strongly support Model 4. Discrepancy strongly affects the participant's position (sentence recommended), whereas disconfirmation had no significant effect on position (a result replicating that of Nemecek, 1985). As Model 4 suggests, discrepancy—but not disconfirmation—directly influenced position, whereas disconfirmation—but not discrepancy—influenced a nonpositional measure, the participant's rating of how bad the convict was believed to be.

Two major disconfirmation studies (Eagly et al., 1978; Wood & Eagly, 1981) have results consistent with our model. In these studies, the attitude measures significantly affected by disconfirmation were also nonpositional measures, which were unaffected by discrepancy.

The nonpositional rating in the 1991 study was a *comparative evaluation*; participants compared an object (the defendant) with others in some relevant class (other defendants). Our generalization is that disconfirmation influences comparative evaluation, via an attributional process. Given that different processes are involved in affecting our two dependent variables (position and comparative evaluation), we believe that only under conditions of high cognitive elaboration will the two dependent variables significantly influence each other.

Our fourth model is not only supported in the two experiments reported in Kaplowitz and Fink et al. (1991), but also in several unpublished studies using the same scenario (Fink, Kaplowitz, & McGreevy, 1995; Lai, 1991). Despite these replications, further research is required. Specifically, we need to clarify what comparative evaluation means, operationally, in other contexts, and examine whether the two-opinion model successfully predicts effects of discrepancy and disconfirmation in other contexts.

IV. PSYCHOLOGICAL PROCESSES ACTIVATED BY DISCREPANCY

Even if we can specify the functional relationship between discrepancy and opinion change and know how certain variables affect that relationship, we still wish to have a better understanding of the psychological processes involved. There are a number of theories about how discrepancy effects opinion change.

A. Social Judgment Theory

According to social judgment theory (Sherif, Sherif, & Nebergall, 1965), positions that are minimally discrepant (i.e., those within the latitude of acceptance) are perceived to be less discrepant than they objectively are (i.e., they are *assimilated*), whereas positions that are discrepant and fall within one's latitude of rejection are perceived to be more discrepant than they objectively are (i.e., they are *contrasted*). This perception of the position in a message determines the message's effectiveness. Assimilation brings about greater attitude change, and contrast brings about less attitude change.

These ideas are clearly related to our work on psychological discrepancy. Like Sherif et al. (1965), we distinguish between objective (positional) and perceived (psychological) discrepancy. Our own ideas, however, stay closer to the psychophysical analogy that originally motivated social judgment theory. In our model, the perceived discrepancy of a message is determined by the *external* anchor of other (external) messages. In contract, social judgment theory sees the receiver's attitude as an *internal* anchor; that attitude determines the latitudes of acceptance, rejection, and indifference. These latitudes, in turn, are seen as determining the effectiveness of a message in bringing about attitude change.

Although social judgment theory has been widely accepted, the evidence for the underpinnings of this approach is not strong. As Eagly and Chaiken (1993) commented:

> Although social judgment theory's attitude change predictions have often been borne out, existing research provides little, if any, convincing evidence that the perceptual processes of assimilation and contrast covary with attitude change, let alone *precede* attitude change as the theory maintains. (p. 380)

Probably the most direct test of social judgment theory was conducted by Eagly and Telaak (1972), and found that those with wider latitudes of acceptance are more readily persuaded than are those with more narrow latitudes of acceptance. Yet Eagly and Telaak found no evidence that this effect is the result of the predicted differences in participants' perceptions of the positions in the various experimental messages.

Although interest in social judgment theory has generally waned, Siero and Doosje (1993) employed it. Consistent with the theory, they found that participants were most influenced by messages within the latitude of noncommitment and that messages within this latitude are most likely to induce cognitive elaboration. But, consistent with Eagly and Chaiken's (1993) comment, they found no evidence for the perceptual processes at the heart of this theory.

B. Cognitive Dissonance Theory

Aronson et al. (1963) explained the nonlinear relationship between discrepancy and opinion change via cognitive dissonance theory. They proposed that:

1. The greater the discrepancy of the message from the receiver, the greater the cognitive dissonance;
2. this dissonance is greater when sources are credible than when they are not;
3. the dissonance created by a discrepant message may be resolved in laboratory experiments by changing one's opinion or by derogating the message source;
4. it is harder to derogate a highly credible source than a less credible one; and
5. as discrepancy increases, source derogation, rather than opinion change, is employed to resolve one's dissonance.

