

Self-Efficacy as a Function of Attributional Feedback

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Abstract

The researchers investigated the effect of attributional feedback on self efficacy judgments among a sample of 192 eighth grade students. Self efficacy judgments were measured by the scale developed by Bandura and Schunk (1981). The results showed that improvement in self efficacy judgments was significantly more for attributional feedback conditions as compared to no attributional feedback conditions. When different feedback conditions were compared, it was found that the effort feedback affected the self efficacy judgments most positively; ability feedback was second, and ability + effort was in the third position.

Self-Efficacy as a Function of Attributional Feedback

The assumption with which the present research work was undertaken is rooted in the self-efficacy theory of Bandura (1977) which states that behavior is changed by the self-efficacy expectations which can be strengthened by different types of feedback given to the subjects. Self-efficacy is defined as the levels of confidence individuals have in their ability to execute certain courses of action or achieve specific outcomes (Bandura, 1977, 1982, 1997). The strength of people's firm belief in their own effectiveness is likely to effect whether they will even try to cope with given situation. At this initial level, perceived self-efficacy influences choices of behavioral actions. The latest research of Bandura (1999) as well as Schunk and Ertmer (1999) showed that the stronger the belief in self-efficacy, the better the subsequent performance. Their results also indicated that causal attributions could influence achievements strivings; however, the effect is mediated almost entirely through changes in perceived self-efficacy (Weiner & Graham, 1999). The stronger the self-efficacy, the more active the effort, and that results in better performance.

This positive link between self-efficacy and performance is widely reported and much research has been conducted in a range of different settings (Manstead & Van-Eekelen, 1998; Newby-Fraser & Schlebusch, 1998; Panjares, 1996; Sadri & Robertson, 1993; Stajkovic & Luthans, 1998), although a number of conditions appear to influence the effect size. Thus, by giving appropriate skills and adequate incentives, self efficacy and performance can be increased.

Attributions were introduced to the psychological literature by Heider (1958), wherein attribution was defined as the process of drawing inferences (Griffin, 1994).

Attribution theory examines the causal inferences that individuals attach to performance decisions (DeVader, Bateson & Lord, 1986; Dugan, 1989; Feldman, 1981; Lord & Smith, 1983; Weiner, 1985). The linkage between attributional analysis and self-efficacy is based on the premise that causal attributions have been linked with attitudinal and behavioral changes (Andrews & Debus, 1978). Attributions have also been connected with responses such as persistence (Andrews & Debus, 1978; Medway & Venino, 1982).

The first study to acknowledge this attributional possibility was Schunk (1982) who found that effort attributions influenced self-efficacy. More recently, research by Martocchio and Dulebohn (1994) as well as Quinones (1995) demonstrated that attributions influence self-efficacy. The research by Schunk and Ertmer (1999) with 44 students combined attribution and feedback with the result that the attributional feedback on effort in the previous task could improve a pupil's self-efficacy expectancy and that the attributional feedback on ability had stronger influence on self-efficacy. Yet another study (Weiner & Graham, 1999) suggested that attributional feedback not only had direct influence on conduct but also had stronger indirect effect on it by affecting self-efficacy. Furthermore, Silver, Mitchell, and Gist (1995) pointed out the importance of examining the relationship between self-efficacy and attributions under both conditions of successful and unsuccessful performance, stating, "no one to date has studied these relationships" (p. 287). Weiner's (2000) attribution research found that lack of ability attribution to failure behavior can decrease individual's sense of self-efficacy and result in the lowering of the motivation level of subsequent behavior. In a study with 146 Chinese students, Aiging and Qian (2002) found a significant interaction

between self-efficacy and attributional feedback of ability. Most recently, in a quantitative research study with 168 German students, Narciss (2004) found that academic achievement depended on both self-efficacy of students and the type of feedback given to them.

Method

In the present study, three types of attributional feedback were given to the subjects, namely ability feedback, effort feedback and ability + effort feedback. The selection of these three particular types of feedback was done on the basis of the research literature which showed that in the achievement context, outcomes are often attributed to ability, effort, task difficulty and luck (Weiner 1979, Weiner et al. 1971). For our present research work, only effort and ability feedback were chosen, because these were thought to be especially relevant for the self-efficacy perceptions in the achievement related contexts.

