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Disentangling the Effects of Discrepant and Disconfirming Information*

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Previous research has shown that both message discrepancy *(the difference between the position advocated in a message and the position of the receiver) and message* disconfirmation *(the degree to which the position advocated is unexpected) affect opinion change. Their combined effects have been unclear, however. They are typically confounded, and studies of their effects generally use different types of dependent opinion measures. To disentangle their effects, we use an experimental design in which discrepancy and disconfirmation are orthogonal and in which we measure both the subject's* position *along the same scale as the position advocated and his or her* comparative evaluation *of the attitude object. Using structural equation models, we find that discrepancy affects* position *positively (via a weighted averaging process) but does not directly affect comparative evaluation. Disconfirmation affects the* comparative evaluation *of the attitude object positively (via an attributional process) but not the position. Effects of comparative evaluation on position appear to require substantial cognitive elaboration.*

Many studies have shown that message *discrepancy* (the difference between the position in a message and the receiver's initial position) affects opinion change in either linear or curvilinear fashion (see, for example, Aronson, Turner, and Carlsmith 1963; Bochner and Insko 1966; Fink, Kaplowitz, and Bauer 1983; Jaccard 1981; Kaplowitz et al. 1986; Kaplowitz, Fink, and Bauer 1983; Whittaker 1965).

One model that has been used often to predict discrepancy effects assumes that the final position (i.e., opinion) of the subject (P_1) is a weighted average of the subject's initial position (P_0) and the position advocated by the message (P_A). (See Anderson and Hovland 1957; Fink et al. 1983; Himmelfarb 1974; Hunter, Danes, and Cohen 1984, ch. 3; Kaplowitz et al. 1986; Saltiel and Woelfel 1975 for various versions of this model.) This assumption leads, after algebraic manipulation, to the following:

$$P_1 - P_0 = \frac{w_A Dp,}{w_0 + w_A}, \qquad (1)$$

where Dp, discrepancy, is defined as

$$Dp = P_A - P_0. \qquad (2)$$

In this model, the weight of the recipient's initial view (w_0) is an increasing function of his or her prior commitment to that view, while the weight of the message (w_A) is an increasing function of source credibility and also may be a decreasing function of discrepancy (see Fink et al. 1983).

A number of studies (e.g., Eagly and Chaiken 1975, 1976; Eagly, Wood, and Chaiken 1978; Walster, Aronson, and Abrahams 1966; Wood and Eagly 1981) have

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shown that messages which *disconfirm* expectations of the source's position are more effective than messages which confirm them.

Although the existing literature typically treats disconfirmation (*Df*) as a discrete (often dichotomous) variable, we may define it so that it is continuous:

$$Df = P_A - P_E, \quad (3)$$

where *Df* is disconfirmation and P_E is the position that the source was *expected* to advocate.

Messages that differ in discrepancy may also differ in disconfirmation. In Bochner and Insko's (1966) study, for example, a highly discrepant message advocating zero hours of sleep would also be very different from what a subject would expect any reasonable source to advocate. Hence such a message is highly disconfirming as well. Thus in that study and in others, the independent roles of discrepancy and of disconfirmation remain unknown.

Persuasion research has examined the effects of disconfirmation only where information about the source's background or prior behavior suggests an expectation of his or her position. The example cited above, however, suggests that such an expectation may exist in other contexts as well. For example, receivers may assume that the source has a modal position. Moreover, the false consensus effect (see, for example, Ross, Greene, and House 1977) suggests that when people lack data, they will assume that the modal position, and hence the source's position, is the same as their own (i.e., $P_E = P_0$; in this case, discrepancy and disconfirmation are equal).

What is the combined effect of discrepancy and disconfirmation on opinion change? Below, we present and discuss several alternative answers.

Three Alternative Models

Model 1. This model holds that *the effect of discrepancy is spurious* and results from its correlation with disconfirmation. Typically, studies vary discrepancy by varying the position advocated while holding the expected position constant. From Equation (3) and our discussion above, we see that to vary P_A while holding P_E constant is to vary not only discrepancy but also disconfirmation.[1] Hence the apparent effect of discrepancy may be a spurious result of its correlation with disconfirmation. In this case, *Df* should replace *Dp* in Equation (1) above, and discrepancy would have no independent effect.

Model 2. This model assumes that discrepancy belongs in Equation (1) but that greater disconfirmation leads to the attribution that the source's position was based on a "particularly compelling external reality" (see, for example, Eagly et al. 1978). Thus the weight of the source's position (w_A in Equation (1)) would be an increasing function of disconfirmation. Because opinion change would be a product of discrepancy and the weight of the source's position, it would be an *interactive* function of discrepancy and disconfirmation.

Model 3. This model holds that discrepancy and disconfirmation have additive effects on opinion change; that is, their *weighted average* replaces *Dp* in Equation (1).[2] What might determine the weights of these two predictors? Sometimes the position expected from the source is very salient. At other times, the receiver may not think about it at all. We hypothesize that the more the receiver focuses his or her attention on this expectation, the greater will be the weight of disconfirmation. Conversely, the more the focus is on the position advocated and on other issue-relevant cognitions, the greater may be the effect of discrepancy, and the less the effect of disconfirmation. (See, for example, Arkin and Duval 1975; McArthur and Post 1977 for evidence that focus of attention influences the attribution process.)

Implications. Model 1, *spurious effect of discrepancy*, predicts that messages which are discrepant, but are totally expected, will cause no change. On the other hand, messages that are not at all discrepant, but are unexpected, will lead to change. As an example of the latter effect, suppose that a

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[1] In fact, under certain conditions, disconfirmation and discrepancy are perfectly collinear. To see this, we combine Equations (1) and (2) above to solve for *Df* in terms of *Dp*:

$$Df = Dp + P_0 - P_E.$$

When P_0 and P_E are assumed constant for all subjects exposed to the same source, discrepancy and disconfirmation differ by a constant ($P_0 - P_E$) and therefore are perfectly collinear.

[2] The second and third models are consistent with the two versions of the scale adjustment model presented in Birnbaum and Stegner (1979).

supporter of gun control learned that the National Rifle Association was supporting a bill which he or she also supported. The receiver might then conclude, "If the NRA supports this proposal, it must be too weak.")

Model 2, the *interactive* model, predicts that messages with zero discrepancy will produce no opinion change, regardless of their level of disconfirmation. The greater the discrepancy, the greater will be the effect of disconfirmation.

The predictions of Model 3, *focus weighted average*, depend on the receiver's focus of attention. When there is maximum focus on source expectation, it approximates the spurious effect model above. When there is minimal source focus, it simplifies to Equation (1) above, in which discrepancy, but not disconfirmation, has a causal effect. At intermediate levels of source focus, it predicts that if either discrepancy or disconfirmation is zero, but the other is not, there will be some opinion change. Overall, this model predicts that both discrepancy and disconfirmation will interact with focus in their effect on position.

