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Information Availability, Goodness of Outcome, and Attributions of Causality

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H. H. Kelley's (*American Psychologist,* 1973, **28,** 107–128) framework for studying attribution processes is introduced as a means of accounting for characteristic asymmetries in success/failure attributions. It is argued that while success/failure asymmetries should occur in the presence of single-observation information, asymmetries should be eliminated when individuals are allowed to observe the covariation between their own actions and outcomes. Subjects participated in a 15-trial stock market simulation in which type of information (single-observation or covariation) and goodness of outcome (relative success or failure) were manipulated. The obtained results supported the experimental hypotheses. Given single-observation information, subjects were more likely to accept personal responsibility for good than for poor outcomes. However, subjects' attributions were not affected by goodness of outcome when they were provided with covariation information. The implications of these findings are discussed in terms of the current debate between motivational and information-processing explanations of asymmetries in success/failure attributions.

How do individuals identify the causes of outcomes in the environment? What cognitive processes do humans adopt in assigning responsibility for events in their lives to internal or external sources? A primary phenomenon researchers have utilized in attempts to answer these questions concerns cognitions which have personal relevance for the indi-

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vidual—attributions of the causes of successes and failures. Research designed to explore success/failure attributions has repeatedly demonstrated a tendency for individuals to accept personal responsibility for good outcomes, while attributing responsibility for poor outcomes to chance or external factors (e.g., Arkin & Maruyama, 1979; Cialdini, Braver, & Lewis, 1974; Schopler & Layton, 1972).

Characteristically, researchers have asked subjects to form success/failure attributions based on minimal information concerning events which preceded the success or failure. In the typical experiment, the subject enacts a discrete set of behaviors (e.g., instructs a "learner," attempts to influence a target person's attitude), and is later told that these actions resulted in a good or poor outcome. The subject is not cognizant of other potential influences on the final outcome, is not allowed to observe the manner in which changes in his actions produced corresponding changes in the outcome, and has no knowledge of the behavior of the person to whom his control attempts are directed. In short, subjects are required to form attributions in an informationally sparse environment. It seems likely that a richer set of information concerning the stimulus field might produce a different pattern of attributions.

The goal of the present research is to explore the impact on success/failure attributions of varying amounts of causal information. To this end, it is useful to introduce Kelley's (1967, 1971, 1973) general framework for studying attributional processes. In this framework, he distinguishes between situations in which historical data regarding the outcome under consideration are available and situations in which they are not available. When historical data are available, he hypothesizes that attributions are made according to the covariation principle—"an effect is attributed to the one of its possible causes with which, over time, it covaries" (Kelley, 1973, p. 108). For example, if an individual perceives that when he studies for his psychology exams he receives good grades, and when he does not study for exams he receives poor grades, he should infer that he is personally responsible for the grades he receives. The quality of the outcomes (exam grades) directly covaries with changes in behavior (study habits), so the student should logically infer that changes in personal study habits cause changes in exam grades. Thus, in order to employ the covariation principle, the attributor must be able to observe, over time, changes in outcomes and changes in potential causes.

When historical data concerning an outcome are *not* available (the single-observation case), Kelley proposes that individuals employ simplified attributional processes such as the discounting principle (Kelley, 1967) or causal schemata (Kelley, 1972). These simplified processes entail reliance on the attributor's naive knowledge of causal relations, and are of the following general form: "In the past, I have generally been responsible for good outcome X, good outcome X has occurred, therefore I must be responsible for this outcome." Thus, in the single-observation case, the attributor is forced to employ prior expectations and his naive knowledge of typical causal relations/patterns in lieu of historical data.

