Attributional Processes as Mediators of Sex Differences in Achievement

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There has been sufficient discussion in the attributional literature to suggest the possibility that sex differences in causal attributional patterns may be important mediators of sex differences in persistence in achievement in general and in mathematics education in particular. In assessing this possibility, three issues need to be addressed: First, both the exact nature of the sex differences in attributional patterns for school achievement and the consistency of these differences need to be specified; second, the causal significance of these differences for explaining math achievement needs to be assessed; finally, the interpretations commonly given to these differences need to be evaluated.

Sex Differences in Attributional Patterns

Recent reviews of the attributional literature have concluded that females and males differ in their attributional patterns in systematic ways, and that these differences have an adverse effect on girls' classroom performance (Bar-Tal, 1978; Deaux, 1976; Frieze, Parsons, Johnson, Ruble, & Fellman, 1978; Ickes & Layden, 1977). A careful review of the most commonly cited studies and of the most recent studies focusing on the attributional patterns of school-age children has led me to question the validity of these conclusions. Based on the conclusions of the various reviews, the effects reported are neither as consistent nor as strong as might be expected.

Typically, the reviews reach two conclusions: one regarding sex differences for failure attributions and one regarding sex differences for success attributions. With regard to failure, it is concluded that males tend to attribute failure to external or unstable causes, while females tend to attribute failures to internal causes. To assess the accuracy of this conclusion, I compared boys' and girls' attributions of their failures to lack of ability, to lack of effort, to internal causes, and to external

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causes. The pattern of findings for each of these comparisons is equivocal. For example, while some studies reported that girls attribute their failures more to lack of ability than do boys (Dornbusch, 1974; Wolleat, Becker, Pedro, & Fennema, 1980; Nicholls, 1975; Parsons, Adler, Kaczala, & Meece, in press; Parsons, Adler, Futterman, Goff, Kaczala, & Meece, in press) other studies either did not find or did not report sex differences (Beck, 1977-1978; Deiner & Dweck, 1978; Dweck & Reppucci, 1973; Dweck, Davidson, Nelson, & Enna, 1978; Parsons, 1978). Still other studies have found that the nature of the sex differences varies depending on a variety of related variables, such as the child's achievement level (Fennema, in press; Parsons, Adler, Kaczala, & Meece, in press), the point in the task at which the attribution is taken (Nicholls, 1975), the wording of the question (Dweck & Bush, 1976; Parsons, Adler, Kaczala, & Meece, in press), and the sex and age of the evaluator (Dweck & Bush, 1976).

The pattern of results for attributions of failure to both lack of effort and to internality are equally equivocal. For example, using the Intellectual Achievement Responsibility (IAR) questionnaire, Dweck and Reppucci (1973) report no sex difference in general internality for failure but found boys to be slightly more likely to attribute their failures to lack of effort than girls. In contrast, Crandall, Katkovsky, and Crandall (1965) found girls to be more internal for their failures; Fennema (in press) found an interaction between achievement level and sex in attributions of failure to lack of effort; Beck (1977-1978) found no sex differences in either internality or lack of effort attributions; Diener and Dweck (1978) do not report a significant sex difference on either lack of effort or internality for failure; and Dweck et al. (1978), Fennema (in press), Nicholls (1975), Parsons (1978), Parsons, Adler, Futterman, et al. (in press) and Parsons, Adler, Kaczala, and Meece (in press) found no main effect sex difference in attributions of failure to lack of effort.

Inconsistent patterns also characterize the findings associated with the attributions of failure to external causes. For example, while Nicholls (1975) found that boys were more likely to attribute their failures to bad luck, and Crandall et al. (1965) found boys to be more external for failure on the IAR, other studies have either found no sex difference in the use of external attributions for failure (Dweck et al., 1978; Parsons, 1978; Parsons, Adler, Futterman, et al., in press; Parsons, Adler, Kaczala, & Meece, in press) or mixed results depending on the particular attribution assessed (Nicholls, 1975; Dweck & Reppucci, 1973) or the evaluator (Dweck & Bush, 1976).