Model 4: The Two Opinion Model

We have shown that it is possible that *discrepancy* has no independent effect on position. Is it instead, possible that *disconfirmation* has no such effect? In prior disconfirmation studies, subjects receiving the same message (i.e., messages for which discrepancy was constant) from sources with different expected positions (i.e., with disconfirmation varying) showed different amounts of opinion change. Hence, disconfirmation has an effect on opinion change which is not a spurious result of its correlation with discrepancy.

It is possible, however, that instead of affecting *position*, disconfirmation affects some *other opinion* regarding the attitude object. To see why this approach is reasonable, we first distinguish various types of opinion measures used in prior discrepancy and disconfirmation studies.

Measurement issues. By a *position*, we mean a belief about the most desirable or most accurate of a set of alternatives on a *uni*dimensional scale. An alternative that lies numerically between two others represents an intermediate and viable preference or estimate. For example, positional measures include numerical estimates of the amount of sleep people *should* get or of the amount most people *do* get.

A second kind of opinion scale specifies an alternative at each end; intermediate alternatives indicate the intensity or certainty of one's response to these two alternatives. These are not pure positional measures. They contain *two* distinct dimensions: choice between the two viable positions, and degree of intensity or willingness to choose at all.

Discrepancy studies typically have used pure positional measures along the same dimension as the position advocated. Disconfirmation studies, however, have used the second kind of measure discussed above. Their midpoints were either "neutral" (or "uncertain") or left unspecified. The midpoints did not clearly signify some intermediate policy, as they would in a positional measure.

Some intriguing results, however, occurred in two studies that systematically varied both discrepancy and disconfirmation. Wood and Eagly (1981) used the nonpositional dependent measures typical of disconfirmation studies and found a significant effect of disconfirmation, but not of discrepancy, on opinion change. In contrast, Nemecek (1985) found a significant effect of discrepancy, but not of disconfirmation, when using positional measures. These findings suggest that both discrepancy and disconfirmation may have effects, but on different types of opinion and by different processes. Model 4 is consistent with this view.

Discrepancy. In discrepancy studies, the position advocated by the message, the receiver's initial position, and the recipient's final position are generally expressed in the same units. Slovic, Griffin, and Tversky (1990) show that a stimulus attribute has the greatest effect when it is expressed in the same units as the response mode. Hence discrepancy can easily affect final position via the weighted averaging process indicated by Equation (1); this effect is what Model 4 predicts.

Disconfirmation. According to Eagly et al. (1978, p. 425), if a source advocates a totally *expected* position, Kelley's (1971) discounting principle suggests that this may reflect the personal disposition of the source or situational pressures on the source rather than the merits of the case. If the source takes a very *unexpected* position, however, the augment-

ing principle suggests that the source's position is based on a "particularly compelling external reality." Hence this point implies something not only about the source, but also about the attitude object.

For example, suppose that a corporate executive supports strict pollution controls. If the executive generally has opposed such controls, this position might suggest that *this* pollution problem is more serious, or can be solved with lesser cost, than most such problems. If the executive consistently has favored pollution controls, however, this position on pollution might suggest that controlling pollution is so important as to override his or her usual antipathy to regulation.

In either case, the unexpected position leads to the conclusion that there must be something unusual or extreme about this situation. An expected position, however, does not suggest anything unusual. This point suggests that the attribution induced by disconfirmation may affect one's *comparative evaluation* of the particular attitude object in relation to others in some category.

Therefore a two-opinion model implies the following hypotheses:

(H_1) *Discrepancy* directly affects the receiver's *position* along the same dimension as the position advocated, via a weighted averaging process.

(H_2) *Disconfirmation* directly affects the receiver's *comparative evaluation* of the opinion object via an attributional process. (The comparative evaluation need not be along the same dimension as the position advocated.)

Classical cognitive consistency theories (e.g., Festinger 1957; Heider 1946) suggest that one's position and one's comparative evaluation regarding the same object should be consistent. More recent research, however, suggests that "local" inconsistencies are possible and that thoughts linking attitudes reduce inconsistencies between them (see, for example, Judd and Krosnik 1989; Tesser 1978). Hence, according to our two-opinion model, the mutual effects of position and comparative evaluation require cognitive elaboration beyond that necessary for the direct effects predicted above. Hence we have

(H_3) The greater the degree of cognitive elaboration, the greater the effects of the final position and comparative evaluation on each other.

The model assumes, however, that any effect of disconfirmation on position is *indirect* and therefore should be relatively weak. Any effect of discrepancy on comparative evaluation is similarly *indirect* and should be relatively weak.

In discussing the previous models, we proposed that disconfirmation would have the greatest effect if the subject focused on the position expected from the source. Because this model assumes that disconfirmation affects comparative evaluation, this point implies

(H_4) The greater the focus on the position expected from the source, the greater will be the effect of disconfirmation on comparative evaluation.

Summary

We have presented four viable alternative models of the combined effects of discrepancy and disconfirmation: 1) the effect of discrepancy is spurious; 2) disconfirmation and discrepancy have an interactive effect on opinion change; 3) opinion change is an effect of a weighted average of discrepancy and disconfirmation, and the weights are determined by the extent to which the receiver focuses on the source (as opposed to the issues); and 4) discrepancy and disconfirmation affect different opinion variables.

Experiment 1

METHOD

Overview

Experiment 1 was designed to test these four competing models. There are three orthogonal independent variables: discrepancy, disconfirmation, and focus. We also included both positional and comparative evaluation measures.

Subjects were told that we were studying opinions about the criminal justice system. Each questionnaire contained information about some previous sentences a judge had imposed for armed robbery. The questionnaire then presented a more recent case, in which the same judge imposed another

sentence for the same crime. It then asked for the subjects' own view.

Sample and Administration

The questionnaires were administered to nine undergraduate classes at a large state university. Before distribution, forms for the different conditions were interspersed systematically. Hence each class received approximately equal numbers of each form. There was no communication among subjects as they completed the questionnaires. Total N was 502, after the two most extreme outliers were removed and 12 other subjects were eliminated for prior participation or for disbelief in the cover story.

Topic

We chose the topic of criminal sentencing because position can be placed readily on a scale with consensual units (years of imprisonment). In a pilot study, we asked undergraduates (N = 41) the proper sentence (number of years of imprisonment) for 16 different crimes. The preferred sentence for armed robbery had the lowest degree of dispersion relative to its central tendency, which was 10 years.[3]

The Questionnaire Booklet

To minimize the variance in initial position, the questionnaire booklet stated that 10 years is the state's sentencing guideline for armed robbery. Subjects were told that this guideline was supported by a consensus of both legal experts and the public.

Next we presented "Judge Walters." His description was based on a pilot study in which a different sample of undergraduates (N = 12) described a judge in criminal cases. Because the sentences imposed by Judge Walters in most experimental conditions differed from the guidelines, the description also stated that he usually followed his own judgment rather than the guidelines.

The questionnaire next stated that in 1984, Judge Walters sentenced "Defendants A, B, and C" for the crime of armed robbery, and it specified those three sentences. The questionnaire then stated that in 1985, Judge Walters sentenced "Defendant X" for the same crime, and it gave the text of the speech he supposedly delivered in sentencing Defendant X. In all conditions, the speech was the same except for the manipulated sentence at the end.

