1 An attributional analysis of students' reactions to success and failure

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Like it or not, evaluation is as much a part of education as is learning. In most schools and universities students are regularly tested and evaluated by their teachers, who communicate their appraisals in the form of a grade. When the papers are handed back, the grades are posted, or report cards are sent home, students find out if they have succeeded or if they have failed.

How do students react to these academic evaluations? According to a growing number of studies, the answer to this question depends upon their attributions: students' inferences about the causes of their performances and evaluations. Elaborating on theoretical foundations established by Heider (1958), Jones (Jones, 1978; Jones & Davis, 1965), and Kelley (1967, 1971), these investigations assume that students actively strive to understand the origins of their academic outcomes. They ask not only "What did I get on the test?" but also "Why did I get this particular grade?" In reviewing the results of these investigations, we will concentrate on four basic areas: (1) the nature and dimensionality of attributions formulated in academic settings, (2) the impact of success and failure on attributions, (3) the mediating role of attributions in determining expectations and affective reactions, and (4) the behavioral consequences of various types of attributions.

Attributions and academic outcomes

Students explain their educational outcomes through reference to a wide variety of causal factors. Although evidence indicates that Heider's (1958) classic foursome – ability, effort, luck, and task difficulty – are among the most frequently offered explanations of performance (Bar-Tal, Ravgad, & Zilberman, 1981; Elig & Frieze, 1979; Falbo & Beck, 1979; Frieze, 1976), additional factors are also sometimes suggested as causes. For example,

when Forsyth and McMillan (1982) asked 243 college students who had just received feedback about a course examination to describe "what you feel caused your outcome on this test," the students generated over 600 causes. Eliminating highly similar causes, these investigators then asked another group of 119 posttest-feedback students to rate the causal importance of the remaining 175 causes on a five-point scale ranging from "not at all causally important" to "very causally important." Through factor analysis, they then identified the causal factors shown in Table 1.1. The findings of similar investigations are also summarized in this table.

Attributions about outcomes can also be described in terms of underlying dimensions. Although students may attribute their outcomes

Table 1.1. *Unitary attributions in educational settings*

Forsyth & McMillan	Elig & Frieze	Bar-Tal, Goldberg, & Knaani
Good/faulty teaching methods	Motives of others	Teacher's instructional ability
Adequate/inadequate preparation	Effort	Effort for studying Preparation for test Effort during test
Test	Task difficulty	Test difficulty Attentive reading of test
High/low motivation	Intrinsic motives Stable effort Extrinsic motives	Interest in subject Will to succeed Will to prove to others
Personal problems	Personality Physical limitations Fatigue	Mood Self-confidence Health, fatigue Arousal during test
Knowledge	Ability	Ability Memory
Good/bad study habits	Ability/task interaction	Concentration during studying Learning conditions at home Studying load
Luck	Luck	Luck
Support from friends	Others' help	Help in home Cheating
Classroom atmosphere	Teacher's personality Teacher–student interaction	Like teacher
Good/bad textbook	—	Subject matter difficulty

Sources: Bar-Tal et al., 1984; Elig & Frieze, 1975; Forsyth & McMillan, 1982.

to a wide variety of specific, unitary factors like those shown in Table 1.1, many theorists believe that these causal factors are linked to a relatively small number of more fundamental cognitive dimensions. For example, Heider (1958) originally noted the perceptual importance of the internality – externality, or locus of causality, dimension by proposing that ability and effort are both internal, dispositional causal factors, while luck and task difficulty are external, situational factors. However, just as luck is an external factor and ability is an internal one, luck also fluctuates more than ability, suggesting that a second dimension – stability of causes – should be considered when describing attributions (e.g., Frieze & Weiner, 1971; Weiner, 1972; Weiner et al., 1971). More recently, Weiner (1979, 1980) has also suggested that controllability may be the third dimension underlying unitary causal attributions. Although mood and effort are both unstable and internal, Weiner notes that mood is considerably less controllable than effort.