Although Aronson et al. (1963) found evidence of a monotonic effect for a highly credible source and a nonmonotonic effect for a mildly credible one, there are major problems with their evidence and theory. As they themselves noted, contrary to their prediction, source derogation covaried with source credibility, but not with discrepancy. Furthermore, Hunter et al. (1984) showed that Aronson et al.'s predictions of nonmonotonicity do not follow from the five assumptions just stated. In their attempt to formalize Aronson et al.'s model, Hunter et al. showed that to predict nonmonotonicity, one must add the assumption that the tendency to prefer source derogation to opinion change is proportional to the square of the discrepancy. Interestingly, although social judgment theory was widely assumed to be valid even in the absence of direct evidence, the dissonance approach to this problem has been generally ignored.

C. Cognitive Response Approach

Petty and Cacioppo's (1986) cognitive response approach provides another possible explanation for the relationship between discrepancy and opinion change. If discrepancy is a *peripheral* cue, we would expect that it should be uncorrelated with relevant cognitive responses. Moreover, the effects of a discrepant message should be short-lived, easily overturned with new messages, and should be poorly predictive of behavior. Brock (1967), however, showed that greater message discrepancies induce a greater number of counterarguments. This result suggests that the effects of discrepancy are mediated via *central* (systematic) processing.

We can examine some of our own studies relevant to this issue. The results of Kaplowitz and Fink et al. (1991; in both experiments reported) indicate that the

effects of discrepancy are not mediated via cognitive elaboration. Using Petty and Cacioppo's (1986) thought-listing task, we found that discrepancy is unrelated to the number of counterarguments (thoughts suggesting leniency) or favorable thoughts (thoughts suggesting severity) generated by the participants.[14]

In Kaplowitz and Fink et al. (1991), final position was one of many dependent variables measured, via a paper-and-pencil questionnaire, after the discrepant message and before the thought-listing task. In contrast, we performed another more recent study of the effects of discrepancy in which participants continuously indicated their position by moving a computer mouse (Kaplowitz & Fink, 1995; see Fink & Kaplowitz, 1993 and Kaplowitz & Fink, 1996, for descriptions of the method). In this study, participants were given over a minute to decide their position and then had no other questions to respond to before being given the thought-listing task. This study used both the criminal-sentencing scenario used in Kaplowitz and Fink et al. (1991) and a variant of the tuition-increase scenario used in Fink et al. (1983). Each participant responded to both scenarios.

For both scenarios a positive correlation between discrepancy and the number of counterarguments was found: For criminal sentencing, $r = .250$, $p < .004$, one-tailed, $N = 97$, and for tuition, $r = .126$, $p = .058$, one-tailed, $N = 91$. By contrast, the number of thoughts favorable to the position advocated in the message is not significantly related to discrepancy. Thus, for both scenarios our 1995 study is consistent with Brock's (1967) finding that greater discrepancies induce more counterarguments.

The effect of discrepancy on opinion change is smaller in the 1995 study than in our other research. The criminal-sentencing scenario in the 1995 study used three of the four levels of discrepancy found in Experiment 1 of Kaplowitz and Fink et al. (1991).[15] In the 1995 study, the partial correlation between discrepancy and final position, controlling for initial position, was .045 in the low-credibility condition and .254 in the high-credibility condition. In contrast, if we restrict ourselves to the discrepancy conditions in common with the 1995 study, Experiment 1 of Kaplowitz and Fink et al. (1991) has an analogous partial correlation of .473, and Experiment 2 of Kaplowitz and Fink et al. (1991) and Lai (1991) have analogous partial correlations of .358 and .273, respectively.[16]

In conclusion, having participants take time to decide on their final position (as in the 1995 study) apparently changes discrepancy from a peripheral cue to an activator of cognitive responses, increasing the number of counterarguments. This process, in turn, appears to reduce the size of the correlation between discrepancy and opinion change.