Manipulation of Independent Variables

In keeping with other studies, we manipulated message *discrepancy* by varying the position advocated by the source (i.e., the sentence that Judge Walters imposed on Defendant X). We wanted four discrepancy levels, including a lower limit of zero (i.e., a sentence of 10 years) and an upper limit that would be extremely discrepant for most of our subjects. In order to increase discrepancy in steps that would seem equal to our respondents, we wanted the *ratio* of successive steps to be approximately constant (see Lodge 1981). Therefore our four different sentences were 10, 17, 30, and 50 years of imprisonment, which we call discrepancy levels 0, 1, 2, and 3.

The *expected position of the source* was manipulated via the information about Judge Walters's three *previous* sentences (i.e., prison sentences for Defendants A, B, and C). These sentences had seven different averages: 2, 3.5, 6, 10, 17, 30, and 50 years. Defendant A always has received the average of the three previous sentences for that condition, Defendant B received approximately 10 percent *less* than that average, and Defendant C received approximately 10 percent *more*.

In our experimental design, discrepancy and disconfirmation are orthogonal, with four levels each. Table 1 shows the specific combinations of new sentence (P_A) and

Table 1. Sentence for Defendant X and Average of Previous Sentences, as a Function of Disconfirmation and Discrepancy, for Experiment 1

Discrepancy Level	Disconfirmation Level			
	0	1	2	3
0	10/10	10/6	10/3.5	10/2
1	17/17	17/10	17/6	17/3.5
2	30/30	30/17	30/10	30/6
3	50/50	50/30	50/17	50/10

Note: The number before each virgule (/) is the sentence for Defendant X (P_A). The number after the virgule is the average of the three previous sentences (PREVIOUS).

[3] The median sentence recommended for armed robbery from a bank was 10 years, and 85 percent of the responses were in the range of five through 20 years.

previous sentence (PREVIOUS) used to accomplish this design. Both discrepancy and disconfirmation are always nonnegative in that the position advocated by the source is always at least as great as both the subject's presumed initial position (10 years) and the expected position of the source. (This strategy is suggested by the findings of Nemeth and Endicott 1976).

Our third independent variable is the subject's *focus of attention*. To create a focus on the expected position of the *source* after presenting Judge Walters's previous sentences, the booklet states:

> [D]ifferent judges have different points of view. Some tend to be more severe with defendants who have been found guilty, while others tend to be more lenient.

Subjects then were asked how severe they considered Judge Walters, and what sentence they expected him to pass on Defendant X. Next they were told that *as they read* Judge Walters's statement sentencing Defendant X they should "Keep in mind Judge Walters' point of view as well as [their] own." *After* reading Judge Walters's statement and before writing their own post-message opinions, subjects were asked to think about "how strict or lenient Judge Walters generally is."

For the alternative focus of attention, subjects read Judge Walters's previous sentences but were not asked to think about them. Instead they were asked to focus on the *reasons* Judge Walters gave for the sentence he imposed on Defendant X.

Hence the *experimental* conditions constitute a 4 (discrepancy) × 4 (disconfirmation) × 2 (focus) factorial design.

Control conditions. In addition, we included seven control conditions, one for each set of previous sentences. These questionnaires present the previous sentences and Judge Walters's sentencing speech, but not his sentence for Defendant X. They do not contain a focus manipulation.

Measurement of Dependent Variables

Opinion Measures. We measure two opinions regarding Defendant X: the subject's position (expressed in the same metric as the persuasive message) and the comparative evaluation.

The subject's position was measured twice. After presenting the sentencing guideline, we asked subjects what sentence *they* favored for armed robbery. This is the *initial position*. After exposing subjects to Judge Walters's previous sentences, his sentencing speech for Defendant X, and, in the noncontrol conditions, his "actual" sentence, we asked subjects what sentence they thought Defendant X should receive. This is the *final position*.

In order to prevent subjects from being committed to their initial positions, the questionnaire states:

> In this study, you expressed an initial opinion, but since then, you have received additional information and have had additional time to think about this issue. Therefore, please feel free to change your views.

We measured the subject's *comparative evaluation* by asking "How bad is Defendant X?" using a magnitude scaling question (see, for example, Lodge 1981). Subjects were asked to compare Defendant X to "moderately bad" (rated as 100). The higher the numerical value, the worse the subject's comparative evaluation of Defendant X. The scale has no upper limit.

We used other measures for manipulation checks, and to measure other relevant cognitive processes. Magnitude scaling questions measured how discrepant the respondents perceived Judge Walters's sentence to be, how *surprising* and how *unexpected* the sentence was, and how *expert, trustworthy,* or *fair* they viewed Judge Walters to be. For these magnitude scales, a moderate value equals 100. Other questions tested the subject's memory of the sentences given by Judge Walters, and of the facts stated in his sentencing speech. Finally, subjects were asked to list the thoughts they had while deciding on their final position.

RESULTS

Data Transformations

Statistical inference within the general linear model (e.g., ANOVA, regression) assumes homoskedastic and normal population residuals (see, for example, Bauer and Fink 1983). Magnitude scaling items generally result in positive skew and heteroskedastic residuals; such was the case with these data.

We dealt with this situation in two ways. First, to reduce the effect of outliers, we recoded the most extreme responses to be less extreme.[4] Second, after such recoding, we transformed the data logarithmically, a process equivalent to using the geometric mean as the measure of central tendency (see Lodge 1981, pp. 46–47).[5]

For all of these variables, this transformation substantially reduced both the skew (from greater than 2.0 to between -1 and $+1$) and heteroskedasticity. Hence we use this transformation for statistical analysis of the dependent variables and for initial position.[6]

Manipulation Checks

Disconfirmation and expected position. After reading the sentences previously imposed by Judge Walters, and before reading the sentencing speech for Defendant X, both control and source focus subjects were asked what sentence they *expected* Judge Walters to pass on Defendant X (EXPECTED). In examining EXPECTED, one checks whether PREVIOUS (the average of the three previous sentences) was successful in manipulating the position expected. PREVIOUS predicts EXPECTED with $r = .938$, $F(1, 281) = 2032.71$, $p < .001$. Moreover, the central tendencies and variability of these variables are very similar.[7] In short, subjects expected Judge Walters to behave very much as he had behaved previously; this manipulation was very successful.

Our manipulation of disconfirmation has a strong and very similar relationship to the subject's ratings of the surprise and unexpectedness of the sentence for Defendant X. The two correlations with disconfirmation are.46 and .47 respectively; $F(1, 423) = 115$, $p < .001$.

Our manipulation of disconfirmation also had discriminant validity in that surprise and unexpectedness had low correlations with other exogenous variables. All such correlations were less than .174.

Discrepancy. The correlation between the perceived discrepancy of the sentence and the (manipulated) positional discrepancy was $r = .38$, $F(1, 423) = 70.4$, $p < .001$. Perceived discrepancy also had clear discriminant validity.

Initial position. We wished to minimize the variance of initial position around the value of 10 years. In fact, the geometric mean was 10.70 years, and 88 percent of subjects were in the range from five through 15 years.