The descriptive adequacy of Weiner's three-dimensional theory (Brown & Weiner, 1984, Weiner, 1983; Weiner & Brown, 1984) has been supported in a number laboratory (Meyer, 1980; Weiner & Kukla, 1970; Wong & Weiner, 1981) and field (Bar-Tal, Goldberg, & Knaani, 1984; Forsyth & McMillan, 1981a; Hayamizu, 1984) studies. However, several investigators have suggested that other dimensions may also underlie unitary attributions. For example, when Wimer and Kelley (1982) asked subjects to describe their attributions about a number of events, they discovered five interpretable dimensions: internality (the Person), stability (enduring – transient), good – bad, simple – complex, and motivation. Similarly, when Kelley and Forsyth (1984) factor analyzed students' ratings of the causal importance of 70 unitary causal factors, they discovered five major factors: performance-inhibiting factors, performance-facilitating internal factors, performance-facilitating external factors, performance-inhibiting internal factors, and uncontrollable factors. Other theorists have proposed additional or alternative dimensions – including distinctiveness, consistency, and consensus (Kelley, 1967, 1971); globality (Abramson, Seligman, & Teasdale, 1978); intentionality (Elig & Frieze, 1975); and achievement orientation, vitality, mastery, energy, attitude, and ability (Falbo & Beck, 1979) – prompting Wimer and Kelley to conclude cautiously that "people can make many possible attributional distinctions" (1982, p. 1161).

Attributions after success and failure

Despite some uncertainty regarding the dimensions underlying students' unitary attributions, the evidence is clear concerning one point: After

failure students generally underscore the importance of external causes; after success they tend to emphasize the causal impact of internal factors. This pattern, which has been variously termed attributional asymmetry (Ross & DiTecco, 1975), benefectance (Greenwald, 1980), egocentrism (Forsyth & Schlenker, 1977), or egotism (Snyder, Stephan, Rosenfield, 1978), has occurred in a number of studies conducted in academic settings (see Bradley, 1978; Zuckerman, 1979). For example, Bernstein, Stephan, and Davis (1979) asked college students to describe the cause of their performance after three consecutive examinations. Despite fluctuation in performances and expectations, these researchers found that high-scoring students, relative to low-scoring students, felt effort and ability were more important whereas the ease of the test and luck were less important. Using a similar method, Kovenklioglu and Greenhaus (1978) found that success students emphasized the causal importance of ability and effort; failure students emphasized bad luck and the difficulty of the test. Arkin, Kolditz, & Kolditz (1983) found that test-anxious students who failed tended to blame their character; overall, however, successful students emphasized internal over external attributions, and failing students showed the opposite pattern. Forsyth and McMillan (1981b) found that low scorers' descriptions of their performance in terms of the three dimensions of Kelley's cube model (1971) placed them in the external attribution cells of the cube (high distinctiveness/low consistency/low consensus), whereas high scorers maintained that their performance was low in distinctiveness.

At least three perspectives can account for the impact of academic outcomes on attributions (Forsyth, 1980). First, a number of researchers feel that these attributional asymmetries are self-serving (e.g., Covington & Beery, 1976; Covington & Omelich, 1979; Miller, 1976; Wortman, Costanzo, & Witt, 1973). According to this view, when students succeed they can increase their confidence and sense of personal worth by attributing their performance to internal, personal, or dispositional factors. In contrast, when students fail, they can avoid the esteem-damaging consequences of their performance by denying responsibility for their performance – blaming their grades on such factors as the teacher, their home life, or the difficulty of the material.

Second, a logical, information processing explanation like that proposed by Feather (1969; Feather & Simon, 1971) emphasizes the relationship between anticipated grades and actual performance. According to this approach, if students' outcomes match their expectations – they expect to succeed and pass or expect to fail and flunk – then they tend to attribute their outcomes to stable, internal factors such as ability.

If, however, their outcomes violate their expectations, then they attribute their outcomes to unstable factors – for example, luck, mood, or a more difficult test. As Miller and Ross (1975) note, however, most students usually expect to do well because the covariation between (1) their own behavior and positive outcomes and (2) the environment and negative outcomes is attributionally salient. Thus, individuals tend to see themselves as the cause of positive performances; negative expectations are rare. Although it is likely that in instances of extreme and repeated failure a specific negative expectation will overwhelm the generalized positive one, Miller and Ross maintain that in most achievement situations success, and not failure, is expected.

Bradley (1978) has added a third possible explanation that emphasizes the interpersonal implications of attributions. Because students' performances are often public and the subject of considerable discussion, students attribute poor grades to external factors to avoid the embarrassment of academic failure and attribute good grades to their own effort or ability to create the impression of competence. Bradley (1978, p. 63) writes that attributions are "mediated by a desire to maintain or gain a positive public image (e.g., a public motive) rather than by a concern for one's private image."

