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WOMEN'S ATTRIBUTIONS FOR ACHIEVEMENT:  
AN EXAMINATION OF WITHIN-SEX DIFFERENCES

Gail Crombie

A Thesis  
in  
The Department  
of  
Psychology

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ABSTRACT

WOMEN'S ATTRIBUTIONS FOR ACHIEVEMENT:  
AN EXAMINATION OF WITHIN-SEX DIFFERENCES

Gail Crombie

The investigation of female achievement behavior has proven to be complex. Recently researchers have investigated individual's attributions for success and failure outcomes in an attempt to further our understanding of achievement behavior. The research on female attributions however, has also proven difficult to interpret. The inconclusive results of the achievement and attribution studies may be partially due to the consideration of females as a homogeneous group. The present research relates women's attributions to individual differences in both achievement level and sex-role interpretation. In addition, the extent to which the various attributions differentially associate with female achievement behavior is examined. Female undergraduate students were classified as high and low achievers according to their GPA and as androgynous or stereotypic by the Bem Sex Role Inventory. Women's attributions for academic work in general and for an experimental task were measured, as was their performance on the task. The results demonstrated that women who were androgynous and high in achievement attributed their academic success more to ability than did the other three groups. All four groups attributed their academic success to effort to a similar degree. Although the women differentiated in their usage of the ability attribution, women who attributed their success largely to ability were found not to differ in their performance from women who attributed principally to effort. Further research is necessary to determine whether this lack of differences associated with the use of ability and effort attributions extends to various achievement situations.

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## TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES . . . . .	v
INTRODUCTION . . . . .	1
The Attribution Approach to Achievement Behavior . . . . .	2
Sex Differences in Attribution Patterns. . . . .	3
Female Attribution Patterns: Within-Sex Differences	8
Achievement motivation . . . . .	9
Sex-role interpretation. . . . .	13
Present Study. . . . .	17
METHOD . . . . .	20
Design . . . . .	20
Subjects . . . . .	20
Measure of Verbal Intelligence . . . . .	22
Measure of Achievement Level . . . . .	23
Measure of Sex-Role Interpretation . . . . .	23
Measure of Causal Attributions . . . . .	26
Generation Anagram Task. . . . .	26
Procedure. . . . .	27
RESULTS. . . . .	31
Supplementary Finding. . . . .	40
DISCUSSION . . . . .	45
REFERENCE NOTES. . . . .	56
REFERENCES . . . . .	57
APPENDIX A . . . . .	65
APPENDIX B . . . . .	66
APPENDIX C . . . . .	70

## TABLE OF CONTENTS (cont'd)

	<u>Page</u>
APPENDIX D . . . . .	71
APPENDIX E . . . . .	73
APPENDIX F . . . . .	75
APPENDIX G . . . . .	77
APPENDIX H . . . . .	79
APPENDIX I . . . . .	81
APPENDIX J . . . . .	82
APPENDIX K . . . . .	83
APPENDIX L . . . . .	84
APPENDIX M . . . . .	85
APPENDIX N . . . . .	86
APPENDIX O . . . . .	87
APPENDIX P . . . . .	88
APPENDIX Q . . . . .	90
APPENDIX R . . . . .	91

LIST OF TABLES

	<u>Page</u>
TABLE 1. Attributions for Academic Success. Mean Ratings and Summary of Separate Analyses of Variance . . . . .	33
TABLE 2. Attributions for Experimental Task Success. Mean Ratings and Summary of Separate Analyses of Variance . . . . .	35
TABLE 3. T Tests for Differences between Effort and Ability Attribution Mean Ratings for Success by High Achievers as Measured by Two Different Attribution Scales . . . . .	36
TABLE 4. Mean Performance Scores as a Function of Two Principal Attributions for Academic Success. F Values and t Tests. . . . .	41
TABLE 5. Mean Performance Scores as a Function of Two Principal Attributions for Experimental Task Success. F Values and t Tests . . . . .	42
TABLE 6. Within-Sex Differences in Attribution Ratings as a Function of the Measurement Scale Used. . . . .	43

WOMEN'S ATTRIBUTIONS FOR ACHIEVEMENT:  
AN EXAMINATION OF WITHIN-SEX DIFFERENCES

The investigation of achievement behavior has proven to be relatively more complex for females than for males. While the results of studies on male achievement behavior have generally confirmed theoretical predictions (Atkinson, 1964; McClelland, Atkinson, Clark & Lowell, 1953), the results for females have been both inconsistent and contradictory and hence, difficult to interpret. Consequently, despite three decades of research, our understanding of the relevant factors influencing female achievement behavior is far from complete.

Recently a number of researchers have suggested that cognitive variables may play an important role in mediating achievement behavior (Weiner, Frieze, Kukla, Reed, Rest & Rosenbaum, 1971). The attributions and expectations of individuals have been shown to influence their achievement behavior (Atkinson & Feather, 1966; Crandall, 1969; Weiner, 1974; Weiner et al., 1971). Research on attributions has reported some sex differences, with the data for females again being somewhat contradictory. It is suggested that the inconclusive results of the studies, both on achievement and attribution behavior, may be partially due to the consideration of females as a homogeneous group.

Unlike most previous studies in this area, the research contained in this thesis relates female attributions to in-



dividual differences. This study investigates how individual differences in both achievement level and sex-role interpretation are associated with female attribution patterns for achievement behavior. In addition, previous work on attributions is extended by examining whether the various attributions differentially pertain to female achievement behavior.