Focus. If our focus manipulation were successful, subjects in the source focus conditions should have thought more about the relationship between Judge Walters's previous and new sentences than subjects in the reasons focus conditions. The source focus also should have led to more accurate recall of the previous sentences imposed.

Both the thoughts about the (new) sentence imposed on Defendant X and the thoughts about Judge Walters's previous sentences were twice as common in the source focus as in the reasons focus conditions. For thoughts about the new sentence, the Kolmogorov-Smirnov two-sample test (appropriate for these nonnormal data) finds the difference between focus conditions to be significant (K-S $z = 1.675$, $p = .007$).

We also found that those with a source focus showed much less error in recalling previous sentences than those with a reasons focus.[8] We used the nonparametric Mann-Whitney test (appropriate for these data); $Z = 2.72$, $p = .007$.

Although the source focus clearly had the expected effect, the *total* number of thoughts was higher in the reasons focus condition ($M = 3.36$ vs. 2.80, $F[1, 392] = 19.086$, $p < .001$). Hence the total cognitive elaboration

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[4] Recommendations of life, death, or any sentence greater than 75 years were recoded to 75. For magnitude scaling questions, any numerical response greater than 3,000 was recoded to 3,000.

[5] Whenever the raw data contained responses of zero, whose logarithm is undefined, we added an appropriate constant before transforming.

[6] By regarding discrepancy (Dp) and disconfirmation (Df) as having values ranging from 0 to 3, we also have transformed them logarithmically. $Dp = \log(P_A/P_0) = \log(P_A) - \log(P_0)$, and $Df = \log(P_A/P_E) = \log(P_A) - \log(P_E)$. Recall that for this purpose, P_0 is assumed to equal 10 years. The values of 0 to 3 result when the base of the logarithms is the cube root of 5. For example, if $P_A = 50$, then $Dp = 3$ because $P_A/P_0 = 5$, whose logarithm, to our base, equals 3.

[7] The geometric means (and standard deviations) of PREVIOUS and EXPECTED were 10.33 (.91) and 10.39 (.85) respectively.

[8] We measured error in recall of sentences by taking the absolute value of the logarithm of the following ratio: the previous average sentence, as *recalled* by the subject, divided by the "actual" previous average (PREVIOUS). For the source focus, this ratio had $M = .020$, $SD = .064$; for the message focus, it had $M = .078$, $SD = .285$.

may have been greater in the reasons focus conditions.

The sentencing speech. Although Judge Walters's sentence for Defendant X varied by condition, the *text* of the speech justifying that sentence was identical in all conditions. Different positions, however, are usually presented with different evaluative tones (see Wallis 1985). Control conditions (in which subjects read the speech but were not told the "actual" sentence for Defendant X) were used to assess whether the sentencing speech was suited to all of the sentences imposed.

Those control subjects for whom Judge Walters's previous sentences were in the range of 10 to 50 years believed that he imposed essentially the same sentence on Defendant X as he had imposed on the previous defendants. Because the text of the speech did not change expectations of the judge's sentence, it was appropriate for any sentence in that range.

ANCOVAs and Trends in Means

To test our alternative models, we first performed a three-way analysis of covariance (ANCOVA) with discrepancy, disconfirmation, and focus as independent variables, with the subject's initial position as a covariate, and with final position as the dependent variable.

Model 1 (the *spurious effect of discrepancy* model) predicts a main effect of disconfirmation, but not of discrepancy. Model 2 (the *interactive* model) predicts an interaction effect of discrepancy and disconfirmation. Model 3 (the *weighted average by focus-*model) predicts that both discrepancy and disconfirmation will interact with focus. Model 4 (the *two-opinion* model) predicts an effect of discrepancy, but not of disconfirmation, on final position.

The results dramatically support the *two-opinion* model and are clearly inconsistent with the others. We find highly significant effects of discrepancy and of initial position on final position (strength and significance of these effects are discussed below). We find no other significant main or interaction effects. In Table 2 we combine the two focus groups to see the relationship of discrepancy and disconfirmation to the subject's final position.

The two-opinion model suggests that we also examine the effects of our independent variables on the comparative evaluation of Defendant X, so we performed a similar ANCOVA for this dependent variable. The only significant effect from any of the experimental independent variables was the disconfirmation × focus interaction ($F[3, 364] = 2.81$, $p = .039$). Hence we examine the two focus groups separately. We find no significant effects in the reasons focus condition. For the source focus condition, however, we find a significant effect of disconfirmation (predicted by H_2 and H_4). Table 3 shows the effects of disconfirmation and discrepancy on comparative evaluation in the source focus conditions.

Structural Equation Models

A test of the two-opinion model also requires examination of the relationship

Table 2. Geometric Mean (95% Confidence Interval) of Recommended Sentence for Defendant X (Final Position), by Disconfirmation and Discrepancy Level, Experiment 1

Discrepancy Level	Disconfirmation Level 0	1	2	3	Row Means
0	10.58 (9.29 , 12.04)	10.60 (9.90 , 11.58)	11.22 (9.89 , 12.73)	10.36 (8.24 , 13.04)	10.70
1	13.62 (12.27 , 15.12)	14.49 (12.20, , 17.20)	13.68 (11.93 , 15.69)	12.66 (9.62 , 16.66)	13.60
2	17.55 (14.30 , 21.53)	18.88 (16.91 , 21.08)	15.96 (13.84 , 18.40)	15.25 (12.97 , 17.94)	17.12
3	23.09 (17.84 , 29.87)	25.68 (21.82 , 30.22)	22.03 (19.21 , 25.27)	23.64 (19.83 , 28.17)	23.57
Column Means	15.80	16.95	15.33	15.03	15.80

Note: The geometric mean is the antilogarithm of the arithmetic mean of the logarithmically transformed data. The limits of the confidence intervals for the geometric means are obtained by taking antilogarithms of the limits of the confidence interval for the transformed data. These intervals therefore are asymmetric.

Source focus and reasons focus conditions are combined, and control conditions are not included. Each cell contains 23 to 30 subjects, for a total N of 422.

Table 3. Adjusted Geometric Means (95% Confidence Interval) of Comparative Evaluation of Defendant X, by Disconfirmation and Discrepancy Level, Source Focus Conditions Only, Experiment 1

Discrepancy Level	Disconfirmation Level				Row Means
	0	1	2	3	
0	152.9	201.0	284.7	211.0	212.0
	(106.2 , 219.0)	(175.8 , 229.8)	(173.0 , 466.5)	(85.3 , 512.0)	
1	205.3	246.4	301.4	208.5	239.7
	(148.5 , 283.1)	(156.2 , 392.0)	(174.1 , 540.0)	(161.1 , 269.5)	
2	207.4	187.0	233.5	252.2	216.4
	(135.8 , 315.2)	(138.3 , 252.3)	(143.6 , 316.8)	(158.1 , 397.2)	
3	115.2	250.5	200.1	251.1	212.0
	(59.7 , 218.3)	(203.2 , 309.0)	(170.1 , 235.3)	(287.9 , 404.7)	
Column Means	165.7	218.6	254.8	249.7	219.8

Note: When the transformation used was $x^* = \ln(x + k)$, what we call the *adjusted* geometric mean is found by first taking the antilogarithm of the mean of x^* and then subtracting k. Here, $k = 5$. For an explanation of the limits of confidence intervals, see note to Table 2. Each cell contains 10 to 14 subjects, for a total N of 204. Subjects who did not indicate an initial position are excluded. The higher the value, the worse the evaluation of Defendant X. "Moderately bad" is rated 100.

between our two key dependent measures. Hence we now use structural equation modeling (Jöreskog and Sörbom 1984) separately for the source focus and the reasons focus conditions.