These three explanations of the success–internal/failure–external pattern are not necessarily incompatible. As a functional approach to attributions suggests (Forsyth, 1980), in many instances students may become so personally involved in their academic performance that they would experience considerable anxiety if they felt their inability caused their failure or that a too-easy test caused their success. In such cases – when ego-involvement or need for achievement is high (Miller, 1976) – then attributions may be biased by self-serving motivations. However, students may also need to understand the causes of their outcomes if they are going to improve after a failure or maintain a level of success in the future. Therefore, they formulate explanatory, adaptative attributions that explain the outcome and suggest behavioral strategies for improvement or maintenance (Wong & Weiner, 1981). If students wish to project a public image of ability and competence, then they may wish to make certain that their teachers and classmates do not blame them for their failure but do credit them with their successes. When attributions fulfill an interpersonal function, then students can explain "What rotten luck!" or "The test was too hard" after failure and "I'm glad I worked as hard as I did!" or "Good, fair test" after success. This functional view of attribution thus suggests that, dependent upon the circumstances, all three processes can combine to determine attributions after success and failure.

Attributions and expectations

A number of studies based on Weiner's three-dimensional model of attributions indicate that students' attributions are systematically linked to their expectations concerning future performances. For example, in one study (Weiner, Nierenberg, and Goldstein, 1976) college students were told that they had correctly solved a sample problem from an intelligence test. When students were later asked to estimate how many additional problems, out of ten possible, they expected to solve successfully, those students who emphasized the causal importance of stable factors (task difficulty and ability) were more confident than those who attributed their past performance to unstable factors (effort and luck).

Although other studies have reported a similar impact of attributions to stable factors on shifts in expectations (Valle & Frieze, 1976; Weiner, 1974), field studies of students' expectations suggest that the significance of other attributional dimensions should not be underestimated (Bernstein et al., 1979; Forsyth, & McMillan, 1981a). For example, when Forsyth and McMillan examined the expectations of high and low scoring college students whose attributions varied across the internality, stability, and controllability dimensions, they found no effects of stability. Individuals who failed expressed the most negative expectations when they felt that their performance was caused by external, uncontrollable factors; however, individuals who succeeded expressed somewhat more positive expectations when they felt that their score was the product of internal, controllable factors.

In explaining their findings, Forsyth and McMillan argue that controllability may be more important than stability when students are concerned about maintaining or improving their current levels of performance. When success is produced by factors that students can control – effort, motivation, diligence – then they can assume that good scores will occur again. If, however, good grades are attributed to uncontrollable, external factors – an easy test, an excellent substitute teacher, or the topic – then successful students must wonder if they can maintain their high level of achievement. In contrast, if failing students believe that they can control the cause of the poor performance, then they expect to overcome these constraints in the future. If, however, they believe their grade was caused by external, uncontrollable factors – outside pressures or a poor teacher – then they pessimistically conclude that history will repeat itself.

In a related study, Forsyth and McMillan (1981b) found that expectations are also influenced by the attributional dimensions emphasized by

Kelley in his cube model of causal inferences (1967, 1971). According to Kelley, in most situations people formulate causal inferences by attending to three sources of information: distinctiveness, consistency, and consensus. Distinctiveness, in an educational context, is the extent to which a behavior is unique to a particular setting or is much like what occurs in many other settings. For example, if a student fails math, then the student can assess distinctiveness by considering whether his or her grades are low only in math, or if they are low in all subjects. Consistency is an assessment of behavior in similar situations in the past. Has the student always failed math, or does this outcome only apply to the present school, teacher, class, or unit? Consensus information is gathered by comparing personal reactions with other students' reactions. Are all the students in this class failing math, or is the student one of the few who is performing poorly?

To apply the model, Forsyth and McMillan asked students who had just received feedback concerning their scores on their third examination in a college course to estimate distinctiveness ("Is this grade typical of how you are doing in your *other classes*?"), consistency ("Is this grade about the same as your past grades on tests in this class?"), and consensus ("Do you think a very large proportion of the class got about the same grade that you did?"). Based on these responses, students were then assigned to one of the eight cells of the 2 (high vs. low distinctiveness) x 2 (high vs. low consistency) x 2 (high vs. low consensus) attribution cube.

When describing their expectations concerning the fourth test, students who received As or *B*s reported more positive expectations than students who received *C*s or less. However, this impact of performance on expectations only held if students felt that consistency over time was high. If students earned a grade that they believed was inconsistent with their previous test scores, then the impact of both distinctiveness and consensus was more pronounced. High scoring students were still quite positive about their chances for a good grade, unless they also believed their score was highly distinctive (they were performing poorly in other classes) and low in terms of consensus (many other students in the course received lower grades). Such patterns would occur if students were attributing their performance to largely uncontrollable but personal factors, such as mood, inspired guessing, or extreme effort in this course alone. Among low scoring, low consistency subjects, expectations tended to be more negative if students felt their grade was similar to grades they had received in other classes (low distinctiveness) and relatively unique in comparison to other students' scores (low consensus). However, one group of low scoring, low consistency students – those who felt their outcome was low in distinctiveness but high in consensus – were quite

positive in their expectations. Apparently they felt that the test was too difficult or that the material had been poorly covered, and that these factors would change in the future.