In research demonstrating asymmetry in attributions concerning good and poor outcomes (i.e., successes and failures), subjects have not characteristically been provided with the covariation information needed to make the required causal judgments (Cialdini et al., 1974; Forsyth & Schlenker, 1977; Miller, 1976; Wortman, Costanzo, & Witt, 1973). For example, in the Cialdini et al. (1974) "easily persuaded other" paradigm, subjects presented two persuasive arguments and were then informed of the amount and direction of target opinion change. Subjects did not possess the covariation information necessary to accurately ascertain whether the observed outcome (opinion change or no opinion change) was due to their persuasive arguments (personal control) or to external factors, such as degree of target persuasibility. These subjects had no access to information concerning the relationship between changes in their own behaviors and changes in resultant outcomes.

Even in experiments in which researchers have explicitly attempted to provide subjects with information concerning causality, the essential covariation information has been absent (Menapace & Doby, 1976; Schlenker & Miller, 1977). For example, Schlenker and Miller (1977) informed subjects of their majority/minority status in regard to group problem solutions which were successful, average, or unsuccessful. Although knowledge of one's majority/minority status constitutes some form of causal information, subjects in this experiment were nevertheless unable to observe the covariation over time of their actions and outcomes.

Other researchers exposed subjects over time to a series of successful or unsuccessful response–outcome trials (Arkin, Appelman, & Burger, 1980; Stevens & Jones, 1976; Tillman & Carver, 1980; Weary, 1980). In the Stevens and Jones (1976) experiment, which was designed as a test of Kelley's (1967) ANOVA model, subjects performed a series of discrimination judgments and were given faked feedback concerning their success or failure. False feedback was provided over trials, and across two similar types of discrimination task. On the surface, it would seem as though these subjects received covariation information. However, since the outcome information was faked, there was no necessary connection between changes in subjects' responses and changes in outcomes; subjects succeeded (or failed) regardless of what responses they enacted. In this paradigm, responses and outcomes were *contiguous* to each other, but outcomes were not *contingent* on responses (i.e., responses and outcomes did not necessarily covary). Thus, in research designed to explore success/failure attributions, subjects have been forced to form single observation-type attributions. Researchers have not to date explored success/failure attributions in situations where subjects have been provided with covariation information.

The present experiment was designed to examine the impact of varying types of causal information on attributions of personal responsibility for good and poor outcomes. Subjects participated in a stock market simulation in which they made a series of investment decisions. Over time, subjects' cumulative profits could potentially be influenced by both their own investment decisions and by the decisions of other investors (subjects) in the market. Over the course of the 15-trial simulation, subjects were provided with one of two types of information: (a) single-observation information, or (b) covariation information. At the end of the 15 joint investment trials, subjects were given feedback concerning profits indicating either success (i.e., a good outcome) or failure (i.e., a poor outcome). Subjects were then asked to report the extent to which they had been personally responsible for their profits.

Two hypotheses may be deduced from Kelley's model. First, subjects in the single-observation condition should accept more personal responsibility for good outcomes than for poor outcomes. Since these subjects must rely on their naive knowledge of causal patterns, and since the typical subject (a college sophomore) probably expects a strong effort–success relationship, asymmetrical attributions ought to obtain. The second hypothesis was that within the covariation condition, variations in goodness of outcome should not significantly influence attributions of personal responsibility. When provided with the information Kelley specifies as *necessary* to perceive the nature of the causal connection between behavior and outcomes, subjects' attributions should not be influenced by goodness of outcome, a variable logically unrelated to cause.

METHOD

Subjects

Twenty-eight males and 28 females participated in the experiment in partial fulfillment of the requirements for an introductory psychology course. Six to eight same-sex subjects were recruited for each session. Within each session, subjects were randomly assigned to one of four experimental conditions. The number of males and females was equal across conditions.

Procedure

Subjects were told that they would be asked to participate in a computer-assisted simulation of stock market investment behavior. The simulation was "designed to study the manner in which individuals make use of information regarding past profits in making investment decisions." On each of 15 investment "trials," subjects could elect to invest a fixed sum of money in either "Acme Corp." (A) or "Blackwell Co." (B). As in real-world investment decisions, subjects' cumulative profits were dependent upon both their own decisions and on the decisions made by other investors. However, in this case, the "other investors in the market" would be just one other subject. Thus, subjects' cumulative profits could potentially be influenced by their own and/or "another investor's" investment choices.