As proposed above, the two-opinion model assumes that 1) discrepancy has a direct effect only on final position and 2) disconfirmation has a direct effect only on the comparative evaluation of Defendant X.[9] In addition, 3) one's position and one's comparative evaluation regarding the same object may influence each other. Because we have no a priori reason to regard one causal direction as more likely than the other, we estimate both causal paths. 4) Much literature, including a weighted averaging model, suggests that initial position should affect final position. Hence this path is estimated. 5) The comparative evaluation of Defendant X may depend in part on the subject's initial view of armed robbers. Although this view is not measured, it should be correlated with the subject's initial position on the appropriate sentence. Hence the path from initial position to comparative evaluation is a surrogate for the effect of the initial comparative evaluation on the final one. (See Figure 1 for the causal model.)

The model is estimated separately for the source focus and the reasons focus groups. The structural equation results are presented in Figure 1; all fit indices indicate an extremely good fit for both focus groups. Furthermore, the R^2 for final position exceeds .50 for both groups.

In keeping with H_1, we find that discrepancy affects final position directly and significantly. As predicted by H_2, disconfirmation affects the comparative evaluation of Defendant X directly and significantly. In view of the low chi-square values for these models, there could not be a significant path from discrepancy to comparative evaluation or from disconfirmation to final position.

In accordance with H_4, we find a greater effect of disconfirmation on comparative evaluation (γ_{23}) in the source focus group than in the reasons focus group. The difference between the two values of γ_{23} has $t(413) = 1.98$ (one-tailed $p < .025$).

H_3 predicted that greater amounts of cognitive elaboration would lead to a stronger relationship between the two endogenous variables. The reasons focus conditions, in which subjects generated a greater number of total thoughts than in the source focus conditions, showed the only significant such effect—the effect of comparative evaluation on final position (β_{12}).

Moreover, those parameters which were not hypothesized to differ by focus (i.e., the effects of initial position and of discrepancy on final position) are not significantly different across the focus groups.

DISCUSSION

The structural analysis strongly supports the two-opinion model. Discrepancy affects

[9] Polynomial trend analysis on both dependent variables showed all significant trends to be linear. Hence no nonlinear terms are needed in the structural equation models.

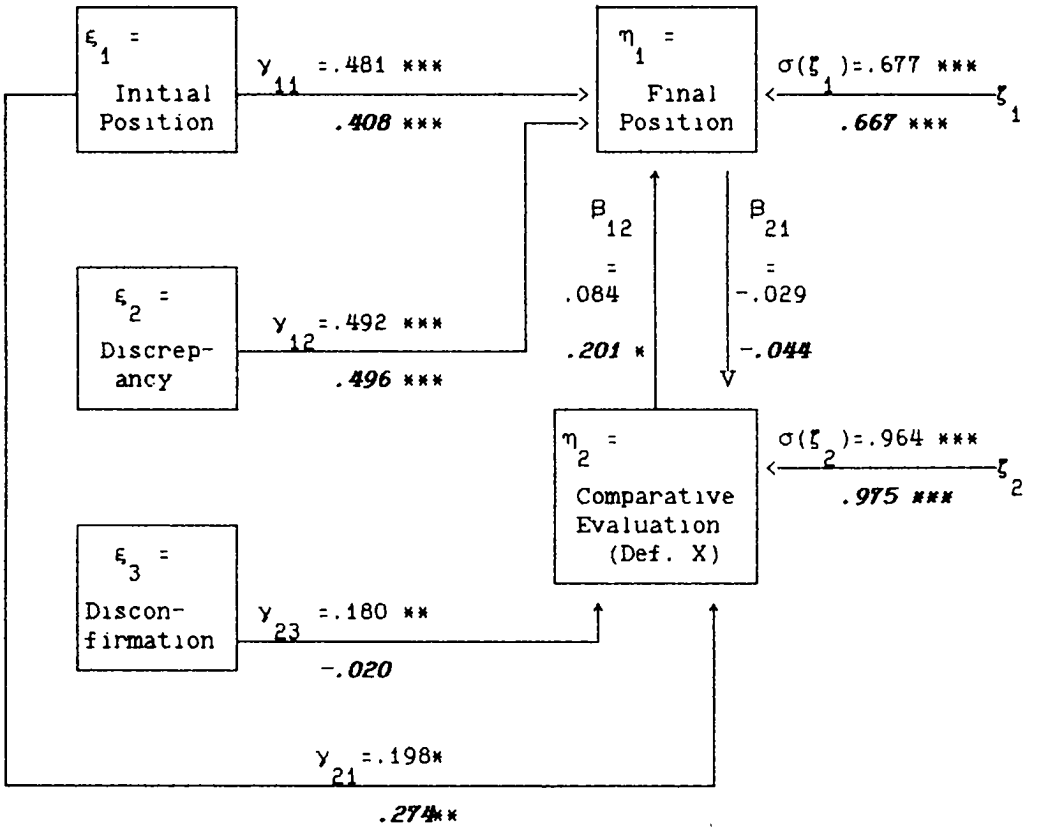

Figure 1. Causal Model and Standardized Parameter Estimates for Experiment 1.

Note: Numbers in Roman type are estimates for the source focus conditions (N = 203); numbers in italics are estimates for the reasons focus conditions (N = 211). Correlations among exogenous variables were near zero as a result of the experimental design; these correlations are not shown. Note that *, **, and *** represent p levels of .05, .01, and .001 respectively. Also note that $\sigma(\zeta_i) = \sqrt{(1 - R^2)}$ for η_i.

For the source focus, the model has chi-square (1) = .76, p = .38. Because the null model, which assumes that all variables are independent, has chi-square (10) = 179.46, Bentler and Bonett's (1980) normed fit index = .996 and Bollen's (1989, p. 272) ρ_1 = .988. For the reasons focus, the model has chi-square (1) = 2.44, p = .12. The null model has chi-square (10) = 199.79. Hence the normed fit index = .958 and ρ_1 = .878.

position, whereas disconfirmation affects comparative evaluation.

The greater effect of disconfirmation in the source focus group is predicted by Hypothesis 4. The greater effect of comparative evaluation on final position in the reasons focus group is consistent with Hypothesis 3, which predicts that greater elaboration leads to a stronger relationship between position and comparative evaluation.

Not only do our results strongly support the two-opinion model; they clearly contradict the three prior models, each of which predicts that greater disconfirmation leads to greater positional change. Although the two-opinion model allows for an indirect effect of disconfirmation on position, such an effect requires the following causal chain: disconfirmation → comparative evaluation → position. In both the source focus and the reasons focus groups, one link in the chain was not significantly different from zero.