Thus it appears that the conclusion that males tend to attribute their failures to external or unstable causes while females tend to attribute their failures to internal causes is a gross oversimplification. The most consistent difference, and the one consistent among studies of math failure in particular, is that females are slightly more likely to attribute their failure to lack of ability than males (Dornbusch, 1974; Fennema, in press; Parsons, Alder, Futterman, et al., in press; Parsons, Adler, Kaczala, & Meece, in press). The evidence regarding more general patterns of attributing failures to stable, unstable, external, or internal causes is equivocal at best.

With regard to attributions for success, the picture is equally confusing. Given general achievement tasks, there is no consistent sex difference in the degree to which success is attributed to either internal or external causes. A finding of no significant difference between the sexes is the most common result. One consistent finding does emerge, however, in studies focusing on mathematics: Boys rate ability as a slightly more important cause of their success, and effort as a slightly less important cause, than do girls (Wolleat et al., 1980; Parsons, Adler, Futterman, et al., in press; Parsons, Adler, Kaczala, & Meece, in press). Nevertheless, even in these studies, both boys and girls rated effort as the most important determinant of success in mathematics, and boys and girls did not differ in the importance they attached to external explanations for their mathematical successes. Thus, as was the case with failure attributions, the global conclusions found in most review articles are overgeneralized.

Psychological and Causal Significance of Attributional Differences

Given the fairly consistent sex differences in the use of ability as a causal explanation for both math success and failure, one might be tempted to build a model of sex-differentiated persistence around this difference. But even these tentative conclusions must be tempered by (a) the magnitude of the sex difference effect, (b) the importance of the lack of ability attribution relative to the other possible attributions, and (c) the causal significance of this difference in mediating achievement behavior.

The magnitude of the sex difference in the attributions is generally quite small. For example, in Fennema's (in press) study, sex accounted for only 1.4% to 4% of the variance in the attributional ratings, and in

other studies (Parsons, Adler, Kaczala, & Meece, in press) it has been found to account for only 3% to 5% of the variance. Similarly, in studies using the IAR the sexes typically differed by no more than 1 to 1.5 items (Crandall et al., 1965; Dweck & Reppucci, 1973), and the direction of the difference varied across the studies.

Ability is also not rated as one of the most important determinants of success by either sex. For example, it has been found that girls rate lack of ability as the fifth, while boys rated it the sixth, most important cause of math failure out of a possible list of eight causes. Dornbusch (1974), Dweck and Bush (1976), Parsons, Adler, Futterman, et al., (in press), and Parsons, Adler, Kaczla, and Meece, (in press) all found lack of effort to be the most preferred attribution for both boys and girls; Parsons, Adler, Kaczla, & Meece (in press) found task difficulty to be the second most important reason given for math failure by both boys and girls. Even in studies in which lack of ability was rated as fairly important (Dweck & Reppucci, 1973; Dweck & Bush, 1976; and Fennema, in press), its importance rarely exceeded the importance attached to lack of effort by either boys or girls.

Finally, one has to question the causal significance of the obtained sex difference. Both Fennema (in press) and Parsons (1980) have argued that the sex difference in the use of the ability attribution is not very important in predicting long-term persistence in mathematics. Parsons (1980) found that attributions add only about 1% to 2% to the amount of variance in persistence that can be accounted for using a battery of measures that include perceived task value, confidence in one's mathematical ability, and perception of task difficulty. A recent study by Covington and Omelich (1979) provides additional support for this conclusion. Using the results of a path analysis, they argue that attributions have little causal significance for ongoing classroom achievement behaviors. Thus it is reasonable to question models based on attributional differences proposing to explain sex differences in academic achievement behavior until more evidence is available to establish the causal importance of attributions for school achievement.