V. DISCREPANT MESSAGES AND THE OPINION TRAJECTORY

Petty and Cacioppo (1986) reported that the valence of cognitive responses is correlated with opinion change. Messages that induce a large number of counterarguments are generally less persuasive than those that induce more positive and fewer negative responses. Furthermore, Gilbert, Krull, and Malone (1990) showed that an assertion is first entertained as true before being rejected. Thus, it is possible that any discrepant message initially causes some opinion change, and, after this point, counterarguments are initiated and subsequent opinion change is reduced. Moreover, when participants are given ample time to think, our data support Brock's (1967) finding that messages with greater discrepancies induce a greater number of counterarguments. Taken together, these ideas suggest an interesting hypothesis about the trajectory (time course) of opinion change following a discrepant message. Specifically, an extremely discrepant message should lead to (a) greater initial opinion change (i.e., change occurring before any counterarguing is initiated) than a less discrepant one, but to (b) less final change (i.e., change occurring after any counterarguing is initiated) than a less discrepant one. This hypothesis suggests a disordinal Time × Discrepancy interaction on opinion change.

The preceding hypothesis requires that, at some point in time, the extremely discrepant message induces less opinion change than is induced by the more moderate one. But, even if the extremely discrepant message always produces more opinion change than the moderate one, we may propose a weaker version of the hypothesis just mentioned:

> When participants are given ample time to think, extremely discrepant messages induce more counterarguments than more moderate messages. Therefore, the final opinion change induced by an extremely discrepant message (a) is less than its initial effect and (b) converges with the opinion change induced by messages with smaller discrepancies.

This prediction suggests an ordinal interaction of time and discrepancy in affecting opinion change.

These hypotheses regarding the opinion trajectories induced by messages that differ in discrepancy are especially plausible in view of research on the effect of mere thought on attitudes (see, e.g., Liberman & Chaiken, 1991; Millar & Tesser, 1986). The hypotheses are also suggested by our dynamic models, which predict that different levels of credibility and discrepancy can induce opinion trajectories that oscillate at different frequencies and amplitudes (see, e.g., Fink & Kaplowitz, 1993; Kaplowitz & Fink, 1996; Kaplowitz, Fink, & Bauer, 1983).

To evaluate these hypotheses, one must examine responses to messages of varying discrepancy levels at different points in time. Several of our studies have done so.

A. Effects of Discrepancy: The First Few Days

Kaplowitz et al. (1986) examined the effect of messages with moderate discrepancy and extreme discrepancy on participants' views of an appropriate tuition

increase. Participants received one or two messages within a statement about tuition. Excluding control conditions, the design of this experiment is a factorial design with two between-subjects variables (discrepancy of the first message and discrepancy of the second message) and one within-subject variable (time of measurement). Discrepancy of the first message had two levels (moderate and extreme). Discrepancy of the second message had three levels (moderate and extreme and no second message). Time of measurement had two levels (immediately after message and about four days later). Although the extremely discrepant message produced (nonsignificantly) more initial opinion change, at Time 2 the results were very different. The opinion change induced by the (first) extremely discrepant message declined substantially, and the (first) moderate message was at this point significantly more persuasive than the extreme one (see Figure 3.3); the second message that was part of the message statement had no significant effect at Time 2. A repeated measures analysis of variance ($N = 282$) showed a highly significant Time × Discrepancy of First Message interaction. Figure 3.3 shows this interaction to be disordinal.

In Kaplowitz et al. (1986), we elaborated the information integration model to encompass the processes of receiving delayed messages and forgetting; both of these processes may take place after the presentation of a discrepant message. We then examined the relationship between initial (Time 1) and delayed (Time 2) reported opinion for each participant in order to learn more about the processes responsible for the Time × Discrepancy of First Message interaction. Our analysis, although inconclusive, is suggestive. First, participants in the moderately discrepant condition apparently received more highly discrepant delayed messages (whether from others or self-generated) than participants in the extremely discrepant condition. Second, the more discrepant message seems to be remembered better and/or to lead to fewer delayed messages than the more moderate message.