Attributions and affective reactions

After receiving feedback about their examination scores, students do not respond by just formulating causal analysis and revising expectations about future grades. They also experience a range of emotional reactions after the success or failure on the exams. In fact, outcome alone – irrespective of the students' attributions – has a major impact on their global emotional state. As commonsense experience suggests, relative to their successful counterparts, students who fail describe themselves as less relaxed, satisfied, content, elated, and pleasantly surprised and more unhappy, tense, incompetent, inadequate, upset, depressed, guilty, and hostile (Forsyth & McMillan, 1981a; McMillan & Forsyth, 1983). No matter what caused the outcome, students still experience a negative emotional state when they fail and a positive emotional state when they succeed.

Several theorists, however, have suggested that attributions can moderate affective reactions in some instances. For example, Weiner and his colleagues (e.g., Weiner, 1980; Weiner, Russell, and Lerman, 1978, 1979) have drawn a distinction between outcome-dependent affect and attribution-dependent affect. Using role-play methods in which subjects are asked to imagine or recall successes or failures on examinations, Weiner found that some affective reactions – such as happiness, confidence, depression, disappointment, disgust, and upset – were outcome-dependent; they were influenced only by the exam grade. Other affects, however, were associated with specific, unitary causes. Weiner noted that attributions to ability engendered feelings of competence and pride after success but feelings of incompetence, resignation, and unhappiness after failure. Effort attributions were associated with relief, satisfaction, and contentment after success but fear and guilt after failure. If a performance was attributed to the efforts of others, subjects reported feeling gratitude, thankfulness, and excitement when they succeeded but anger when they failed. Furthermore, attributions emphasizing luck were linked to feelings of surprise after both success and failure, although success subjects also reported feeling guilt and relief while failures felt sad and stupid.

These findings, however, have not gone unchallenged. First, when students' attributions and affective reactions are assessed immediately

after they receive examination feedback in their classes, outcome tends to dominate their affective response; even those reactions that Weiner considers attribution-dependent – competence, fear, guilt, and surprise – are overwhelmed by the more powerful impact of outcome (Forsyth & McMillan, 1981a; Frieze, Snyder, & Fontaine, 1977; Kelley & Forsyth, 1984). Second, linkages between attributions and affects that Weiner considers outcome-dependent have been obtained in several studies (e.g., Forsyth & McMillan, 1981a; Kelley & Forsyth, 1984). For example, Forsyth and McMillan (1981a) found that, independent of outcome, students who felt that controllable factors caused their performance experienced more positive emotions than students who attributed their grade on an examination to uncontrollable factors.

Third, some of these studies report attribution-affect linkages that contradict those described by Weiner. For example, Bailey, Helm, and Gladstone (1975) found that attributions to the test after success resulted in as much positive affect as attributions to internal factors, such as ability or effort. Likewise, Covington and Omelich (1979, 1981, 1984; Covington, Spratt, & Omelich, 1980) have repeatedly maintained that individuals will experience greater pride after success and shame after failure when they feel their ability, rather than their effort, caused their outcome. In addition, Arkin, Detchon, & Maruyama (1982) found the following attribution-affect linkages: ability with interest (success) and shame (failure); effort and luck with joy (success) and distress (failure); and test difficulty with surprise (success) and fear (failure).

According to an attribution "network" model proposed by Kelley and Forsyth (1984) these empirical inconsistencies could be resolved if both attributions and affective reactions were conceptualized as multi-dimensional, dynamic processes. As summarized in Figure 1.1, the network model includes four primary components: attributional dimensions, unitary attributions, global affective reactions, and unitary affective reactions. Looking first at attributions, the model predicts that students' perceptions of their test performances are both dimensional and unitary. For example, after learning they have failed a test, students implicitly ask themselves such questions as "Was it something about me that caused my failure?" "Did something about this situation cause me to fail?" and "Did something beyond my control cause me to fail?" Furthermore, they also seek information about specific, unitary causes within these general attributional dimensions, including ability, effort, test difficulty, and luck.