Values, Attributions, and Learned Helplessness

Before setting aside the issue of the psychological significance of attributions, comment on the value judgments being made in the research literature regarding the significance of the sex difference in attributional patterns is warranted. One particular concept that warrants discussion is one that has grown out of the attributional research,

namely, learned helplessness. Learned helplessness is currently being used to help explain sex-related differences in achievement strivings. The assumption that girls are more likely to exhibit learned helplessness in an academic setting than are boys has recently been extended to explain achievement differences in mathematics (Dweck & Licht, 1980). Given the importance that is being attributed to the construct of academic learned helplessness, a careful evaluation of its role in explaining sex difference in achievement is called for. Academic learned helplessness is operationally defined in a variety of ways. The four most common definitions are (1) the propensity to attribute failure to a stable, internal cause, that is, ability; (2) infrequent attribution of either success or failure to effort; (3) high frequency of a debilitating behavioral response to failure; and (4) teacher nomination.

As discussed earlier, there are fairly consistent sex differences in children's propensity to attribute failure to lack of ability; girls appear to be more likely to attribute their failures to lack of ability than are boys. So, according to the finest definition of learned helplessness, we might be willing to conclude that girls are more likely to exhibit learned helplessness behavior than are boys. However, both girls and boys are more likely to attribute their failures to lack of effort than to lack of ability, and the sex difference in children's rating of importance of lack of ability in explaining their failures is generally quite small.

The evidence for a sex difference in learned helpless behaviors as delineated in the last three operational definitions is even less definitive. With regard to attributing one's successes and failures to effort, the sex differences are inconsistent and just as likely to go counter to the predicted direction as to support it. The one study that used this criterion to classify children as learned helpless or mastery oriented (Diener & Dweck, 1978) did not report finding any sex difference on either the attributional measures or the percentage of children judged to be learned helpless. Using children's behavioral response to failure as the criterion measure also lends little support to the notion that girls are more likely to exhibit learned helpless behavior than are boys. While the nature of girls' responses to failure are affected by the sex and age of the evaluator (Dweck & Bush, 1976), girls' behavioral responses in terms of persistence and accuracy following failures are, by and large, equivalent to those of boys (Beck, 1977-1978; Dweck & Reppucci, 1973; Dweck, 1975; Dweck & Gilliard, 1975; Diener & Dweck, 1978; Dweck & Bush, 1976; Nicholls, 1975; Parsons, 1978, 1980; Parsons, Adler, Kaczala, & Meece, in press; Rholes, Blackwell, Jordan, & Walters, 1980).

This is not to say that boys and girls do not differ in their responses to achievement feedback. There is some evidence, though it is not entirely

consistent, that girls' expectancies and affective responses are influenced more negatively by failure than are those of boys. However, I could find little support for the conclusion that girls on the average are more likely to exhibit learned helpless behavior than are boys, for either general achievement tasks or mathematical tasks. Cooper, Burger, and Good (1981) have reached a similar conclusion in a meta-analytic study of the locus of control literature.

Conclusions

What, then, can we conclude regarding the psychological origins of sex differences in mathematics achievement? First, there are *small* sex differences in the attributions made for success and failure in mathematics. While both males and females see both effort and ability as important causes of mathematical achievement, they differ slightly in the relative importance they attach to each of these causes; boys rate mathematical ability to be a slightly more important cause of success, and lack of ability as a slightly less important cause of failure, than do girls. Second, when forced to compete with other possible causes, attributions in general do not seem to play a very significant role in mediating course enrollment. What does play the major role is the perceived value of the course. Perhaps at the developmental point, when one can decide whether or not to elect advanced math courses, variables that have been linked to expectancies are not very salient. The relative value for long-term goals of the various options open to the achievement area, especially attributional research, has not assessed the differential impact of expectancies and task value in determining achievement despite the fact that achievement research has its theoretical roots in the expectancy value tradition (Weiner, 1972). Recent work assessing the determinants of mathematics course enrollment clearly indicates the importance of a more systematic study of the impact of task value on achievement behavior. As developmental psychologists, we should now explore how it is that tasks come to be valued differently by different children. More specifically, why is it that mathematics is seen as a more useful activity by boys than by girls?

