

Gender-Roles and Women's Achievement

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Differential participation of the sexes in employment and education has become difficult to ignore. Although increasing numbers of women are working, they are still concentrated in the lower levels of the professional hierarchy and in female-dominated occupations (see Eccles & Hoffman, 1984). Although highly important, institutional barriers are not solely responsible. Psychological factors also contribute to women's underrepresentation in certain high-level and scientific careers. Some of these may limit women's accomplishments through influence on the training young women seek. Successful intervention requires a thorough knowledge of the psychological dynamics themselves. This paper explores these social and psychological processes.

It is important to note that any discussion of sex differences in achievement must acknowledge the problems of societal influence on the very definitions of achievement, as well as on our assessment of the differential worth of various forms of achievement, both of which are value-laden enterprises. Too often social scientists adopt a male standard of ideal achievement, seeking to understand why women do not "achieve" like men, without considering the possibility that not engaging in some activity may reflect the choice of an alternate activity rather than avoidance. Focusing on negative at the expense of positive motivational dynamics

has perpetuated a distorted view of women's achievement choices (see Parsons & Goff, 1980).

What is needed is a more neutral model that legitimizes women's choices while acknowledging the impact of rigid gender-role socialization on the determinants of these choices. Such a model would provide both a framework for more comprehensive research on achievement and the basis for designing more comprehensive intervention programs to broaden the range of educational and occupational choices considered by both females and males.

The approach outlined in this paper is one such model. It analyzes women's "underachievement" from a choice rather than a deficit perspective. We believe that women, like men, select their major life roles and activities from the variety of options they consider to be appropriate and that it is essential to study both approach and avoidance factors if we are to understand women's choices.

Applying decision, achievement, and attribution theories of behavior (see Atkinson, 1964; Crandall, 1969; Weiner, 1974) to academic decisions, my colleagues and I have proposed a model of achievement choice that links academic choices to students' expectations for their performance on various achievement tasks and to their perceptions of the importance of these tasks (see Eccles et al., 1983; Eccles, 1984; Eccles, 1986; Meece, Parsons, Kaczala, Goff, & Futterman, 1982). Applying this model to broader educational and occupational choices, we would predict that such choices are influenced most directly by the value the individual places on the array of choices perceived as appropriate, and by the individual's estimates of the probability of success at these various options. Individual differences on these attitudinal variables, in turn, are assumed to result from socialization experiences, interpretation of one's own performance history at various achieve-

ment tasks, and one's perceptions of appropriate behaviors and goals.

Several features of our model are particularly important for understanding sex differences in the educational and vocational decisions. The first is the model's assumption that the effects of experience are mediated by the individual's interpretation of the events rather than by the events themselves. For example, doing well in math is presumed to influence one's future expectations for math performance only to the extent that doing well is attributed to one's ability. Past research has shown that girls do as well in math as boys throughout their formative years, yet they do not expect to do as well in the future, nor are they as likely to go on in math as are boys. This apparent paradox is less puzzling if we acknowledge that it is the subjective meaning and interpretation of success and failure that determine an individual's perceptions of the task and not the objective outcomes themselves.

The second is our focus on choice as the outcome of interest. We believe that individuals continually make choices, both consciously and nonconsciously, regarding how they will spend their time and efforts. Many of the most significant sex differences occur on achievement-related behaviors that involve the element of choice, even if the outcome of that choice is heavily influenced by socialization pressures.

The third important component of our perspective is the issue of what becomes a part of an individual's field of perceived options. Although individuals do choose from among several options, they do not actively or consciously consider the full range of objectively available options. Many options are never considered because the individual is unaware of their existence. Others are not seriously considered because the individual has inaccurate information about them. Still other options may not be considered seriously because they do

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Support for this paper was provided by the following grants: NIMH grant #R01 MH 31724; NSF grant #BNS-8510504; NICHD grant #R01 HD17296. Thanks go to all the people on my research team who have helped in the formulation and testing of the ideas presented here. Their work is cited throughout.

not fit the individual's gender-role schema.

The fourth feature of our perspective is the explicit assumption that achievement decisions are made within the context of a complex social reality that presents each individual with a wide variety of choices, each of which has both long-range and immediate consequences. The choice is often between two or more positive options or between two or more options that each have both positive and negative components. Too often, theorists have focused attention on the reasons capable women do not select high status achievement options and have failed to ask why they select the options they do. Complex choices are not made in isolation of one another: It is essential to understand the psychological meaning of the roads taken as well as the roads not taken if we are to understand men's and women's achievement-related choices.