Even in the source focus conditions, disconfirmation has a much smaller effect on comparative evaluation than discrepancy has on final position. Because our manipulation of disconfirmation was very successful, it is surprising that its effects were not nearly as strong as those of discrepancy. Thus far we have assumed that if the source took an unexpected position, the subject would conclude that the case at hand must merit an extreme comparative evaluation (e.g., Defendant X must be *worse* than the typical armed robber). Instead, however, the subject could have decided that the previous cases

should be evaluated in the opposite direction (e.g., that previous defendants were *not as bad* as the typical armed robber). Thus, attributional effects of disconfirmation could lead to at least two distinct effects on comparative evaluation.

To understand when each effect is likely, consider the distinction between the *position expected* of the source (i.e., one's best guess as to the source's position) and the *confidence* in that expectation. The latter variable should be influenced by the degree to which the subject believes that the source's prior behaviors represent the source's predisposition.

Disconfirmation studies typically manipulate expected position via information about the source's history of associations and commitments. This process may lead to a belief that the prior behaviors are representative. In contrast, Experiment 1 manipulated expectation of the source's position with a sample of *three* prior behaviors. In a sample of this size, the *central tendency* of the expected position could be manipulated. Yet it may not have created a great deal of *confidence* in this expectation. When subjects' expectations were disconfirmed, they may have concluded that the three previous robbers were less bad than typical robbers instead of concluding that Defendant X must be especially bad. If this is the case, the following additional hypotheses should hold:

(H_5) A *larger* sample of prior behaviors leads to a larger positive effect of disconfirmation on the comparative evaluation of the *current* case; and

(H_6) A *smaller* sample of prior behaviors leads to a larger negative effect of disconfirmation on the comparative evaluation of the *previous* cases.

Experiment 2

The above discussion suggests that we vary the confidence in the subject's expectation by varying the number of prior behaviors on which this expectation is based. It also suggests that we measure a second comparative evaluation: the rating of the *previously* sentenced defendants, relative to the typical rating. Hence Experiment 2 is a replication of Experiment 1, in which discrepancy and disconfirmation are orthogonal, and in which we vary the sample size of the source's relevant prior behaviors. Because we were seeking conditions under which disconfirmation affects comparative evaluation, we used the source focus.

METHOD

With the exception of the differences discussed below, this study is almost identical to Experiment 1. The questionnaires were administered in a single large undergraduate class at the same university as in Experiment 1.

Design and Manipulation of Independent Variables

This study used three levels of discrepancy and of disconfirmation. The values of the sentence for Defendant X were 10, 22.5, and 50 years. The values of PREVIOUS were 2, 4.5, 10, 22.5, and 50 years.

In Experiment 2 we manipulated the *size of the behavioral sample* on which the expectation of the source's position was based. To do this, the questionnaire states:

> In his many years of judicial experience, Judge Walters has had to pass sentences on many defendants for a variety of crimes. . . . Of these defendants, [#PREVIOUS] were sentenced for the crime of armed robbery. Of these [#PREVIOUS] sentences for armed robbery, the average sentence he imposed was [PREVIOUS] years in prison. The smallest of these sentences was [PREVIOUSLO] years while the highest was [PREVIOUSHI] years. . . .

In the small #PREVIOUS condition, #PREVIOUS was 3; in the large #PREVIOUS condition, it was 100.

The subject's confidence in the estimate of the future sentence should depend both on #PREVIOUS and on the variability of the sentences in that sample. To control variability, we standardized the range: PREVIOUSLO was always about 80 percent of PREVIOUS, while PREVIOUSHI was always about 125 percent of PREVIOUS.

Manipulation Checks and Dependent Variables

Expectation. To measure the expectation of the judge's position, we asked subjects for their "best guess" of the average of the next

100 sentences Judge Walters would impose for armed robbery. Their confidence in their expectation was assessed in two ways. First, subjects were asked how *sure* they were about this best guess on a 0 to 100 percent scale, where 0 = completely certain that this guess was incorrect, and 100 percent = completely certain that it was correct. Second, they were asked to state the maximum and minimum believable values for this average sentence, thus creating a measure resembling a confidence interval.

Comparative evaluations. In addition to asking how bad Defendant X was (comparative evaluation of Defendant X), we also asked how bad the previous defendants were, whom Judge Walters had sentences. In this study, the standard for evaluating both variables (= 100 units of "badness") was defined as the badness of the average armed robber.

RESULTS

Our original N equaled 300. After we eliminated subjects who indicated prior familiarity with the study or expressed suspicion, the final N was 283. As in Experiment 1, we transformed data to approximate normality and homoskedasticity.

Manipulation Checks

For disconfirmation, expected position, and discrepancy we used the same manipulation checks as in Experiment 1. In each case, the correlation between the experimental manipulation and the manipulation check was within .02 of the correlation reported for Experiment 1. Hence the manipulations again were successful.

Confidence in expected position. The success of the confidence manipulation was confirmed in two ways. First, subjects in the large #PREVIOUS group felt more sure about the future sentence (M = 73.5%) than those in the small #PREVIOUS group (M = 65.9%). A two-way ANOVA (with #PREVIOUS and PREVIOUS as the predictors) found this difference to be significant; $F(1, 278) = 9.97$, $p = .002$.

Second, we examined the ratio of the maximum believable value of the future average sentence to the minimum believable value. The geometric mean of this ratio was smaller in the large #PREVIOUS group (1.86) than in the small #PREVIOUS group (2.48). This finding indicates an appropriately narrower confidence interval (and hence greater confidence) for the large #PREVIOUS group. A two-way ANOVA on the logarithm of this ratio, using the same predictors as above, finds this difference to be significant; $F(1, 278) = 19.89$, $p < .0005$.

ANCOVAs

Again we performed a three-way ANCOVA (using our three manipulated variables as independent variables and initial position as a covariate) on final position and on both comparative evaluations, to determine whether our structural equation modeling required any interaction or other nonlinear terms. The evidence does not suggest that any such terms are needed.[10] (Tables showing the relationship of discrepancy and disconfirmation to each opinion measure may be obtained from the authors.)

Structural Equation Models

Confirmatory model tests. We started with the same two-opinion model that we had found to be successful for Experiment 1, making the following modifications because of design changes: 1) We now included an additional dependent variable (comparative evaluation of the previous defendants) which, we hypothesized, was caused by disconfirmation. 2) We allowed the two comparative evaluation variables to include correlated errors. We did so because both variables can be affected similarly by individual differences in the perception of the typical robber and by individual differences in use of the scale (see Alwin and Tessler 1974). 3) In this study, our comparative evaluation of Defendant X was measured in relation to the average armed

[10] The only significant nonlinearity was the effect of disconfirmation on the comparative evaluation of Defendant X. Whereas the deviation from linearity has $F(1, 273) = 4.86$, $p = .028$, the linear trend has $F(1, 273) = 15.85$, $p = .0001$; hence the relationship is predominantly linear.