But what of attributions? Are we to conclude that they play little, if any, causal role in children's achievement behaviors? Probably not. Recent laboratory findings suggest that attributions, especially attributions to ability, play a critical role when a child confronts a novel set of tasks for which that child has not yet formed a stable self-concept of ability (Parsons, 1980). Developmentally, these results suggest that attributions may play their most important causal role much earlier than high school, when self and task concepts are first emerging.

Empirically, these results explain, to some extent, the discrepancy between the laboratory attributional studies, like Dweck's (1975), which clearly pointed to the importance of attributions, and field studies, like those of Covington and Omelich (1979), Parsons (1980), Parsons, Adler, Futterman, et al. (in press), and Parsons, Adler, Kaczala, and Meece, (in press), which failed to find a very significant effect of attributions. Laboratory studies, by and large, investigate the importance of attribution in situations that are unfamiliar to children and for which it is unlikely that they already have a well-defined self-concept of their ability. In contrast, field studies investigate the importance of attributions in situations that are familiar to children and for which they have had ample experience on which to base a stable self and task concept. The initial results of my current investigations of the role of attributions in the formation of self-concept of ability lend support to the hypotheses (Futterman, 1980) that attributions have their most direct causal effect in the formation of one's self-concept of ability rather than on more objective measures of achievement behaviors, such as performance or task choice.

Alternatively, it is also possible that attributional patterns influence the decisions students make regarding various achievement tasks because they influence students' perceptions of the demands inherent in the tasks to be chosen. Girls do see consistent effort and skill or knowledge as more important determinants of success in mathematics and natural ability as a less important determinant of success than do boys (Parsons, Adler, Kaczala, & Meece, in press). These differences in attributions for success suggest that there are somewhat different perceptions of the causes of success in math among children who have the ability to master advanced-level math courses and to seek out math-related careers. These differences may have their most marked effect on children's perceptions of the task demands inherent in future more advanced math courses, rather than on their responses to experiences in their current math courses. The girl who views consistent effort (or skill and knowledge generally acquired through consistent effort) as a more important determinant of success in mathematics than ability may have lower expectancies for her future success precisely because future courses are considered even more difficult, demanding even more effort to continue to succeed. The amount of effort a student can or is willing to expend has limits, and if a student already thinks she is working very hard to do well in math, she might conclude either (a) that her performance will deteriorate in these more difficult math courses because she is trying as hard as she can at present or (b) that the

amount of effort necessary to continue performing well is just not worthwhile. For some students either of these beliefs would be sufficient justification for a decision not to enroll in advanced math courses. The same limits would apply to the boy who views his ability rather than his efforts as the relatively more important determinant of his success in math. His abilities should allow him to continue performing well with little or no additional expenditure of effort. In support of this hypothesis, girls do have lower future expectancies and see future math courses as more difficult than do boys (Parsons, Adler, Futterman, et al., in press), but do not have lower expectancies for success either on their current math courses or in the experimental mathematical tasks.

REFERENCES

Bar-Tal, D. Attributional analysis of achievement related behavior. *Review of Educational Research,* 1978, **48,** 259-271.

Beck, J.A.L. Locus of control, task expectancies, and children's performance following failure. *Journal of Educational Psychology*, 1977-1978, **71**, 207-210.

Cooper, H. M., Burger, J. M., & Good, T. L. Gender differences in the academic locus of control beliefs of young children. *Journal of Personality and Social Psychology*, 1981, **40**, 562-573.

Covington, M., & Omelich, C. Are causal attributions causal? A path analysis of the cognitive model of achievement motivation. *Journal of Personality and Social Psychology*, 1979, **37**, 1487-1504.

Crandall, V. C., Katkovsky, W., & Crandall, V. J. Children's belief in their own control of reinforcement in intellectual-academic achievement situations. *Child Development*, 1965, **36**, 91-109.