We thus assume that educational and vocational choices are guided by: (a) one's expectations for success on the options perceived as appropriate, (b) the relation of these options both to short and long-range goals and to core self-identity and basic psychological needs, (c) the individual's gender-role and more general self-schema, and (d) the potential costs of investing time in one activity rather than another.

We believe that each of these psychological variables is shaped by experiences, cultural norms, and other external forces. Because we have focused on choice rather than avoidance, we believe our model provides a more positive perspective on women's achievement behavior than is found in most explanations for sex differences in achievement. Beginning with the work associated with need achievement, and continuing to current work in attribution theory, a variety of scholars have considered the origin of sex differences in achievement patterns. There are problems with this body of work that stem from the fact that it has assumed a deficit model of female achievement—the deficit perspective has limited the range of variables studied, and the assumption that the differences uncovered in most studies actually mediate sex differences in achievement behavior has rarely been tested.

Our model provides a different perspective. By assigning a central role to subjective task value, we offer an alternative explanation for sex differences

in achievement patterns that puts male and female choices on a more equal footing. Males and females may have been socialized to have different but equally important and valuable goals for their lives. Our model also opens up the possibilities of testing the relative im-

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portance of a variety of beliefs in mediating females' occupational decisions and of designing interventions based on value socialization rather than expectancy socialization.

Testing the Model

To test the utility of our model, we have been conducting a series of longitudinal studies of the ontogeny and socialization of precollege students' achievement beliefs, attitudes, and behaviors. In support of our predictions, sex differences in students' enrollment in advanced high school math courses and in students' plans to continue taking advanced high school English courses are mediated most strongly by sex differences in the value males and females attach to math and English.

In addition, from the ninth grade on, girls value English more than boys do and more than they value math. From seventh grade on, girls have lower confidence in their math abilities than their English abilities and lower expectations for future success in math than do boys (Eccles, Adler, & Meece, 1984; Eccles, Wigfield, Jayaratne, Meece & Kaczala, 1986; Wigfield, 1984).

Finally, both mothers and fathers think that math is harder for daughters than for sons, despite the fact that the boys and girls in our samples have earned equivalent math grades, test

scores, and teacher ratings (Eccles, 1984). Even more important, parental beliefs have a stronger impact on children's confidence in their ability than do the course grades they receive. Furthermore, parents rate advanced math courses as less important, and English and history courses as more important for daughters than for sons (Eccles et al., 1986; Jayaratne, 1983; Parsons, Adler, & Kaczala, 1982). It is not surprising, then, that girls enroll in approximately one semester less mathematics than boys.

We have also found small but consistent sex differences in the attributional patterns of both children and their parents for success in mathematics. First, parents of boys rate talent as a more important cause of their child's math successes than do parents of girls; parents of girls rate effort as more important (Yee & Eccles, 1983). Similarly, in comparison to girls, boys attribute their successes in mathematics more to ability: in contrast, girls attribute their successes more to unstable factors such as effort or a good teacher (Eccles et al., 1986; Parsons, Adler, Kaczala, & Meece, 1982).

These patterns suggest that males and females of approximately equivalent math ability have a different perception of the causes of success and failure in math that may lead them to different decisions regarding future prospects for success in mathematics courses. Both boys and girls think next year's math course will be harder than this year's. The girl who views consistent effort as a more important determinant of her success in this year's math course might have lower expectations of success for next year's math course, precisely because she assumes that future math courses will require even more effort for success than this year's course.

Attributional Process, Perceived Task Value, and Occupational Beliefs

The results above suggest that males and females have differing attributional patterns that may influence academic decisions. Comparable attributional differences may also mediate sex differences in occupational choice. Perhaps the fact that many capable women do not enter male-dominated occupations such as engineering results, in part, from women's perceptions of the causes of success and failure in male versus female stereotyped fields. If women do

not attribute success in male stereotyped fields to stable, internal causes and failure to unstable, modifiable causes, then they may be disposed to select other occupations. Similarly, women and men may select different careers because they perceive professions differently.

We have conducted a series of studies to look at these issues. In a study reported earlier, the validity of the attributional approach to career choices was established (Eccles, 1985). Study 1 below assesses the link between attributions and the gender-stereotyping of occupations; Study 2 assesses the links among attributions for math, perceptions of math, and students' math-related occupational aspirations; and Study 3 assesses the link between students' ratings of the characteristics and the gender-stereotyping of occupations.