Although the Kaplowitz et al. (1986) study has some intriguing conclusions, it also has some major limitations. First, it never directly measured the processes implicated in the model; the processes are inferred from the model and each partcipant's opinion at Time 1 and Time 2. Second, some processes have effects that cannot be distinguished from each other by examining the data (e.g., the effect of forgetting cannot be distinguished from the effect of messages received after Time 1). Moreover, cognitive responses (internally generated delayed messages) are assumed to have the same effect as externally generated ones. Finally, we do not know how many of the messages received were internally or externally generated.

As a result of this last limitation, we do not know whether the Discrepancy × Time interaction represents a process driven by the participants' internal cognitive dynamics or by social interaction (the responses of others to the partcipant's report of the discrepant message). We also do not know how any of the cognitive processes affect opinion change in the initial few minutes. Two of our studies have attempted to elucidate this last issue.

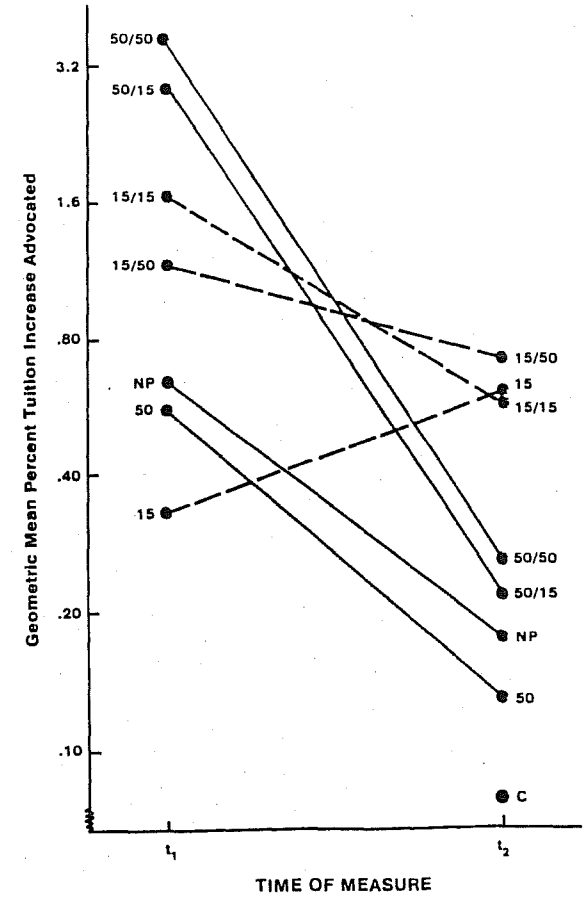

Figure 3.3. Geometric means of percentage tuition increase advocated by participants, by position(s) advocated in experimental message(s) and by time of measurement. Note (1) the *y* axis uses a logarithmic scale: equal distance represent equal ratios. (2) "C" refers to the *control* condition, in which there was no Time 1 contact and therefore no persuasive message delivered to subjects. (3) "NP" refers to the message condition in which subjects were told that a tuition increase was being considered but where no specific percentage was mentioned. This condition is of less theoretical interest than the others. (From Kaplowitz et al., 1986, reprinted with permission.)

B. Effects of Discrepancy: The First Few Minutes

1. *Time as a Between-Subjects Variable*

In Kaplowitz et al. (1983), participants were given one of three messages advocating an increase in the annual student health service fee. Some participants received a moderately discrepant message (n = 391), some received an extremely discrepant message (n = 390), and some comprised a control group (n = 391), receiving a message suggesting that the issue be thought about. The message was attributed to "Students for Better Health Care," and the argument in the message was designed to be logical and persuasive. In this study, each participant's opinion was measured following receipt of the message only (at a preassigned time varying from immediate to about 10 min. from the presentation of the message).

In this study, time is a between-subjects variable. The participants were individuals who were alone in the university library; they were asked not to discuss the message with anyone until they had given their response to the survey. Therefore, any opinion change should be the result of internal processing.

We found that, overall, the extremely discrepant message produced more opinion change than the moderate message. This result may have occurred because the message was of high quality, or because the message allegedly came from a student group, thereby disconfirming expectations, and perhaps giving the source greater credibility. Moreover, there was no significant interaction of discrepancy and time on opinion change, and there was no evidence for convergence of the trajectories from the two different experimental groups.[17] There was evidence of opinion oscillation, with the amplitude of oscillation greatest for the participants who received the message with the greatest discrepancy. The period of oscillation, estimated using all the data, was 13.5 sec.