Although the predicted disconfirmation × #PREVIOUS interaction on comparative evaluation of Defendant X is not quite significant ($F[2, 256] = 2.32$, $p = .10$), an ANCOVA combines linear and quadratic effects and is nondirectional. Our structural equation modeling, performed separately on the two #PREVIOUS groups, can assess more accurately whether #PREVIOUS has the predicted effects.

robber, and should not be affected by initial position. Hence we removed this causal path.

This model had chi-square (5) = 12.37 (p = .03) for the small #PREVIOUS group and chi-square (5) = 18.74 (p = .002) for the large #PREVIOUS group. Significant for both groups, however, was the modification index for the effect of disconfirmation on final position. Because the *same path* contributes to a significantly improved fit in *both groups*, this finding is strong evidence that such a path is appropriate.

Exploratory modification. Hence we added the path from disconfirmation to final position (γ_{32}); the model fits very well for both #PREVIOUS groups. (See Figure 2.) Further, the R_2 for final position exceeds .55 for both groups.

The results in Figure 2 strongly support a number of our hypotheses. First, in keeping with the two-opinion model's H_1 and H_2, discrepancy again has a strong and significant direct effect on final position (γ_{12}), while disconfirmation again has a significant positive effect on the comparative evaluation of defendant X (γ_{23}).

H_5 predicted that the large #PREVIOUS group would show a larger effect of disconfir-

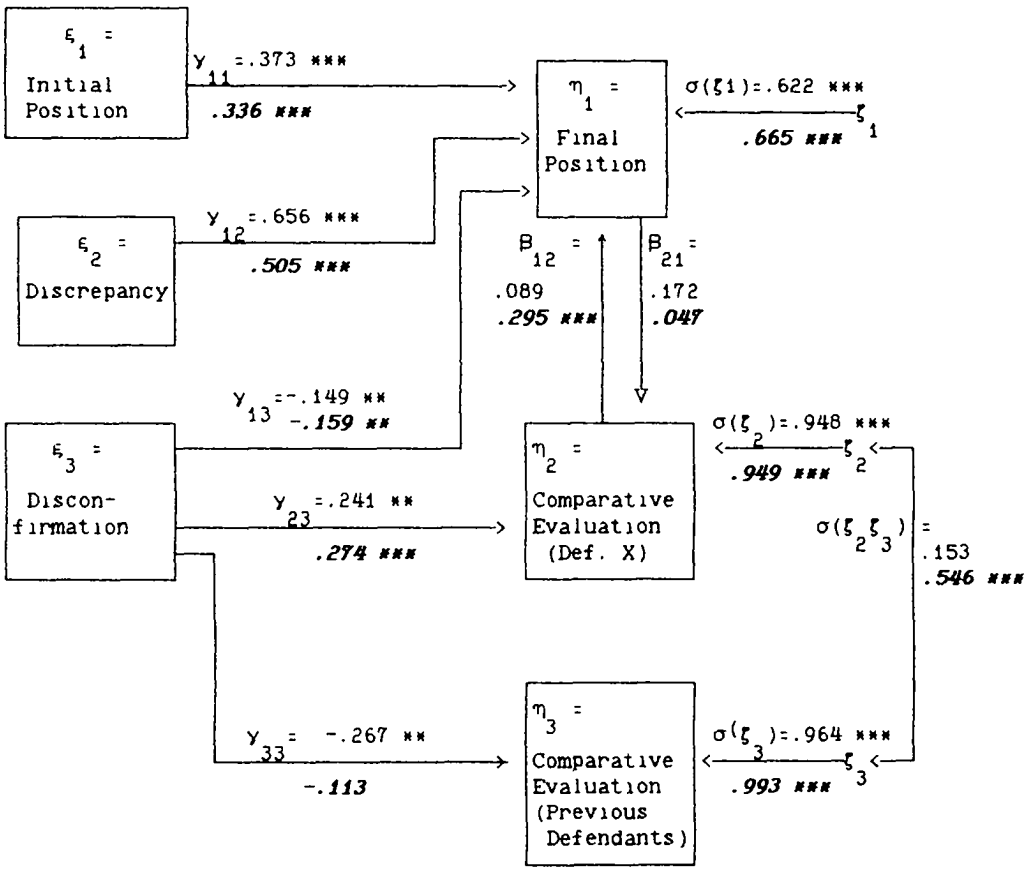

Figure 2. Causal Model and Standardized Parameter Estimates for Experiment 2.

Note: Comparative Evaluation (X) and Comparative Evaluation (Prev) are respectively the ratings of the badness of Defendant X and of the previous defendants. Numbers in Roman type are estimates for the small number of previous sentences conditions (N = 134); numbers in italics are estimates for the large number of previous sentences conditions (N = 139). Correlations among exogenous variables were near zero as a result of the experimental design; these correlations are not shown. Note that *, **, and *** represent p levels of .05, .01, and .001 respectively. Also note that $\sigma(\zeta_i)\sqrt{(1 - R^2)}$ for η_i and that $\sigma(\zeta_2\zeta_3)$ is the correlation between the errors of prediction for η_2 and η_3.

For the small number of previous sentences, the model has chi-square (4) = 5.74, p = .22. Because the null model, which assumes that all variables are independent, has chi-square (15) = 157.00, Bentler and Bonett's (1980) normed fit index = .963 and Bollen's (1989) ρ_1 = .863). For the large number of previous sentences, the model has chi-square (4) = 11.89, p = .02. The null model has chi-square (15) = 205.37. Hence the normed fit index = .942 and ρ_1 = .783.

mation on the comparative evaluation of Defendant X (γ_{23}) than would the small #PREVIOUS group. Figure 2 shows that the results are in the predicted direction, but the difference is not statistically significant.

H_6 predicted that the small #PREVIOUS group would show a larger negative effect of disconfirmation on the comparative evaluation of previous defendants (γ_{33}) than would the large #PREVIOUS group. In Figure 2 we see that the results are in the predicted direction. The difference of coefficients is marginally significant $t(271) = 1.50$ ($p < .07$, one-tailed).

H_4 predicted that greater elaboration should be associated with greater relationship between final position and comparative evaluation of Defendant X. This hypothesis again was confirmed. Subjects in the large #PREVIOUS group showed a greater total number of thoughts ($M = 2.01$) than those in the small #PREVIOUS group ($M = 1.54$), and this difference is significant ($F[1, 258] = 12.05$, $p = .001$). Moreover, the two #PREVIOUS groups also showed significantly different effects of comparative evaluation of Defendant X on final position (β_{12}); $t(271) = 1.98$, ($p < .05$).

We found a surprising negative direct effect of disconfirmation on final position (γ_{13}). This effect, however, is far smaller than either of the direct effects (γ_{12} or γ_{23}) predicted by the two-opinion model.

Among the effects of exogenous variables on final position which were not hypothesized to be different across groups, none are significantly different.

DISCUSSION

As in Experiment 1, a two-opinion model fits the data very well. These results again show a very strong direct effect of discrepancy on final position and a significant direct effect of disconfirmation on comparative evaluation of the current case.