Turning to affective reactions, recent studies indicate that emotions can also be conceptualized as unitary, discrete, monopolar states or as global,

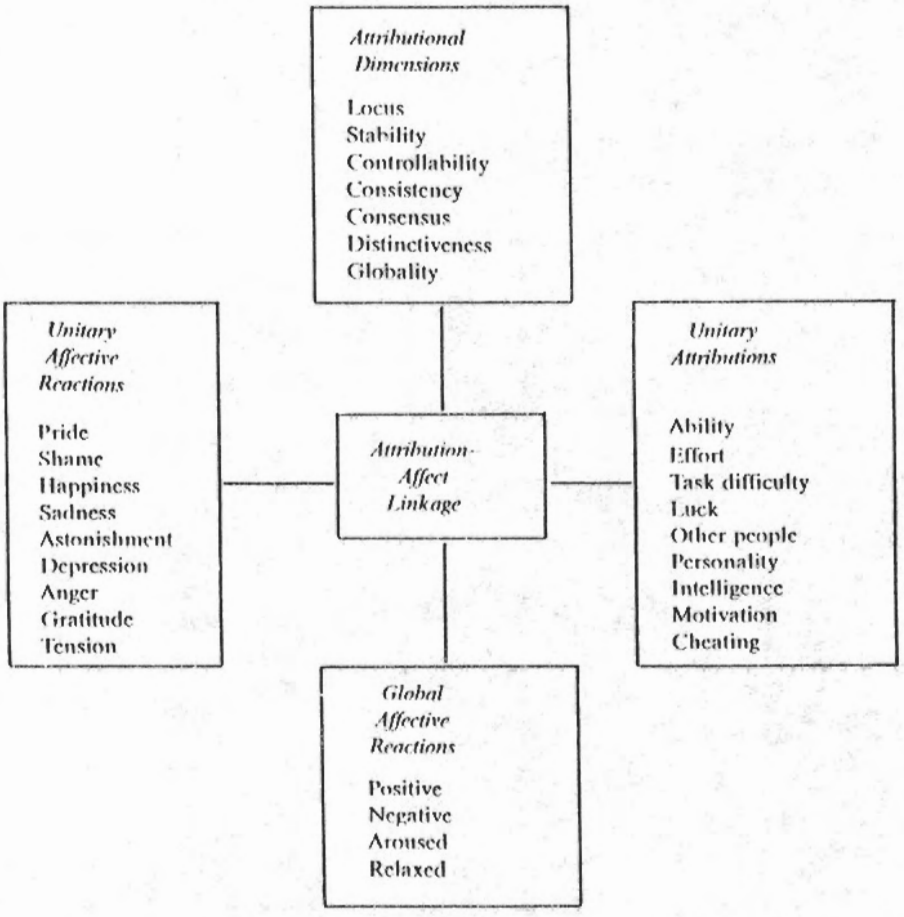

Figure 1.1. A network model of attribution-affect linkages in educational settings.

multidimensional reactions. For example, through factor analyses of self-reported affective states, several investigators have identified distinct emotional states, including sad, anxious, angry, elated, tense, relaxed, excited, and aroused (e.g., Izard, 1972; Nowlis, 1965). Other theorists, however, prefer to view emotions in dimensional terms. For example, Schlosberg (1952), by examining the errors that people make when inferring emotions from facial expressions, concluded that specific emotional states can be classified along two fundamental dimensions: pleasant-unpleasant and attention-rejection. Osgood, Suci, and

Tannenbaum (1957) argued that three dimensions account for the semantic meaning of most affective expressions: evaluation, activity, and potency. Russell (1978, 1979, 1980, 1983) has repeatedly argued that two dimensions are sufficient to describe affective experiences: pleasure – displeasure and degree of arousal. Moreover, Daly, Lancee, and Polivy's conical model (1983) is based on three dimensions: pleasantness, activity, and intensity.

The dimensional models and the unitary models complement one another (Russell & Steiger, 1982). Just as attributions can be described in both unitary and dimensional terms, unitary affective states can be linked to more global emotional dimensions. Although individuals may experience a global, dimensional reaction when they succeed or fail on a test, they may also describe this general emotional state with a discrete, unitary label, such as anger, depression, misery, happiness, bliss, or elation.

Applied to attribution-affect linkages, the network model posits complex interrelationships among both dimensional and unitary attributions and affective reactions. Although the temporal sequencing of cognitive and affective processes is the subject of considerable debate (Lazarus, 1984; Zajonc, 1984), one possible sequence might begin when students receive their grades on an exam. First, this information elicits a global affective reaction, which ranges from positive to negative and involves a degree of arousal or relaxation. At this stage, the emotional process is largely data-driven – a psychological reaction to valenced environmental stimuli.

Second, students formulate global attributional explanations for their outcomes. Although these attributional reactions include attributions to factors that vary in terms of such dimensions as stability, controllability, and globality, in this initial stage of cognitive processing students are primarily focused on facilitating–inhibiting factors and personal–nonpersonal factors.