2. *Time as a Within-Subjects Variable*

In discussing the cognitive response approach, we have already described aspects of our more recent laboratory experiment utilizing a computer mouse (Kaplowitz & Fink, 1995). In that study, we manipulated discrepancy (with three levels) and credibility (with two levels) as independent variables. The sample consisted of 99 participants, all students from the same university, who responded one at a time on a personal computer.

Each respondent received two different persuasive messages, one based on the criminal-sentencing scenario and one based on the tuition-increase scenario. These scenarios were expected to differ in their importance to the participant, and therefore in the participant's involvement. Credibility and discrepancy were manipulated with the same levels for both scenarios. For the criminal-sentencing scenario the message suggested a sentence for the convict of 17 years (low discrepancy), 30 years (moderate discrepancy), or 50 years

(high discrepancy); the computer screen was set for the mouse to move between 0 and 60 years. For the tuition scenario, the message advocated a 9% increase (low discrepancy), a 15% increase (moderate discrepancy), or a 22% increase (high discrepancy); the computer screen was set for the mouse to move from 0% to 25%. Manipulation checks showed the credibility manipula-

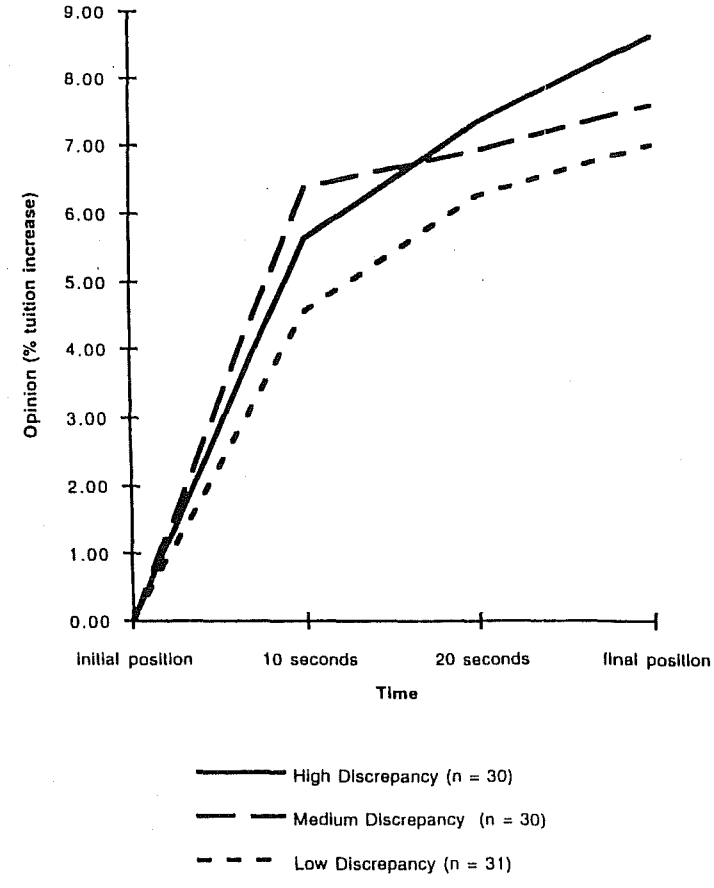

Figure 3.4. Mean opinion (% tuition increase favored) of participants by time of measurement and message discrepancy, for *tuition increase* scenario (from Kaplowitz & Fink, 1995).

tion to be successful, and for both issues there was a significant effect of credibility on the final opinion.