After explaining the simulation, the experimenter escorted the subjects to a computer laboratory and assigned each to a separate cubicle. Each cubicle contained a computer teletypewriter through which: (a) subjects' investment decisions were to be made (by typing "A" or "B" on each trial); and (b) feedback on the results of each investment trial was to be typed. The information manipulation (single-observation or covariation) was effected through changes in the typed feedback provided subjects at the end of each trial.

The experimenter explained both the use of the teletypewriter and the details of the simulation, and subjects began to participate in the 15-trial stock market simulation. At the end of the 15 trials, the teletypewriter printed a list of 10 subjects' cumulative profits, including the subject's. This feedback served to manipulate goodness of outcome (good or poor). At this time, the experimenter returned to each cubicle, explained the meaning of the profits list, and noted how well/poorly the subject performed relative to other investors. Subjects then completed anonymous questionnaires which contained manipulation checks and dependent measures. Following this, subjects returned completed questionnaires to the experimenter, and were escorted to a waiting room and thoroughly debriefed.

Stock Market Simulation

Unbeknownst to subjects, the "other investor" (whose investment decisions could potentially influence the subject's profits) was simulated by a PDP 11/45 Computer. This served to control for unusual response patterns, and ensured that subjects were exposed to all four combinations of investment choices (both invest in A; one invests in A, one in B; etc.). The philosophy guiding the development of the computer response contingencies was to create an "investor" who attempted to maximize profits. Its decisions were based on a win–stay lose–change strategy.

The profits for the four combinations of response were:

(a) Subject invests in A, Other invests in A—Subject earns 2 pts. Other earns 2 pts.

(b) Subject invests in A, Other invests in B—Subject earns 6 pts. Other earns 6 pts.

(c) Subject invests in B, Other invests in A—Subject earns 12 pts. Other earns 12 pts. and

(d) Subject invests in B, Other invests in B—Subject earns 8 pts. Other earns 8 pts.

Objectively, the subject could cause average variations in his/her profits of 6 pts. and the "other investor" could cause average variations in the subject's profits of 4 pts. Thus, in an objective sense, the subject's control over his/her profits was slightly greater than was the "other investor's" control over the subject's profits.

Independent Variables

The experiment manipulated two independent variables: information availability (single-observation or covariation) and goodness of outcome (good or poor). These variables were incorporated in a complete 2 × 2 factorial design.

Information availability was manipulated through variations in the amount and type of feedback provided subjects following each trial of the simulation. Subjects in the *single-observation* condition were provided with a cumulative total of their obtained earnings following every even-numbered trial. In contrast, subjects in the *covariation* condition were given trial-by-trial feedback on their own and "the other investor's" investment choices, and were told what profits they obtained for that combination of choices. Thus, subjects in the covariation condition could observe the relationship between changes in own and others' responses and changes in outcomes, while single-observation subjects could not. In the single-observation condition, subjects were only cognizant of cumulative profits, and had no way of ascertaining the nature of the relationship between their investment decisions and the profits they earned.

Goodness of outcome was manipulated through changes in the profits list given to subjects at the end of the 15-trial simulation. Each list displayed the profits of 10 "comparable but randomly selected subjects," including those of the subject him/herself. The profits of 9 fictional subjects were scaled relative to the subject's own profits in order to effect a standard manipulation. In the *good-outcome* condition, the mean score of the 9 fictional subjects was 10 pts. less than the subject's. Profits covered a 30-pt. range—from 4 pts. more than that of the subject to 26 pts. less than that of the subject. In the *poor-outcome* condition the mean profits of the 9 fictional participants was equal to the subject's own profits, and the 30-pt. range extended from 16 pts. above to 14 pts. below the subject's profits. In order to add potency to the manipulation, the experimenter also explained the meaning of the profits list, reporting that the subject had done "quite well relative to other subjects" or "not that well relative to other subjects."