In our study, both boys and girls were included since Cobb (1954) and Wheeler (1963) found that wishes of young boys exceed those of girls in the areas of personal achievement and possessions. It was assumed that boys are more efficacious than girls and perform better as compared to girls. However, sex differences have not been observed in the study of Schunk (1983). In the achievement context, Todd, Terrel, and Frank (1962) reported sex differences in goal patterns related to academic achievement of college students. Thus, keeping in mind these discrepant findings, the present study included both boys and girls.

To ensure that children were grasping the feedback provided to them, we obtained the effort expenditure ratings as self reported by the boys and girls. It was

expected that subjects who received effort feedback would give higher expenditure ratings as compared to those who received ability feedback.

The present study was conducted with 8th graders, since the concepts of ability and effort begin to emerge around the age of eight and are almost complete by the age of thirteen years (Nicholls, 1978; Nicholls & Miller, 1984). At earlier ages children view effort as the primary cause of outcomes and ability related terms are closely associated with effort. Thus, in the present study, children older than thirteen years of age were selected because it was thought these subjects would be better able to differentiate ability from effort, and the difference between the two concepts would be much clearer to them.

Hypotheses

1. Improvement in self-efficacy would be more in attributional feedback condition as compared to no attributional feedback condition.
2. Improvement in self-efficacy would be more in effort feedback condition as compared to ability feedback and ability + effort feedback condition.
3. Improvement in self-efficacy would be more in ability feedback as compared to ability + effort feedback condition.
4. Improvement in achievement would be more in attributional feedback condition as compared to no attributional feedback condition.
5. Improvement in achievement would be more in effort feedback condition as compared to ability feedback and ability + effort feedback condition.
6. Improvement in achievement would be more in ability feedback condition as compared to ability + effort feedback condition.

Participants

The 192 participants (male $n = 96$; female $n = 96$) in this study were eighth grade students studying in 24 schools in the district Lakhimpur-kheri, UP, India and were deficient in mathematical ability. Mathematical deficiency was assessed on the basis of marks obtained in their previous examination. Children who failed in the last examination or obtained only 45% marks in mathematics were selected as subjects based on random selection and follow-up recommendation by their mathematics teacher. These students were from middle Socio-Economic status and ranged in age from 12 to 14 years. They were randomly assigned to four treatment groups; each group consisted of 24 boys and 24 girls.

Instruments

Self-efficacy. The Self Efficacy Scale was developed by Bandura and Schunk (1981) with their same procedure as used in this study. The efficacy scale ranged from 10 to 100 with an interval of 10 units, with verbal description occurring at the following points, 10 = not sure, 40 = maybe, 70 = pretty sure, 100 = real sure.

Effort Expenditure Scale. Immediately following the last training session, subjects' perception of the amount of effort they expended during the training sessions was assessed. Children self evaluated and reported how hard they thought they had worked on a 10 unit rating scale ranging from 10 = not hard to 100 = really hard. Thus, the subjects' effort expenditure was measured.

Procedure

After the children were selected and randomly assigned to treatment groups, the researcher explained to them the procedure for rating their self efficacy judgment on the

Self Efficacy Scale and conducted one practice test. Once this was completed, the participating children gave their pre-test ratings on that scale. For the pretest, children were shown a total of 24 mathematical problems. Each problem was shown to children only for 2 seconds. After each exposure, children judged their capability to solve and rated privately the strength of their perceived efficacy on a 100 point rating scale. The measure of strength of self efficacy was obtained by dividing the summed magnitude score by the total number of problems. After recording the children's self-efficacy ratings, they were given 8 problems to solve which were selected for the pretest. The time limit, decided on the basis of a pilot study, for 8 problems was 45 minutes.

After completing this procedure, subjects attended 3 days of training sessions. During each day, 8 problems of intermediate difficulty were given to the children to solve. The time limit was 45 minutes for every training session. Data were collected in small groups of eight. In each group, two children participated in each of four different treatments. Each feedback was given individually to two children, two times per training session. The seating arrangement was very spacious; thus, the children were unable to see each other's papers or hear each others' voices. The same experimenter gave all feedback. The description of specific feedback, as designed by the researcher based on literature, is given below:

1. Ability Attributional Feedback:

While giving ability feedback, the investigator asked the child "Which question are you working on?" And following the child's response, the investigator linked child's prior achievement to ability remarking "You are good at this."

2. Effort Attributional Feedback:

The treatment was identical to ability feedback condition, except that following the child's reply, the investigator linked the child's prior achievement with effort by remarking "You have been working hard."