Study 1

This study assessed the link between attributional patterns and gender-stereotyping of occupations (Eccles, 1985). If women perceive male-stereotyped occupations differently than female-stereotyped occupations of comparable status and required training, then they should respond differently to these career options. Specifically, if women attribute success and failure in male-stereotyped occupations in accord with a low expectancy, low value pattern, but attribute success and failure in female-stereotyped occupations in accord with a high expectancy, high value pattern, then they should be more likely to select female occupations.

To investigate, we had 78 undergraduate women rate the importance of effort, ability, specific help from others, stable help from others, task ease, and interest for success and failure in either three relatively female-stereotyped (Pediatrician, Elementary School Teacher, and Nurse) or three male-stereotyped (Surgeon, Secondary School Teacher, and Mechanical Engineer) occupations. These were a subset of a large number of occupations that best matched status and training while varying gender-role stereotyping within each pair of occupations.

Outcome was manipulated within subject, and gender-stereotyping was manipulated between subjects. Separate three-way ANOVA's (gender-stereotyping \times status level \times outcome) were run for each of the six causes. Gender-stereotyping emerged as either a signifi-

cant main effect or in a significant three-way interaction for three of the attributions (effort, ability, and task ease). Predicted simple effects were tested with Newman-Keuls at $p < .05$. The most interesting comparisons emerged for the contrasts between Nurse and Mechanical Engineer. Consistent with predictions, success at nursing was seen as due relatively more to effort, ability, and interest; in contrast, failure at mechanical engineering was seen as due relatively more to lack of ability.

More generally, whenever stereotyping effects emerged, the women rated the cause as a more important determinant of success or failure in female than in male occupations. Nevertheless, of the 14 relevant significant differences, twelve supported our predictions. But of these, only one supported the low expectancy predictions (attributing failure at engineering to lack of ability). In contrast, the other 11 supported the high expectancy, high control predictions (e.g., both success and failure were seen as more due to effort in the three female-typed occupations; similarly, success was seen as more due to ability and to interest in the female-typed occupation for two of the three comparisons).

Thus, although there is support for the prediction that women's success and failure attributions for female-stereotyped occupations are more characteristic of the high expectancy, high control pattern than are their success and failure attributions for male-stereotyped occupations, there was virtually no evidence of a low expectancy attributional pattern in any of the occupations.

These results support our original suggestion that avoidance models of female-occupational choices may be painting an unnecessarily negative picture of females' occupational choices. The results from this and other studies suggest that females may select female-stereotyped occupations because they are positively attracted to these occupations, and not because they are avoiding male-stereotyped occupations.

Study 2

We next evaluated the attributional patterns of 77 math-able college women (SAT math scores greater than 550 or math ACT scores higher than 28) and related these patterns to their career goals (Kane, 1986). If our model is correct, women's decisions to enter math-related fields should relate to their suc-

cess attributions more than to their failure attributions for mathematics.

To test this prediction, we asked women to rank the causal importance of talent, unstable effort, stable effort, interest, parent help, teacher help, mood, and task difficulty for success and failure on an imagined math test. These attributions were combined to form the following dimensional categories: internal, external, stable, unstable, internal controllable, and internal uncontrollable.

The women were also asked their career goals, and the following Career Groups were created: (1) engineers, mathematicians, computer scientists, chemists, physicists; (2) biologists, pharmacists, medical professionals; (3) business careers; (4) clinical psychologists, lawyers, other social science professionals; and (5) professions in humanities, education, and social work. Analysis of variance was used to assess the relation between career goals and attributional ratings.

Consistent with our perspective, attributional differences emerged only for success and reflected a high-expectancy pattern. Women planning careers in math-related fields, more than other women, attributed math successes to stable and internal reasons and less to unstable and external reasons ($p < .05$ for all four comparisons).

We also asked these women to rate the interest and utility value of math, their confidence in their math abilities, and their perception of the difficulty of math courses (Freedman, 1986). Consistent with our perspective, the women's career goals related significantly *only* to their ratings of the value of math ($p < .05$), with women in Career Groups 1 and 2 valuing and enjoying math more than women in Groups 4 and 5. Contrary to what might be expected from a deficit perspective, women seeking relatively low math related careers did not lack confidence in their math ability and did not think math was any harder than did women seeking more highly math related careers.

Study 3

We next turned to a set of attitudinal variables linked to occupational perceptions and subjective task value. Women may select female-stereotyped occupations over male-stereotyped occupations of comparable status and required training if they think that male-stereotyped

occupations are more difficult, demand more of the individual, and yet are of no more importance to them than female-stereotyped occupations. Women should thus be more likely to select female-stereotyped occupations, especially if they also want to devote energy to such non-career pursuits as raising a family.