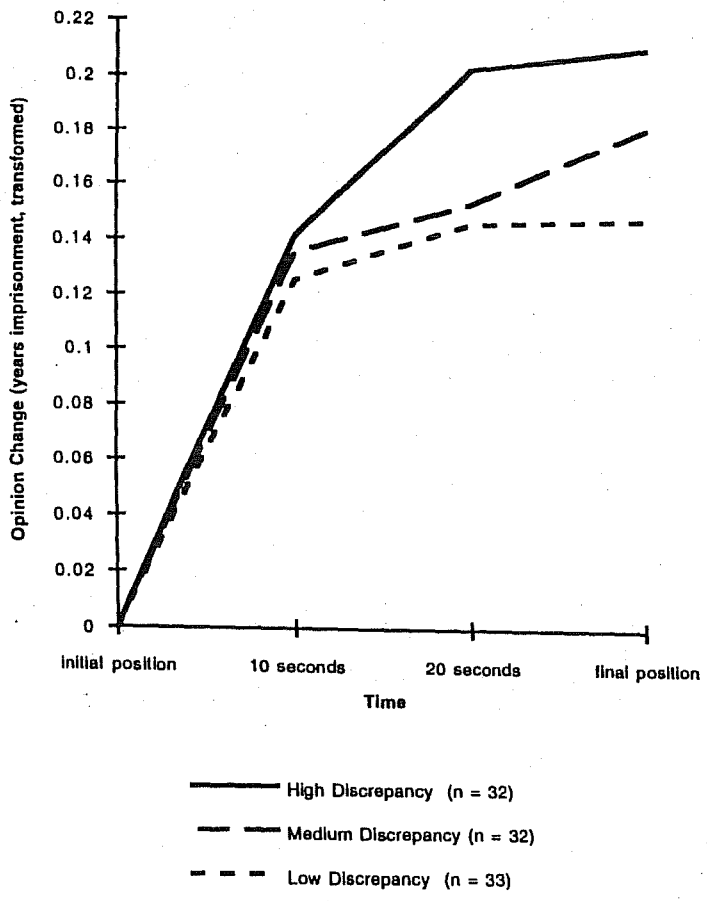

Figure 3.5. Mean opinion change (years imprisonment favored) of participants, by time of measurement and message discrepancy for *criminal sentencing* scenario (from Kaplowitz & Fink, 1995). Each point represents the mean difference between the logarithm of position at that time and the logarithm of the participant's initial (premessage) position. In order to minimize skew, a constant of 3 was added to the raw score before logarithmic transformation.

For the high-credibility sources, the relationship between discrepancy and final opinion was monotonic and showed a significant linear trend, but, as mentioned previously, the effect of discrepancy on the final opinion was weaker than in our other (nonmouse) studies with the criminal sentencing scenario. In contrast, with low-credibility sources, the criminal-sentencing scenario showed no significant effect of discrepancy on the final opinion, whereas the tuition scenario exhibited a significant linear relationship between discrepancy and the final opinion.

Our next concern was the whether the form of the opinion trajectories varied by the level of message discrepancy. For example, do they exhibit a reversal (as found in Kaplowitz et al., 1986, which examined data over several days) or a convergence? We examined the relationship between discrepancy and the respondent's position at three different times: (a) at 10 sec. from message receipt, (b) at 20 sec., (c) at the respondent's final position.[18] The data are presented in Figures 3.4 and 3.5. The initial position for the tuition scenario was imputed to be 0 (based on pilot studies). Because we measured the participant's initial (premessage) position in the criminal-sentencing scenario, our dependent measure for that scenario was *change* of position, where the initial value was 0 by definition. In general, the highly discrepant message was more effective than the medium discrepant message, which in turn was more effective than the low-discrepancy message. The sole exception was that the medium discrepancy message was more effective than the highly discrepant message at 10 sec. for the tuition scenario.

If messages produce more initial change, which wears off after counterarguments are generated, we would expect to find a downturn in the opinion trajectory. None of the graphs in Figure 3.4 or Figure 3.5 exhibit a downturn.

Examination of Figures 3.4 and 3.5 reveals no evidence for reversal or convergence of these trajectories over time. To consider whether the trajectories converge, we can look at the spread of the graphs at the three time points. For the tuition scenario, the spread across the discrepancy groups in Figure 3.4 goes from 1.84 (at 10 sec.) to 1.07 (at 20 sec.) to 1.62 (at the final point). For the criminal-sentencing scenario, the comparable values are .016 (at 10 sec.), .057 (at 20 sec.), and .063 (at the final point).