Third, specific, unitary labels are then assigned to both the affective experiences and causal factors. At this point in the sequence, attribution-affect linkages are formed. For example, students who feel that their failure is due to inhibiting, nonpersonal factors will likely attribute their outcome to the instructor's poor teaching ability and experience anger. In contrast, students who feel that they, personally, controlled their performance will experience pride while attributing their outcome to effort. The direction of causality linking attributions and affects is not yet known, but a reciprocal model in which each influences the other should not be discounted (Stephan & Gollwitzer, 1981).

Several studies support these tentative predictions of the network approach shown in Figure 1.1. For example, Forsyth and McMillan (1981a) found that global affective reactions were linked to feelings of controllability; irrespective of performance, students who thought they controlled the causes of their outcome experienced a more positive emotion than students who thought their performance was caused by uncontrollable factors. Furthermore, the locus of the cause (internal or external) and the nature of the performance (success or failure) were linked to specific emotions: Students who believed their good performance was the product of internal causes felt more competent and adequate, whereas students who attributed their poor performance to internal factors felt more incompetent and inadequate.

Kelley and Forsyth (1984) also tested the multidimensional model. As described earlier, these investigators assessed a wide range of unitary causal forces, including ability, effort, task difficulty, and luck. They also measured affect using 28 unitary adjectives drawn from Russell's circumplex model (1980). These adjectives were selected to sample the affective space described by the model and included the words tense, bored, calm, astonished, and aroused. In addition, four items that Weiner (1980) feels are particularly important in educational settings – ashamed, competent, proud, and confused – were also included.

Through factor analysis, these investigators identified five factors underlying the students' responses to the 32 affect items: negative affect (frustrated, sad, miserable, depressed, angry, etc.), positive affect (glad, delighted, pleased, proud, happy, etc.), calm (calm, relaxed, at ease, tranquil), sleepiness (sleepy, drowsy, tired), and arousal (astonished, excited, alarmed, aroused). Furthermore, analysis of the attributions yielded five factors: inhibiting factors (poor teaching methods, poor preparation, poor textbook, poor test, low motivation, personal problems), facilitating personal factors (high motivation, good study habits, adequate preparation), uncontrollable factors (luck, help from friends, intelligence), external facilitating factors (good teaching methods, classroom atmosphere, good textbook), and personal limitations (bad mood, emotional problems; all items that loaded on the personal-limitations factor also loaded on the inhibiting-causes factor, suggesting considerable overlap).

These findings lend support to the "dimensionality" assumption: Both unitary affects and attributions are systematically related to fundamental affective and attributional dimensions. However, the dimensions that were obtained aren't completely consistent with previous empirical findings. For example, Russell maintains that affective dimensions are

bipolar – they range from positive to negative – but Kelley and Forsyth identified independent unipolar dimensions – positive affect and negative affect. Similarly, a stability dimension was not identified in the attributions, although internality, controllability, and facilitative dimensions were in evidence.

Attributions and students' behaviors

Attributions also influence a range of academic behaviors, including examination performances, persistence at difficult intellectual tasks, and even attendance at study sessions. Looking first at the impact of attributions on examination performance, Bernstein et al. (1979) found that the more students attributed their grades on the first test in a course to their personal ability and the ease of the test, the lower their grade on the next test. According to Bernstein et al., these students may have become too complacent; by relying on their ability and assuming the test would be easy, they failed to study enough for the second test. Furthermore, Bernstein et al. found that students who attributed their performance on the second test to their effort when studying tended to earn higher grades on the third test. Although attributions and grades were not significantly related in a study conducted by Covington and Omelich (1979), attributions were correlated with expectations, which were, in turn, related to performance.

Recent conceptualizations of learned helplessness also underscore the impact of attributions on motivation, persistence, and performance (Abramson et al., 1978; Garber & Seligman, 1980; Wortman & Dintzer, 1978). Although Seligman (1975) originally proposed that students experience helplessness whenever their outcomes are independent of their behaviors, laboratory studies soon indicated that attributions mediate the relationship between noncontingency and helplessness. The reformulated model, as proposed by Abramson et al. (1978), hypothesizes that students who attribute aversive outcomes to certain causes are more likely to show signs of helplessness: motivational deficits, negative expectations about future performances, a depressed emotional outlook, and self-blame.

> Global attributions imply to the individual that when he confronts new situations the outcome will again be independent of his responses. So, if he decides that his poor score was caused by his lack of intelligence (internal, stable, global) or his exhausted condition (internal, unstable, global) . . . he will expect that here, as well, outcomes will be independent of his responses, and the learned helplessness deficits will ensue. If the individual makes any of the four specific attributions for

a low math score, helplessness deficits will not necessarily appear. (Abramson et al., 1978, pp. 57–58).