Since the experimenter delivered verbal instructions intended to reinforce the success/failure manipulation (e.g., "you performed quite well relative to other subjects"), she was not completely blind to each subject's experimental condition. However, the determination of which of four conditions each subject was assigned to was established before each experimental session, and the experimenter was not cognizant of each subject's assignment. Thus, the experimenter did not know to which information availability condition the subject was assigned, and she was unaware of the subject's goodness-of-outcome assignment until just prior to the time she delivered the statement to reinforce that manipulation.

Dependent Variables

The effectiveness of the goodness-of-outcome manipulation was assessed by two Likert-type items: "how well did you perform relative to others" (1 = very poorly, 9 = very well), and "how satisfied are you with your profits" (1 = very dissatisfied, 9 = very satisfied). Two sets of items assessed the information availability manipulation. The first set required that subjects note whether or not they had received each of four types of feedback: "your choice on each trial," "the other investor's choice on each trial," "your profits on each trial," "the other investor's profits on each trial." The second set assessed knowledge of response–outcome contingencies: "did you know what profits you obtained as a result of each of the four combinations of own and other investor's decisions" (yes or no), and "if yes, please note your profits for each of the following combinations" ("when I chose A and the other investor chose A, I earned ———"; "when I chose A and the other investor chose B, I earned ———"; etc. for the four combinations of investments).

Five Likert-type items assessed subjects' attributions of the cause(s) of profits: "what percentage of your profits was determined by your own investment decisions" (1 = 0–10%, 10 = 90–100%); "what percentage of your profits was determined by the other investor's decisions" (1 = 0–10%, 10 = 90–100%); "to what extent are you personally responsible for the profits you earned" (1 = not at all, 9 = completely); "were your profits determined by your investments or by those of the other investor" (1 = my investments, 9 = other investor's investments); and "to what extent were you in control of the profits you earned" (1 = completely, 9 = not at all). A final item asked, "were you given sufficient information in the trial-by-trial feedback to make judgments regarding who was responsible for your profits" (yes or no). Dependent measures were ordered randomly in the questionnaire, but a single random ordering was employed across subjects.

RESULTS

Manipulation Checks

To assess the effectiveness of the goodness-of-outcome manipulation, a two-factor multivariate analysis of variance was performed on the "satisfaction with profits" and "quality of performance" measures. The means of the "quality of performance" measure for the good- and poor-outcome conditions were 8.43 and 4.85, respectively, while mean "satisfaction with profits" was 7.67 for the good-outcome condition and 5.17 for the poor-outcome condition (*Mult.* $F.(2, 51) = 108.29$, $p < .001$). Thus, the goodness-of-outcome manipulation was judged to have been successful.

The information availability manipulation also appears to have been successful. Covariation condition subjects correctly reported that they received feedback on own investments for each trial (96%), other investor's investments for each trial (90%), and own profits for each trial (93%), but not on the other investor's profits for each trial (11%). Single-observation-condition subjects correctly reported that although they received feedback on their own choices (82%), they were not given feedback on own profits for each trial (21%), the other investor's choices (36%), or the other investor's profits (14%). Additionally, while 93% of the subjects in the covariation condition could accurately report what profits they earned for each of four possible combinations of investment decisions, no subjects in the single-observation condition could do so.