3. Ability + Effort Attributional Feedback:

These children received both forms of feedback. The procedure was similar to those of previous conditions. Following the child's reply the investigator remarked "You are good at this, and you have been working hard."

4. No Attributional Feedback:

These children were monitored in the same fashion as the feedback treatment except that after the child's reply the investigator remarked 'OK' and departed.

This group was control group.

Social reinforcers, such as smiles or encouraging pats, were not given during any of the treatment conditions, since the purpose was to manipulate only verbal reinforcement. Immediately following the last training session, children were asked to rate the amount of effort expended during the training session on the scale of effort expenditure. After a three day training session, the posttest was conducted in which self efficacy ratings were recorded as in the pre-testing.

Results and Discussion

As seen in Table 1, the present study revealed significant differences among the three attributional feedback conditions with regard to self-efficacy judgment of children. Bandura's related research also points out that self-efficacy is mediated by attribution. Attribution plays its role by affecting people's self-efficacy (Bandura, 1999). As seen in

Table 1 regarding self- efficacy judgments, effort feedback was found to be most effective for enhancing self- efficacy ratings. Ability feedback came in second position and last was ability + effort feedback condition.

Table 1

Pre and Post Test Results for Different Feedback Conditions

<i>Conditions</i>		<i>Pretest Mean</i>	<i>Posttest Mean</i>	<i>Mean Difference</i>	<i>SD</i>	<i>t</i>
EFFORT	Boys	56.42	81.09	24.67	11.35	7.42*
	Girls	48.56	74.17	25.17	7.90	11.18*
ABILITY	Boys	50.86	72.87	22.01	14.45	5.25*
	Girls	52.50	66.93	14.43	15.24	2.59**
A + E	Boys	54.55	68.42	13.87	12.71	3.74*
	Girls	40.23	55.90	15.67	9.82	5.50*
No Feedback	Boys	47.83	45.87	-1.96	14.06	0.48(ns)
	Girls	50.95	46.84	-4.00	11.57	0.99(ns)

* $p < .01$. ** $p < .05$

Table 1 shows that participant's mean differences in scores on pretest and posttest for effort, ability, and ability + effort feedback conditions of boys and girls were significant at 0.01 or at 0.05 level. This finding could suggest that telling children that they are working hard conveys to them that they are efficacious enough to succeed and that they can actualize their capabilities through sustained effort. Thus, their self-efficacy judgments are raised. However, results of our study are not supported by Schunk who worked with younger subjects (1983). Comparing ability and effort feedback, Schunk (1983) found that ability feedback had a greater effect on self-efficacy

judgments and mathematical achievement as compared to effort and ability + effort feedback.

The greater effectiveness of ability feedback has been explained by Schunk in terms of the greater social reinforcement value of such feedback. The contrary findings of our present study suggest that telling children that they had worked hard conveys approval more explicitly than does telling children that they are good at mathematics. Another reason for finding greater effectiveness of effort feedback in the present study could be that effort is under volitional control and because it is unstable, it may alter from moment to moment. On the other hand, ability is known to be nonvolitional and relatively stable and thus should be less sensitive to external control. Probably by having a better understanding of concepts of ability and effort (subjects of this study were considerably older than those of Schunk's study), subjects may have thought that they could work hard if they wished. An idea of exerting greater effort led them to rate higher self-efficacy. Supporting the findings of the present study are numerous psychologists (Chen & Stevenson, 1995; Kim & Park, 2001; Park & Kim, 1997) who have pointed out that effort attribution have greater effective consequences than ability attribution.

Furthermore, there is evidence that effort attribution is most effective with tasks having an intermediate difficulty level (Kukla, 1972; Weiner et al., 1972). The task selected for the present study had intermediate difficulty level and thus might have been responsible to some extent for the increased efficacy ratings in the effort feedback condition. In summary, the findings of this study support the hypothesis that effort

feedback are more effective for enhancing efficacy ratings as compared to ability and ability + effort feedback.

When other conditions of feedback are compared (as shown in Table 2), children receiving ability feedback rated their self-efficacy higher as compared to ability + effort feedback, thus supporting the hypothesis. However, the motivational effect of ability feedback may not be as great as that of effort feedback for the reasons offered earlier.