The number of prior behaviors (#PREVIOUS) had the predicted effect on the relationship between disconfirmation and one of the comparative evaluation variables—the badness of previous defendants—but no significant effect on the relationship with the other variable, the badness of Defendant X.[11] A larger number of previous behaviors, however, increased significantly both the amount of cognitive elaboration (total thoughts) and the effect of comparative evaluation on the final sentence recommended. Thus a larger number of previous behaviors increased the *indirect* (positive) effect of disconfirmation on final position. Yet even in this set of conditions, the indirect effect ($.274 \times .295 = .081$) is very small.

The small negative effect of disconfirmation on final position is predicted neither by the two-opinion model nor by any of the other three models. Perhaps some subjects believed that the judge should give Defendant X a sentence close to the previous sentences he had imposed, thereby causing a positive effect of PREVIOUS on final position. Because PREVIOUS and disconfirmation are correlated negatively, a positive effect of PREVIOUS on final position could create an apparent negative effect of disconfirmation on final position.[12]

GENERAL DISCUSSION

The two studies show very clearly that the effect of discrepancy on positional measures

[11] The effect of #PREVIOUS is less than expected, but not because this experimentally manipulated variable had a modest effect on the more psychologically immediate cause of the comparative evaluations (namely, the subject's confidence in his or her expectation). If we use confidence as the causal variable, the results are essentially similar.

[12] Although discrepancy and disconfirmation are orthogonal, neither of them is orthogonal with PREVIOUS because those three variables, by definition, are perfectly multicollinear. Because initial position is considered constant, discrepancy is determined entirely by position advocated (P_A). Disconfirmation, however, is the difference between P_A and PREVIOUS. In fact, discrepancy has a correlation of .7 with PREVIOUS and disconfirmation is correlated with it $-.7$. Hence effects of PREVIOUS can be confounded with effects of these other two variables.

The best way to separate effects of PREVIOUS from effects of these other variables is to examine the control conditions from Experiment 1. (In these conditions, the sentence for Defendant X, P_A, was not given.) We find a positive correlation between PREVIOUS and final position ($r = .52$, $N = 77$, $p < .001$).

Once subjects have seen what "actual" sentence was given, the positive effect of PREVIOUS on final position is much smaller, but it is still significant. Therefore it can account for the apparent negative effect of disconfirmation on final position found in Experiment 2.

Yet although PREVIOUS appears to have affected final position, it would not be appropriate for PREVIOUS to replace either discrepancy or disconfirmation in our causal model. Disconfirmation—not PREVIOUS—influences the comparative evaluation of Defendant X, and discrepancy has a much greater effect than PREVIOUS on final position.

of opinion is not spurious. Because previous studies confounded discrepancy and disconfirmation, they could not give us this.

Our studies also show that if the subject pays attention to the source's bias, disconfirmation directly affects the comparative evaluation of relevant attitude objects. Greater disconfirmation clearly affects comparative evaluation of the current case: in our studies, it led to the conclusion that Defendant X is *unusually* bad. When one knows only a small sample of relevant prior source behaviors, greater disconfirmation also leads subjects to evaluate these previous cases in the opposite direction from the new (e.g., that previously sentenced defendants are not so bad).

As in the two-opinion model, but not in accordance with any of the other models presented, we find no direct positive effect of disconfirmation on the subject's position. Experiment 1 found no direct effect at all; Experiment 2 showed a slight *negative* effect.

The two-opinion model predicted that any indirect effects of disconfirmation on position (via comparative evaluation) would be weak. This prediction was supported. Figures 1 and 2 show four causal paths of disconfirmation → comparative evaluation of Defendant X → final position. In only one case (large #PREVIOUS in Figure 2) are both links in the causal chain significant. Even here, however, the causal impact (the product of the path coefficients) for this effect is quite weak.

The proportion of variance in final position explained by discrepancy (r^2 = .37 and .41 in Experiments 1 and 2 respectively, combining both focus groups and both #PREVIOUS groups) is consistently much larger than the proportion explained by disconfirmation on the comparative evaluation of Defendant X (r^2 = .042 in the source focus conditions of Experiment 1 and r^2 = .054 in Experiment 2, combining large and small #PREVIOUS groups). Our effect sizes for disconfirmation are not unusually small, however. When the reasons focus group is excluded from Experiment 1, their average is .048. Only one of the five disconfirmation studies that we have cited had an effect size larger than this.

Whereas our effect of disconfirmation is not unusually small, our r^2s for discrepancy are unusually large. (In the seven discrepancy studies cited, η^2 or r^2 ranges from .06 to .15.) Our unusually strong results may be because these experiments controlled the most obvious source of variance (other than discrepancy) in our dependent measure, namely variance in initial position.

Evaluation of the Source

Eagly et al. (1978) and Wood and Eagly (1981) found that disconfirming messages caused the source to be viewed as less biased, thereby increasing his or her effectiveness. Although our results in both studies found that greater discrepancy caused subjects to regard the judge as significantly less fair, we found no significant effects of disconfirmation on any ratings of the source.

Our results show that when the source takes an unexpected position, this position need not suggest that the source is unbiased. Rather, it may suggest that the case at hand merits a comparative evaluation which is extreme enough to overcome any bias on the part of the source.

Effects of Cognitive Elaboration

The effect of disconfirmation on comparative evaluation appears to require thinking about one's expectancy regarding the source and about the disconfirmation of that expectancy.

We predicted that cognitive elaboration is necessary if comparative evaluation and position are to affect each other. Our results support that prediction strongly. In Experiment 1, the reasons focus group showed a significantly larger number of thoughts. In Experiment 2, the large #PREVIOUS group showed significantly more thoughts. Both of these groups showed significantly larger effects of comparative evaluation on final position.

In contrast, it appears that the effects of discrepancy on position do not require elaboration. First, in both experiments, discrepancy was found to be unrelated to subjects' memory of the "facts" of the case, unrelated to the total number of thoughts they listed, and unrelated to whether these thoughts tended to suggest severity or leniency for Defendant X. Second, although discrepancy was correlated with ratings of the source's fairness, this correlation was negative and hence cannot explain the positive relationship between discrepancy and positional change. Finally, although comparative evaluation sometimes affected position, in no

group was the effect of position on comparative evaluation significant.[13]

Hence, in determining their final positions, subjects apparently formed a weighted average of their initial position and the position advocated, as suggested by Equation (1). This effect appears to have implicated any other cognitive processes only minimally.

Our discussion implies the following hypotheses for further research: 1) the greater the amount of thinking about the source's bias, the greater the effect of disconfirmation on comparative evaluation; 2) the greater the amount of issue-related thinking (see, for example, Petty and Cacioppo 1986), the greater the effect of comparative evaluation on position.

CONCLUSION

Which kind of a message will result in more opinion change—one which is not at all disconfirming, but is highly discrepant, or one which is not at all discrepant, but is highly disconfirming? A clear implication of these studies is that the answer depends on the aspect of the opinion that one wishes to change. If one wishes to change a positional measure, the former kind of message will be most effective. If one wishes to change a comparative evaluation of the attitude object, the latter kind of message is appropriate. Our studies show clearly that discrepancy and disconfirmation affect different variables via different processes.

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