Causal Attributions

Preliminary three-factor multivariate analyses of variance on the attribution measures revealed no significant main effects nor interactions involving the sex-of-subject factor, so this variable will not be considered further. A two-factor multivariate analysis of variance was performed on the five causal attribution measures. Mean responses for each condition are displayed in Table 1. The interaction of information availability with goodness of outcome was significant (*Mult.* $F(5, 48) = 2.44$, $p < .05$), so tests of simple effects were performed. Goodness of outcome significantly influenced causal attributions within the single-observation condition (*Mult.* $F(5, 48) = 4.45$, $p < .002$); subjects with good outcomes reported greater personal responsibility for their profits than subjects with poor outcomes. However, within the covariation condition, goodness of outcome did not significantly affect causal attributions (*Mult.* $F(5, 48) = 0.28$, ns). These results are consistent with the experimental hypotheses.

Correlations were computed in order to further explore the relationship between goodness of outcome and causal attributions. First, reliability coefficients were computed for the two goodness-of-outcome measures (manipulation checks) and the five causal attribution measures. Since the two measures of goodness of outcome ($\alpha = .73$) and the five causal attribution measures ($\alpha = .87$) seemed to be strongly interrelated, composite measures of each concept were formed for each subject (mean goodness of outcome and mean personal responsibility). Within the sin-

TABLE 1
MEAN JUDGED PERSONAL RESPONSIBILITY AS A FUNCTION OF INFORMATION AVAILABLE AND GOODNESS OF OUTCOME

	Single observation		Covariation	
	Good outcome	Poor outcome	Good outcome	Good outcome
Percent profits by self	7.71	5.85	6.00	6.07
Percent profits by other (reversed)	7.43	5.71	6.00	6.07
Personal responsibility	6.21	5.21	5.50	5.85
Own investments controlled	6.07	5.21	5.78	5.85
Personal control	6.93	5.57	6.50	6.28
Average across measures	6.87	5.51	5.96	6.01

Note. Measures were reverse-scored where necessary so that higher numbers indicated greater judged personal responsibility for profits. The first two measures could vary from 1 to 10, the third, fourth, and fifth measures had ranges from 1 to 9.

gle-observation condition, the correlation between composite goodness of outcome and degree of personal responsibility measures was significant ($r = .37$, $p < .05$). However, within the covariation condition, goodness of outcome and reported personal responsibility were not significantly correlated ($r = -.09$, ns). These results are also in agreement with the experimental hypotheses.

A final item on the questionnaire asked whether or not subjects were given sufficient information in the trial-by-trial feedback to form the attributions they were required to make. Within the covariation condition, 82% felt they had sufficient information to make required causal judgments, while within the single-observation condition, only 32% perceived their feedback to be sufficient in this regard.

In order to examine the function of information availability in mediating attributions, several nonparametric correlational analyses were performed. If subjects employ the covariation rule when possible, and otherwise perform single observation-type attributions, then within-cell correlations should indicate that asymmetrical attributions were made by those subjects in the covariation condition who did not possess sufficient feedback information. These subjects were in essentially the same position, in terms of information, as were those in the single-observation condition. The results supported this reasoning. Within the covariation conditions, judged sufficiency of information was negatively related to perceived personal responsibility for the good-outcome condition ($r = -.33$) and for the poor-outcome condition this relationship was positive

(r = .38).[1] The difference between these correlations is significant at the 2% level. Subjects *did* appear to employ the covariation principle when they possessed sufficient information to do so, and employed simplified rules and logic (and evidenced asymmetries) when they possessed insufficient information.

DISCUSSION

The purpose of this experiment was to contrast two types of attributional situations—one in which historical data were available, and one in which they were not available. When subjects were provided with covariation information (i.e., historical information concerning the relationship between changes in behavior and changes in outcome), asymmetry in success/failure attributions did not occur. Changes in goodness of outcome did not significantly affect perceptions of personal responsibility, and the correlation between judged personal control and perceptions of goodness of profits was almost nil (r = −.09).