To test for differential perception of occupational difficulty and importance, we had 48 college women rate six occupations on (a) the difficulty of the occupation, (b) the probability of success, (c) the importance of success, (d) the amount of effort they would be willing to expend to succeed, (e) how good they would feel if they succeeded, and (f) how bad they would feel if they failed (Eccles, 1985). Four of the occupations represented pairs matched on status and required professional training, but that varied on gender-role stereotyping: surgeon-pediatrician and mechanical engineer-nurse (both B.A. level). Two other occupations were included because of their importance to women: psychologist (a commonly selected occupation) and mother.

Since specific a priori predictions were made, the data were submitted to

a series of tests with $p < .05$ as the alpha level. In general, the results support the predictions (see Table I). The male-stereotyped occupation in each occupational pairing was rated as more difficult, and the probability of success was rated as lower. Furthermore, success at nursing was seen as more important than success at engineering, and the benefits for success as well as the potential costs of failure were rated as higher in nursing.

Perhaps most interestingly, the occupation of mother was rated as very important, affectively very salient, and moderately difficult. Need-achievement theory (Atkinson, 1964) suggests that activities perceived to be of moderate difficulty and high importance are likely to be seen as especially attractive by people with high need achievement motives. Mothering appears to fit these subjective criteria as well as, if not better than, the other occupations tested.

Comparing the ranking of the six occupations on each of the dependent measures yielded additional interesting information. The amount of effort one would be willing to exert, and the level of affect one would expect to experience if one succeeded or failed in each occu-

pation, correlated significantly with the perceived importance of success ($p < .001$ for each comparison), and not with either the perceived difficulty or perceived probability of success ($p < .05$ for each comparison, except the correlation between positive affect and anticipated difficulty of success, for which $p < .05$). If we consider perceived difficulty, probability of success, and importance of properties primarily of the occupation, and anticipated effort and affect as personal responses to the occupations, then these data suggest that it is the perceived importance of various occupations that determines one's anticipated personal response to these occupations.

The data from this study support the prediction that male-stereotyped occupations are seen as relatively more difficult, but not more important than, comparable female-stereotyped occupations. The mother role is extremely important to this group of college women and they plan to put great effort into succeeding in this role. It seems likely, given this pattern, that any occupation that seriously threatens these women's ability to become successful mothers would not be seen as very appealing.

TABLE I
Mean Ratings for Career Attributes in Study 3

Attributes	Careers					
	Surgeon	Pediatrician	Mechanical Engineer	Nurse	Mother	Psychologist
Difficulty ^a	6.65*	6.00	5.33*	4.73	5.60	5.30
Probability of Success ^b	52.68%*	64.49%	42.51%**	70.40%	82.84%	82.76%
Importance of Success ^a	5.73	5.75	4.07*	4.82	6.73	5.32
Effort ^a	5.29	5.27	3.89*	4.60	6.38	5.14
Positive Affect for Success ^a	5.88	5.63	4.25*	4.81	6.49	5.41
Negative Affect for Failure ^a	4.82	4.97	3.39**	4.54	6.31	4.80

Notes. Student *t* tests were used to compare ratings within each career pair for each dependent variable.

Significant differences indicated with asterisks (* $< .05$; ** $< .01$).

^aItems rated on scale ranging from 1 (low) to 7 (high).

^bProbability ranges from 0-100%.

General Discussion

Although I would like to conclude that perceived causes of success and failure, confidence in one's abilities, expectations for success, and perceived importance influence educational and occupa-

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tional choices, the causal direction of these relations cannot be specified unequivocally from the data reported here. It is probable that academic course selection, career choice, attributional patterns, expectations for success, and perceived importance are all influenced by gender-role stereotyping (as well as other factors like aptitude).

Nonetheless, it seems likely that some of the impact of gender-role socialization is mediated by its impact on expectations, attribution, and subjective task value. Thus, it seems reasonable that once established, the attributional, expectancy, and valuing patterns demonstrated in these studies will influence one's consideration of various occupations. As a result, some occupations may not be considered as viable career alternatives. In turn, without serious consideration of new information, it is unlikely that either the attributional patterns or the perceived importance of occupations will change.

The implications of these results for understanding women's career choices are clear. If we assume that females acquire differential attributional patterns, expectations, and values for success at various occupations, and that these patterns are associated with the gender-role appropriateness of the career and one's other long-range goals, then attributional, expectancy, and valuing patterns can help explain preference for gender-appropriate careers.