A visual inspection of the graphs suggests that in both scenarios the position change (hence the effectiveness of the messages) increases over time. We also note that in the criminal-sentencing scenario the trajectories for different levels of discrepancy appear to diverge over time. Thus, we performed repeated measures analyses of variance (with time of measurement as a within-subjects variable) to determine the significance of these over-time effects. For both scenarios we found a significant effect of time. But for neither scenario did either discrepancy or credibility significantly interact with time to affect position.[19]

VI. SUMMARY AND CONCLUSION

Source credibility, argument strength, and strength of prior opinion (Laroche's ego-involvement) not only influence the persuasiveness of messages, but they all appear to interact with discrepancy in their effect on opinion change. The lower the credibility, the greater the strength of the initial opinion. The less strong or available the arguments, the more the relation between discrepancy and opinion change departs from linearity and the greater the likelihood of observing nonmonotonicity. And, although nonlinear monotonic functions may look quite different from linear ones, conventional statistical measures such as the Pearson correlation will not be of much help in distinguishing these nonlinear functions from truly linear ones.

The psychological discrepancy of a message is determined not only by its positional discrepancy, but by the message environment. For example, the psychological discrepancy of a message received after exposure to an even more discrepant message makes this second message seem less extreme, which makes it more effective. And there is some evidence that by making the same message less psychologically discrepant, it becomes more effective.

Although discrepancy and disconfirmation are typically correlated, the observed effect of discrepancy on opinion change is not a spurious consequence of this correlation. In fact, although disconfirmation does affect opinion change, it appears to have no direct effect on positional measures of opinion.

When responding quickly to a discrepant message, participants seem to employ discrepancy as a peripheral cue and report a weighted average of their initial position and the position advocated. In these circumstances, there is little evidence that discrepancy has influenced cognitive elaboration. On the other hand, when participants are given adequate time to think about their responses, discrepancy influences the number and content of their cognitive responses. In this circumstance, more discrepant messages lead to more counterarguments. Despite this outcome, there is no evidence that highly discrepant messages lose their initial effectiveness in the few minutes during which they are cognitively processed.

Epilogue

We began with a seemingly simple question: How discrepant should the most effective message be? The study of message discrepancy has made us consider and review various theories and a plethora of (often conflicting) evidence. We see this research area as ripe for theoretical investigation, mathematical modeling, and experimental creativity. We hope the questions raised are worth this additional investigation.

VII. NOTES

1 Note that Johnson and Eagly (1989) distinguished among several different kinds of involvement. They stated that *outcome-relevant* involvement is not associated with greater resistance to persuasion, but that *value-relevant* involvement (their term for ego-involvement) is associated with greater resistance to persuasion.

2 We (Fink, Kaplowitz, & Bauer, 1983; Kaplowitz, Fink, Armstrong, & Bauer, 1986) have done studies that compare the effect of two discrepant messages versus one discrepant message. In each case most of the persuasive arguments were in the first message. Thus, the relative amount of information contained in the first message has been confounded with the resistance to persuasion that might be induced by the first message.

3 For example, when applying Laroche's model to the data from Aronson, Turner, and Carlsmith (1963), if the original values of discrepancy and attitude change are used in the low-credibility source condition, the model has an R^2 of .003. By contrast, when we normalize, as Laroche suggested, the R^2 for this condition increases to .916. For the highly credible source the R^2 increases less dramatically, from .919 to .987.

4 For example, nonlinear routines only yield approximate standard errors, and they involve iterative solutions that are not guaranteed to converge to an optimal set of estimates. In addition, there may be multicollinearity and identification problems in arriving at a set of estimates (see Beck & Arnold, 1977; Daniel & Wood, 1971; Meyer, 1975).

5 What we refer to as β, Laroche (1977) referred to as r. We have made this change to avoid confusion with the Pearson correlation. Laroche found that the pattern of sample means of ΔP by Dp typically fit this equation with $R^2 > .99$. As predicted, β was usually close to 1.0. This very good fit is to be expected, given that he was usually fitting an equation with two parameters (β and γ) using only three data points (the sample means). Nevertheless, with eight data points with our data the fit was as good.

6 We do so to have a measure of central tendency that is less influenced by extreme cases than the arithmetic mean, but that still uses all of the data; see the original articles for a further discussion of this issue.