When subjects were provided with single-observation-type information concerning the relationship between their actions and profits (a conceptual replication of past research in this area), characteristic asymmetrical success/failure attributions occurred—subjects exhibited a tendency to accept greater responsibility for good than for poor outcomes. In fact, their judgments of degree of personal responsibility for earned profits were significantly correlated with perceptions of the goodness of those profits (r = .37). Furthermore, while subjects given covariation information reported that they possessed sufficient information to make required causal judgments, subjects given single-observation information stated that they were not given enough information to form such attributions. These results are in complete agreement with predictions derived from Kelley's (1973) model of attributional processes.

Additional data provided suggestive evidence concerning factors which mediate the formation of asymmetrical attributions. Within the covariation condition, asymmetries occurred among subjects who reported that they possessed insufficient information to perform required causal judgments. These subjects seemed to employ simplified attributional rules, which led logically to asymmetrical attributions. Those subjects who said they possessed sufficient information to make required judgments showed no evidence of asymmetry. Although conclusions based upon these findings should be tentative, this interpretation of the data is consistent with the research of Ross and Sicoly (1979), who point to

[1] Within the single-observation conditions, sufficiency of information was positively related to personal attributions for both the good-outcome (r = .35) and poor-outcome (r = .26) conditions. This result is difficult to interpret, however, since subjects in the single-observation condition were not provided with sufficient feedback and were unaware of the response–outcome contingencies.

the role of biases in the *availability* of causal information in producing asymmetrical attributions.

Future research should be designed to: (a) further explore the impact on attributional behaviors of varying types and amount of causal information; and (b) specify the conditions under which covariation information does or does not eliminate asymmetric success/failure attributions. An initial issue concerns the impact of hedonic relevance and/or personalism (Jones & Davis, 1965). The task employed in the present research may have been relatively "barren" motivationally, in that success or failure at investment decisions may not be viewed as relevant to one's personal competence. It would be useful to ascertain whether the present findings hold for tasks that are both high and low in hedonic relevance or personal importance (cf., Miller, 1976; Weary, 1980), and for cooperative, independent, and competitive tasks (cf., Stephan, Rosenfield, & Stephan, 1976). A second issue concerns the manner in which covariation information is provided subjects. In this study, subjects were provided with fairly numeric feedback concerning the impact of changes in responses on changes in outcomes. Would the same pattern occur if subjects were provided with less numeric, more qualitative covariation information? Additionally, the present research provides information concerning subjects' ability to assess personal responsibility given *contingent* response–outcome relationships, but it would be interesting to evaluate the nature of subjects' causal judgments given *noncontingent* response–outcome relationships (cf., Alloy & Abramson, 1979). Finally, it would be useful to explore subjects' attributional behaviors not only in highly controlled laboratory experiments, but also in more realistic, nonlaboratory settings (cf., Arkin & Maruyama, 1979; Ross & Sicoly, 1979).

The results of this experiment not only serve as a test of certain aspects of Kelley's (1973) model, but also bear on a current debate among attribution researchers. Although there exists abundant empirical evidence that humans often exhibit asymmetry in success/failure attributions (also referred to as "biased," "egocentric," or "self-serving" attributions), several alternative theoretical explanations of the phenomenon have been proferred. The two primary classes of explanation are (a) motivational, and (b) nonmotivational, or information-processing.

The more traditional explanation of the attributional asymmetry, the *motivational approach,* is based on the assertion that cognition and motivation are very strongly interrelated (e.g., Jones, 1973). From this point of view, individuals are assumed to exhibit asymmetry in success/failure attributions because, in doing so, they may (a) maintain or enhance their self-esteem (Heider, 1958) or (b) improve their public image (Bradley, 1978; Forsyth & Schlenker, 1977).

In contrast, several authors have suggested that this bias has a logical rather than a motivational basis. This alternative, *nonmotivational approach* argues that the observed asymmetry in success/failure attributions may result from individuals' adherence to rational information-processing rules (Bem, 1972; Fischhoff, 1976; Miller & Ross, 1975). From this point of view, the observed asymmetries are said to occur because: (a) individuals perceive greater covariance between their actions and successful outcomes than they do for failures; or (b) when placed in an ambiguous, informationally sparse situation, subjects rely on prior experience in inferring cause.