Deaux, K. Sex: A perspective on the attribution process. In J. H. Harvey, W. J. Ickes, & R. F. Kidd (Eds.), *New directions in attribution research* (Vol. 1). Hillsdale, NJ: Lawrence Erlbaum, 1976.

Diener, C. I., & Dweck, C. S. An analysis of learned helplessness: Continuous change in performance, strategy, and achievement cognitions following failure. *Journal of Personality and Social Psychology*, 1978, **36**, 451-462.

Dornbusch, S. M. To try or not to try. *Stanford Magazine*, 1974, **2**, 51-54.

Dweck, C. S. The role of expectations and attributions in the alleviation of learned helplessness. *Journal of Personality and Social Psychology*, 1975, **31**, 674-685.

Dweck, C. S., & Bush, E. Sex differences in learned helplessness: I. Differential debilitation with peer and adult evaluations. *Developmental Psychology*, 1976, **12**, 147-156.

Dweck, C. S., Davidson, W., Nelson, S., & Enna, B. Sex differences in learned helplessness, II. The contingencies of evaluative feedback in the classroom; and III. An experimental analysis. *Developmental Psychology*, 1978, **14**, 268-276.

Dweck, C. S., & Gilliard, D. Expectancy statements as determinants of reactions to failure: Sex difference in persistence and expectancy change. *Journal of Personality and Social Psychology*, 1975, **32**, 1077-1084.

Dweck, C. S., & Licht, B. G. Learned helplessness and intellectual achievement. In J. Garber & M.E.P. Seligman (Eds.), *Human helplessness: Theory and application*. New York: Academic, 1980.

Dweck, C. S., & Reppucci, N. D. Learned helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology*, 1973, **25**, 109-116.

Fennema, E. Attribution theory and achievement in mathematics. In S. R. Yussen (Ed.), *The development of reflection*. New York: Academic, in press.

Frieze, I., Parsons, J., Johnson, P., Ruble, D., & Fellman, G. *Women and sex roles*. New York: Norton, 1978.

Futterman, R. *A causal analysis of expectancies and values concerning mathematics*. Unpublished doctoral dissertation. University of Michigan, Ann Arbor, 1980.

Ickes, W., & Layden, M. A. Attributional styles. In J. Harvey, W. Ickes, & R. Kidd (Eds.), *New directions in attribution research* (Vol. II). Hillsdale, NJ: Lawrence Erlbaum, 1977.

Nicholls, J. G. Causal attributions and other achievement-related cognitions: Effects of task outcomes, attainment value, and sex. *Journal of Personality and Social Psychology*, 1975, **31**, 379-389.

Parsons, J. *Cognitive mediation of the effects of evaluative feedback on children's affect and expectancy for success*. Symposium paper presented at the annual meeting of the American Educational Research Association, Toronto, 1978.

Parsons, J. *Attribution: Cause, effect or mediator of attitudes toward mathematics*. Symposium paper presented at the meeting of the American Educational Research Association, Boston, 1980.

Parsons, J. E., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. Expectancies, values and academic choice: Origins and change. In J. T. Spence (Ed.), *Assessing achievement*. San Francisco: W. H. Freeman, in press.

Parsons, J. E., Adler, T. F., Kaczala, C. M., & Meece, J. L. Sex differences in attributions and learned helplessness? *Sex Roles*, in press.

Rholes, W. S., Blackwell, J., Jordan, C., & Walters, C. A developmental study of learned helplessness. *Developmental Psychology*, 1980, **16**, 616-624.

Weiner, B. *Theories of motivation: From mechanism to cognition*. Chicago: Rand McNally, 1972.

Wolleat P. L., Becker, A. D., Pedro, J. D., & Fennema, E. Sex differences in high school students' causal attributions of performances in mathematics. *Journal for Research in Mathematics Education*, 1980, 356-366.