Some of the clearest support for an attributional model of learned helplessness comes from Dweck's studies of helpless and mastery-oriented students (Diener & Dweck, 1978, 1980; Dweck, 1975; Dweck & Bush, 1976; Dweck & Licht, 1980; Dweck & Reppucci, 1973; Goetz & Dweck, 1980). In one early project (Dweck & Reppucci, 1973) fifth graders were given insoluble problems by one female "teacher" and soluble problems by another teacher. When the teacher who originally gave the insoluble problems switched to soluble problems, a number of children continued to perform poorly; apparently they attributed their earlier failure to the teacher and the difficulty of the problems she assigned and thus became helpless. Furthermore, the children who evidenced the greatest helplessness were those who blamed their failure on lack of ability. Students who performed the best tended to emphasize the causal role played by effort.

In subsequent research Dweck and her colleagues have found that helpless children and mastery-oriented children behave similarly after successes, but when failure occurs they display dramatically divergent reactions. Among mastery-oriented children "effort is escalated, concentration is intensified, persistence is increased, strategy use becomes more sophisticated, and performance is enhanced" (Dweck & Licht, 1980, p. 197). In contrast, when helpless children fail, "efforts are curtailed, strategies deteriorate, and performance is often severely disrupted." In one demonstration of these differences, Diener and Dweck (1978) asked children who were failing on a cognitive task to "think out loud" about what they were doing. When they examined the content of these verbalizations, they discovered that 52% of the helpless questioned their ability, while none of the mastery-oriented students mentioned ability. In addition, mastery-oriented students emphasized effort and luck more than the helpless students. In a subsequent study, Diener and Dweck (1980) also found that helpless students, when given a series of tasks followed by immediate feedback about success and failure, underestimated their successes, overestimated their failures, and avoided attributing their performances to ability.

Dweck (Dweck, Goetz, & Strauss, 1980; Dweck et al., 1978) also believes that attributions may be partly responsible for certain sex differences in academic achievement. Dweck et al. (1978) found that males tend to be exposed to more negative feedback than females, but they tend to attribute this feedback to nonability factors such as the teacher's attitude or their own lack of effort. In contrast, failure feedback for females

focuses on ability. In consequence, girls, more so than boys, tend to attribute their successes to external factors, while blaming themselves for their failures (Deaux, 1976). In some instances, girls also show decreased persistence after failure, impaired performance when threatened with failure, and more negative expectations when compared with boys (Dweck et al., 1978).

Ames and Lau (1982), in a study of help-seeking after failure on a test, also found sex differences; males, in comparison to females, were more likely to attend help sessions before the next examination. In addition, Ames and Lau discovered that attempts to seek help were also related to students' attributions to internal and external factors. Drawing a distinction between help-relevant and help-irrelevant attributions, these investigators predicted that low scoring students would be most likely to seek academic help when their attributions matched the following pattern: (a) relatively few attributions to overall ability (they are generally confident in their intellectual skills); (b) specific attributions focusing on their lack of understanding of key concepts or particular topics; (c) attributions to low effort in the form of lack of studying and preparation; and (d) an avoidance of help-irrelevant attributions, such as "ambiguous test questions" or "poor teacher." As predicted, 62% of the students who attributed their failure to help-relevant factors attended these sessions; only 43% of the failing students who blamed their outcomes on help-irrelevant causes sought help.

Changing attributions to improve outcomes

To summarize briefly, an attributional analysis of students' reactions to their educational outcomes assumes students implicitly identify the causes of their successes and failures. This attributional process results not only in attributions to specific, unitary causes such as ability, effort, task difficulty, and luck, but also in inferences about such attributional dimensions as internality and controllability. Students who perform well generally internalize their success while less successful students emphasize the causal significance of environmental factors, but this attributional pattern may be due to several interrelated processes, including self-serving biases, logical information processing, and self-presentational concerns. Attributions are also systematically linked to expectations about future performance in the course, as well as emotional reactions to examination feedback. According to a multidimensional model of attribution-affect linkages, these relationships occur at both the dimensional and the unitary affective and attributional level. In addition,

attributions influence behavior, for certain attributional patterns lead to poor performance, reduced persistence, helplessness, and failures to seek academic help.

Given that attributions influence educational achievement (McMillan & Forsyth, 1981), educators should help their students arrive at the most adaptive, educationally beneficial causal conclusions possible. For example, the bulk of the evidence indicates that the student's first attributional inclination after failure – externalization – does not facilitate learning, help-seeking, or increased persistence. Also, while some students clearly take credit for their failures, when this self-blame reaches extreme levels, it can result in debilitating losses in motivation, persistence, and achievement. To counteract these "natural" attributional tendencies, educators should encourage students to explore the causes of their successes and failures, while guiding them toward achievement-promoting conclusions about causality.