The present results tend to support the information-processing interpretation of success/failure asymmetry rather than the motivational approach. Although it is difficult to devise a critical test which effectively contrasts these two points of view, Schlenker and Miller (1977) identified one subtle but important difference between the two approaches: "According to the information-processing approach, any information that clarifies the stimulus field should increase the veridicality of attributions....[However], according to the self-serving biases position, clarifying information should *minimize but not eliminate* egocentric patterns of attributions. Self-enhancement and self-protection still should occur, though they should be less pronounced than in more ambiguous situations in which motivated distortions are given free reign" (Schlenker & Miller, 1977, pp. 756, 757; italics not in original).

In the present study, clarifying information (i.e., covariation information) *eliminated* asymmetries in success/failure attributions.[2] The asymmetry observed in the single-observation condition may have resulted from subjects' use of the "representativeness" heuristic (Nisbett & Ross, 1980; Tversky, 1977) rather than motivational distortion. According to the representativeness heuristic, when placed in a somewhat ambiguous situation, the attributor searches for a "cause" that is representative of, resembles, or is similar to the "consequences." Thus, a subject might reason, "I obtained a good outcome, I was trying to obtain a good outcome, so I must be responsible for the outcome," or alternatively, "I obtained a poor outcome, I was trying to obtain a good outcome, so I must not be responsible for the outcome."

How might the motivational approach explain these results? In the

[2] In fact, one might argue that these subjects' judgments were not only unbiased, but were also reasonably accurate. Objectively, subjects were able to produce variations in their outcomes (6 pts. on the average) that were somewhat greater than those produced by the "other investor" (4 pts. on the average). Given covariation information, subjects who received both good and poor profits made attributions concerning degree of personal responsibility for profits that were just above the midpoint on the response scale, on the average. Thus, these judgments were objectively quite accurate. However, this line of reasoning is clearly speculative. It would be useful to actually manipulate subjects' control over outcomes and measure resultant perceptions of personal responsibility.

presence of single-observation information, subjects displayed characteristic success/failure asymmetries. It might be argued that they were motivated to maintain high self-esteem, and that they were able to do so by claiming greater responsibility for good than for poor profits. However, in the presence of covariation information there was no evidence of a link (not even a weak link) between the quality of outcomes and acceptance of personal responsibility for those outcomes. The motivational theorists might adopt one of several lines of reasoning to explain this absence of success/failure asymmetry.

First, one might argue that the seemingly unbiased judgments observed in the covariation condition were in reality simply a different form of motivated attribution. Assuming that the subject's goal is to maintain a positive public image, this goal might be best achieved by forming attributions which are uninfluenced by success/failure. In so doing, the subject may "look better" to the experimenter. This argument is reminiscent of Bradley's (1978) discussion of "counterdefensive" attributions. By relying on both defensive and counterdefensive processes to explain experimental results, however, predictions based upon the motivational approach become untestable—both biased *and* unbiased attributions are consistent with the theory.

Second, it might be argued that subjects were still motivated to form asymmetrical attributions, but were prevented from doing so by the "press of reality." That is, perhaps subjects form self-serving attributions only when they find themselves in informationally ambiguous situations.

These motivational interpretations notwithstanding, the weight of evidence in the present experiment is more congruent with the information-processing than the motivational point of view. Although it is difficult to devise a "critical" experiment which contrasts the information-processing and motivational viewpoints to the satisfaction of both approaches, the cumulative evidence indicates that a nonmotivational interpretation of attributional biases is justified. Additionally, the present research contributes to our understanding of success/failure attributions by demonstrating the impact of varying types of information on causal attributions. These findings provide strong support for derivations from Kelley's model of attribution processes, and suggest that it may be fruitful to view success/failure attributions within the context of this more general theory.

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