Table 2

Duncon's Multiple Comparison Test of Attributional Feedback Conditions

	A	B	C	D	Shortest Significance Range
MEANS	46.37	62.16	69.89	77.63	
A 46.37	X	15.79*	23.52*	31.26*	R2= 6.66
B 62.16	X	X	7.13*	15.45*	R3= 6.95
C 69.89	X	X	X	7.74*	R4= 7.13

Note. Here A stands for No attributional feedback condition; B stands for A + E attributional feedback condition; C stands for ability attributional feedback condition; and D stands for effort attributional feedback condition.

* $p < .01$)

Looking at the ratings of ability + effort feedback condition, it is evident that the efficacy ratings are lowest in this condition. This finding can be explained on the basis of inverse compensation used by children. Inverse compensation means that if an effect remains invariant, changes in the strength of some other facilitative cause (effort) is negatively related to the changes in the strength of other facilitative cause (ability) (Kun, 1977). Therefore, combining ability with effort feedback was not expected to promote

self-efficacy in additive fashion; rather, perhaps these children discounted the ability information in favor of effort. Children receiving ability + effort feedback may wonder how good at mathematics they really are even if they work hard to succeed, thus questioning, the validity of the ability feedback.

In order to check that children were grasping the concepts of ability and effort, they were asked to give the effort expenditure ratings before they gave efficacy ratings as seen in Table 3. The highest efficacy ratings were expected in children who received effort feedback and the lowest from those who received ability feedback. These expectations were confirmed by the results of the present study.

Table 3

Mean Scores of Effort Expenditure Ratings

<i>Conditions</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>
EFFORT	48	70.41	17.61
ABILITY	48	37.50	23.47
A + E	48	50.62	18.83
NO ATTRIBUTION	48	51.87	19.20

Children receiving ability + effort feedback judge their effort expenditure higher as compared to those who were given only ability feedback. The findings suggest that children receiving ability + effort feedback grasp effort feedback more than ability feedback, but due to inverse compensation, the total effect of this condition could not exceed the effect of the other two experimental conditions. Empirical evidence for the inverse relation effort and ability, when performance level is specified, comes from the study of achievement attribution conducted by Anderson and Butzin (1974) and from

efficacy studies of Schunk (1983). Another possibility is that children conceptualize ability differently when judging it versus when they are using it to infer effort. Perhaps children who infer ability to be a direct function of effort are expressing a belief that higher effort results in higher ability, as suggested by Kun (1977).

Another approach to explaining the asymmetry in the judgments of ability and effort is to propose that it may be based on the general cognitive development in the study of causal relations. If consistent use of inverse compensation is a normal step in the development of causal inferences for both social and non social events, the development of mature concepts of ability or effort may depend on the cognitive developments involved in causal thinking. Undoubtedly, both cognitive development and social experiences influences the development of social attributions. Weiner and Peter (1973) have suggested that such knowledge may not develop until the onset of formal operational thinking (around 11 years).

In this study, the subjects also used inverse compensation in judging ability and effort. The results obtained for self-efficacy with regard to attributional feedbacks have been confirmed by the comparisons made between pre test and post test. The greatest improvement in the post test was in the effort feedback condition and least in the ability + effort feedback. In summary, by means of the present findings, it can be said that the results of the present study support previous findings.

Conclusion

Every student through 12th grade in India faces six examinations throughout an academic year. It is necessary for students to have a good academic achievement in order to be promoted to the next class. Therefore, helping students to do their best is

critical in India, as here in the United States with the accountability requirements of the No Child Left Behind Act of 2001 (U.S. Department of Education, 2005). As cited, research shows that self-efficacy plays a major role in the academic achievement of students. These results again demonstrate the significant power of attributional feedback in improving the self-efficacy of the students which may ultimately lead to an improvement in their academic achievement. Professional school counselors may consult and collaborate with teachers and staff to realize the importance and implementation of attributional feedback and implement so as to realize long term implications and benefits. In particular, school counselors may want to inform teachers that attributional feedback hypothesis states that teachers' expression of sympathy or pity on students' failure conveys the idea that students lack ability (Mayer, 2003).

In addition, school counselors can conduct group counseling sessions for students with low academic achievement and implement a feedback based model for enhancing their self-efficacy, which may ultimately result in improvement in their academic achievement as attributional training hypothesis states that students who are trained to attribute academic success or failure to effort are more likely to work harder than students who attribute their performance to ability (Mayer, 2003). Based on the results of this study and the study by Bandura et al. (2001), counselors can organize support group of parents to increase their own self-efficacy and improve their feedback style so that they can further support their adolescents' self efficacy and outcome expectations.

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