7 The decrease in this ratio is also consistent with the model proposed by Fishbein and Ajzen (1975, pp. 478 ff.).

8 See Lodge (1981) for arguments for this position (cf. Fink, Kaplowitz, & McGreevy, 1995; Kaplowitz, Broman, & Chen, 1992).

9 A set of control participants were not told the sentence for this convict but were asked, after reading the sentencing speech, what they thought the sentence was. Before presenting this speech, the experimental booklet informed participants of the judge's prior sentences. Those participants who were told of prior sentences anywhere in the range of 10 to 50 years expected the judge to impose the same sentences that he had previously given. Thus, the speech appeared well suited to any sentence in the 10- to 50-year range.

10 The main difference between these studies is that one control group responded in writing in a classroom setting and the other was called on the phone. These different methods may be responsible for the different results. In particular, social desirability effects may have influenced those being interviewed by another student in the direction of favoring a very low (or zero) tuition increase.

[11] Mill's more extreme proposals were typically advanced *after* more moderate ones had already been advanced. In the course of lengthy public debate, however, people could reevaluate the psychological discrepancy of the original proposal in light of Mill's new proposal.

[12] A pilot study found that a 15% tuition increase was viewed as the most extreme of the moderate views and the most moderate of those rated as extreme, so a message advocating a 15% increase became our moderately discrepant message. A message advocating a 50% tuition increase was our extremely discrepant message.

[13] There is a degrees of freedom type of problem in all this research. We have three variables (P_0, P_A, and P_E) that, in combination, define two variables (Dp and Df). Therefore, in our 1991 study, although discrepancy and disconfirmation are orthogonal, they are perfectly multicollinear with the expected position of the source (P_E) if one treats P_0 as constant for all participants.

[14] Data from another study using the same experimental scenario (Lai, 1991) leads to a similar conclusion. In this study, two independent variables (issue focus and source focus) affect the degree to which participants engage in cognitive elaboration. In the condition with high issue focus and low source focus, we found a significant positive correlation between discrepancy and thoughts favoring leniency. But in the other three conditions, the corresponding correlation is near zero and not significant. In none of the four conditions is there a significant correlation between discrepancy and thoughts favoring severity.

[15] Unlike the Kaplowitz and Fink et al. (1991) experiments, the 1995 study did not have a condition with zero discrepancy.

[16] These figures are actually conservative estimates of the differences between the paper-and-pencil versus mouse studies. Both the linear discrepancy model and the nonlinear models suggest that the higher the source credibility, the higher the correlation between discrepancy and opinion change. Thus, it is even more surprising that our earlier studies, which employed moderately credible sources, would show a higher correlation between discrepancy and opinion change than our 1995 results from a high credibility condition. In addition, the nonzero discrepancy conditions in Experiment 2 of Kaplowitz and Fink et al. (1991) and in Lai (1991) had a smaller range of discrepancy than did the 1995 study. This feature should have attenuated the correlation between opinion change and discrepancy in these studies, as compared to the correlation found in the 1995 study.

[17] The data were analyzed in several different ways that were not reported in the original article. For some analyses, we grouped all respondents into time intervals based on the time between their receipt of the message and the recording of their opinion. To see if major changes occurred much closer to the beginning of message receipt, we also separately analyzed those participants who responded in the first 120 sec., dividing them into groups for each 40-sec. block. In Kaplowitz, Fink, and Bauer (1983), we reported the results of fitting a nonlinear model to these data.

[18] The 10-sec time point was chosen to be large enough so that almost everyone who changed from their initial position would have done so. The 20-sec point was chosen as the largest value of time with over one half of the participants not yet settled on their final position. If the mouse was in motion at 10 or 20 sec, then the position used was the one closest to 10 or 20 sec. that the participant had settled on for at least 1 sec. Participants were instructed to press the mouse button when they made their final decision. Their position at the time they pressed the button was considered to be their final position.

[19] Another way to examine whether the shape of the trajectories is influenced by discrepancy or by credibility is to do an analysis in which the time at which the maximum position is reached is the dependent variable. This analysis reinforces our earlier results. There is no significant effect of either discrepancy or credibility on this variable.

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4 Persuasion, Public Address, and Progression in the Sciences: Where We Are at What We Do

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