Perhaps more importantly, this approach provides a mechanism for increasing women's perceived career options. Women's (and men's) perceived career options can be increased by pro-

grams targeted to their beliefs that train them to (1) associate different attributions and expectations with various occupations, (2) assess the value they attach to occupations, (3) reevaluate their stereotypes of various occupations and

life-roles, and (4) reassess the compatibility between various career options and one's adult-role plans. Actively socializing young women and men to recognize the need to be able to support oneself and one's family is probably as important as helping them select the most "appropriate" profession.

Many effective intervention programs (e.g., EQUALS, see Klein, 1985) incorporate components of this set. Comprehensive career and life-role counseling programs would be most effective at preparing girls to make wise decisions if they incorporated all components (see Eccles & Hoffman, 1984; Eccles, 1985; and Klein, 1985 for further discussions of intervention procedures).

References

- Atkinson, J.W. (1964). *An introduction to motivation*. Princeton, NJ: Von Nostrand.
- Crandall, V.C. (1969). Sex differences in expectancy of intellectual and academic reinforcement. In C.F. Smith (Ed.), *Achievement-related behaviors in children* (pp. 11-45). New York: Russell Sage Foundation.
- Eccles, J. (1984). Sex differences in mathematics participation. In M. Steinkamp & M. Moehr (Eds.), *Women in science* (pp. 93-137). Greenwich, CT: JAI Press.
- Eccles, J. (1985). *Female achievement patterns: Attributions, expectancies, values, and choice*. Unpublished manuscript, University of Michigan.
- Eccles, J. (1986, April). *Sex differences in achievement*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Eccles, J., & Hoffman, L.W. (1984). Sex roles, socialization, and occupational behavior. In H.W. Stevenson & A.E. Siegel (Eds.), *Research in child development and social policy: Volume 1* (pp. 367-420). Chicago: University of Chicago Press.
- Eccles, J., Jacobs, J., Flanagan, C., Goldsmith, B., Barber, B., Yee, D., & Carlson, E. (1986). *Sex differences in achievement: Parental influences, Part II*. Unpublished manuscript, University of Michigan.
- Eccles (Parsons), J., Adler, T.F., Futterman, R., Goff, S.B., Kaczala, C.M., Meece, J.L., & Midgley, C. (1983). Expectations, values, and academic behaviors. In J.T. Spence (Ed.), *Perspective on achievement and achievement motivation* (pp. 75-146). San Francisco: W.H. Freeman.
- Eccles (Parsons), J., Adler, T., & Meece, J.L. (1984). Sex differences in achievement: A test of alternate theories. *Journal of Personality and Social Psychology*, 46, 26-43.
- Eccles, J., Wigfield, A., Jayaratne, T., Meece, J., & Kaczala, C.M. (1986). *Ontogeny of achievement-related beliefs and attitudes*. Unpublished manuscript, University of Michigan.
- Freedman, D. (1986). *Gender-role identity and the choice of a math-related major*. Unpublished thesis, University of Michigan.
- Jayaratne, T. (1983). *Sex differences in children's math achievement: Parental attitudes*. Paper presented at the annual meeting of the Society for Research in Child Development, Detroit.
- Klein, S. (Ed.). (1985). *Handbook for achieving sex equity through education*. Baltimore, MD: Johns Hopkins University Press.
- Meece, J.L., Parsons, J., Kaczala, C.M., Goff, B., & Futterman, R. (1982). Sex differences in math achievement: Toward a model of academic choice. *Psychological Bulletin*, 91, 324-348.
- Parsons, J.E., & Goff, S.G. (1980). Achievement motivation: A dual modality. In L.J. Fyans (Ed.), *Recent trends in achievement motivation: Theory and research* (pp. 349-373). Englewood Cliffs, NJ: Plenum.
- Parsons, J.E., Adler, T.F., & Kaczala, C.M. (1982). Socialization of achievement attitudes and beliefs: Parental influences. *Child Development*, 53, 310-321.
- Parsons, J.E., Adler, T.F., & Kaczala, C.M., & Meece, J. (1982). Sex differences in attributional patterns and learned helplessness. *Sex roles*, 9, 322-339.
- Weiner, B. (1974). *Achievement motivation and attribution theory*. Morristown, NJ: General Learning Press.
- Wigfield, A. (1984, April). *Relationships between ability perceptions, other achievement-related beliefs, and school performance*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.
- Yee, D., & Eccles, J. (1983). *A comparison of parents' and children's attributions for successful and unsuccessful math performances*. Paper presented at the annual meeting of the American Psychological Association, Anaheim.