What attributions promote academic achievement? Although additional research is needed, several studies suggest that attributions to controllable, unstable factors may facilitate academic performances after failure. For example, in one study Dweck (1975) identified 12 children who showed extremely maladaptive responses after failure: negative expectations about their performance, performance deficits following negative feedback, and low persistence on difficult tasks. She then trained six of these children to attribute their failures to a lack of effort rather than ability. For a 25-day period, these students worked on a series of arithmetic problems while the experimenter-teacher watched. While students received success feedback on most of the problems, at various intervals the teacher told the student he or she hadn't performed the problems quickly enough. In all cases, however, the teacher then stated "You should have tried harder." The remaining six students were exposed to success feedback only; they were never told that they failed.

Before the students' training, halfway through the experiment, and after the training the students' reactions to negative feedback were measured by asking them to solve sets of difficult math problems. As predicted, only the trained students persisted at these difficult problems, and when they did receive failure feedback they attributed their performance to a lack of effort. The students in the success-only conditions, in contrast, continued to show a severe deterioration in persistence when they learned they had failed.

Wilson and Linville (1982) have extended these findings to college students, but rather than trying to shift students from ability attributions to effort attributions, they sought to convince first-year college students

that their grades were caused by unstable, rather than stable, factors. In a brief presentation, the subjects were told that, on the average, college students improve their grades during their educational careers. They were also shown videotaped testimonials of advanced students describing how poor first-year grades had improved over the course of their academic career. Relative to "untreated" students, the students who received the information (a) were less likely to drop out at the end of their second year, (b) achieved greater increases in their grade point averages, and (c) performed better on sample items from the Graduate Record Exam. Although the impact of this attributional intervention may have been due partly to regression toward the mean and attrition (Block & Lanning, 1984), the findings have been replicated (Wilson & Linville, 1985).

Other attributional strategies may be more effective after students receive success feedback. For example, in an elaborate study of math achievement in second-graders, Miller, Brickman, and Bolen (1975) assigned inner-city Chicago public school students to one of six experimental conditions: ability attribution, effort attribution, ability persuasion, effort persuasion, reinforcement, and a no-treatment control. Students in all but the last group were exposed to a series of verbal and written comments from their teachers, letters from the principal, and medals matched to their particular treatment. In the ability attribution condition, these messages reiterated the student's ability with such messages as: "You are doing very well in arithmetic" and "You are doing very good work." The achievement medal read "good student - math." In the effort attribution condition, the messages emphasized motivation – "You really work hard in arithmetic" and "You're working harder, good!" and the medal stated "hard worker - math." The messages in the ability and effort persuasion conditions were similarly phrased, but in every case they included a persuasive request such as "You should be doing well in arithmetic" or "You should work harder." The medals in these two conditions read "do better – math" and "work harder – math". Students in the reinforcement condition received a series of positive comments and awards ("very good," "excellent," and "math award"), while the students in the control group received no treatment whatsoever.

When students' scores on a math test given before, immediately after the eight days of treatment, and two weeks after the termination of the special treatments were compared, Miller and his colleagues found that only the students in the two attribution conditions showed improvement. Furthermore, the attribution treatment continued to produce increases in performance, while scores in the two persuasion conditions tended to drop once the experiment was terminated. Overall, the ability attribution

treatment was the most effective, the effort attribution treatment was the next most effective method, the reinforcement and ability persuasion conditions were moderately effective, and the effort persuasion and control conditions were the most ineffective. These findings were recently replicated by Schunk (1983), who arranged for children who were deficient in subtraction skills to perform a series of workbook problems. Periodically during these exercises, they received attributional feedback that focused on the causal importance of (a) their ability, (b) their effort, or (c) their effort and ability. A control group that received no attributional information was also included. As in the Miller et al. study, the children given ability feedback performed best, whereas the children in the control condition performed worst. The students in the effort only and the ability plus effort conditions achieved intermediate scores.

These findings suggest that instructors must remain sensitive to students' attributional reactions to test feedback. In general, if students who do poorly in class conclude there is nothing they personally can do to change their outcomes, then their failure could undermine their motivation and satisfaction with self and school work. However, if the teacher encourages students to associate failure with factors that can be controlled, then the debilitating consequences of failure may be avoided. In contrast, by emphasizing the importance of internal factors as causal agents after success, teachers may further ensure continued success.

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