The Attribution Approach to Achievement Behavior

Weiner and his associates (Weiner et al., 1971) have demonstrated that attributions for success and failure are important cognitive mediators of achievement behavior. The attributions which individuals utilize to explain their achievement performance have been shown to influence future expectancy of success for similar activities, as well as the amount of pride or shame experienced. The research of Weiner and his colleagues has revealed several patterns of individual differences in attribution, as well as stability among the attribution patterns of individuals. The Weiner attributional approach has generally examined four causal attributions: ability, effort, task difficulty, and luck. Frieze (1976) has investigated other possible attributions and her research has demonstrated that mood is also an important attribution. Weiner's theoretical model classifies the four principal attributions along the two dimensions of internality and stability.

With respect to internality, ability and effort are

considered to be internal attributions, while task difficulty and luck are viewed as attributions which are external to the individual. Research (Weiner, Heckhausen, Meyer & Cook, 1972) has found that variation along the internality dimension influences an individual's affective response to an achievement outcome. A greater degree of pride for success and shame for failure are experienced with internal attributions than with external attributions.

With respect to stability, ability and task difficulty are considered to be factors which are relatively stable over time, whereas effort and luck are viewed as more changeable. The stability dimension has been reported to influence an individual's future expectations; attributions such as ability and task difficulty lead to future expectations that are congruent with present outcomes, while attributions such as effort and luck lead to future expectations that differ from present outcomes. Accordingly, an individual who attributes success to a stable attribution will expect to do as well in the future. Moreover, if an individual attributes failure outcomes to an unstable cause, then expectations for future success can also remain high.

#### Sex Differences in Attribution Patterns

A number of studies (Feather, 1969; Frieze & Weiner, 1971; Simon & Feather, 1975; Weiner et al., 1971) provide support for Weiner's theoretical predictions concerning the relation between expectations and the stability dimension of

4

causal attributions. In addition, Jackaway (1975) has proposed a model to predict the relations between expectations, attributions, and actual achievement behavior. Research has demonstrated that expected outcomes tend to be attributed to stable factors, whereas unexpected outcomes are more likely to be attributed to unstable ones. Sex differences in expectations have been found, with females at all age levels generally reporting lower expectations than males for a variety of tasks (Crandall, 1969; Deaux & Emswiller, 1974; Feather, 1969; Jackaway, 1975). The lower generalized expectancy for success of females appears to influence their attributional analysis of achievement outcomes. Jackaway (1975), outlining relations between expectations and causal attributions for success and failure, has suggested that females are prone to a Low Expectation Cycle. Successful outcomes, which are unexpected, will tend to be attributed to unstable factors, such as effort and luck, whereas failure outcomes, which are expected will tend to be attributed to stable factors, such as lack of ability. Females' attribution of failure to lack of ability reinforces their lower expectations for future success outcomes and thereby affects their future achievement behavior. Jackaway has suggested that, in contrast to females, males demonstrate a High Expectation Cycle. Males, with higher generalized expectancy for success, tend to attribute success outcomes to stable factors (e.g., ability) and unexpected failure outcomes to unstable factors (e.g., effort, luck). The sex differences

in expectations suggest that the attributions of females and males will also differ.

Research on sex differences in attribution patterns has generally required subjects to explain their success or failure on either an experimentally manipulated task or on an actual academic endeavor. Following the success and failure outcomes, the subjects' attribution usage has been measured by Likert scales, bipolar scales or percentage rating scales. In the studies reviewed in this thesis, the subjects have ranged from elementary to college students, with the majority of the studies using college students. This research has demonstrated some sex differences in the usage of the four causal attributions.

Due to the lower generalized expectancy for success of females, it has been suggested that females will utilize luck attributions to a greater degree than males (Jackaway, 1975; Frieze, Fisher, Hanusa, McHugh & Valle, in press). Studies by Feather (1969), Simon and Feather (1973) and Bar-Tal and Frieze (1977) have reported that females do make greater use of luck attributions than males, however no conclusive interpretation may be made from Feather's study because of the methodology used. Feather used a bipolar attribution scale with luck at one pole and ability at the other pole and therefore, as McMahan (1971) has argued, no definitive conclusions can be made on whether females rated their luck as more important or their ability as less important. Furthermore, an examination of the results reveals

that the greater utilization of luck by females occurs predominantly for failure outcomes. Interpretation of the results is further complicated by the fact that McMahan (1973), Nicholls (1975), Luginbuhl, Crowe, and Kahan (1975), Wiegers and Frieze (1977), and Erkut (Note 1) have found no sex differences in the usage of luck attributions. Hence, although some researchers have suggested that females utilize luck attributions to a greater degree than males, a review indicates that the results have been inconsistent. In addition to the discrepant data, there is evidence to suggest that luck is not utilized by either females or males as a principal attribution. When attributions have been measured by a percentage rating scale (Erkut, Note 1; Luginbuhl et al., 1975; Nicholls, 1975), luck has generally been allotted less than 10% of the percentage weight, while on both bipolar scales (McMahan, 1973) and Likert scales (Bar-Tal & Frieze, 1977; Simon & Feather, 1973; Wiegers & Frieze, 1977), luck has received the lowest attribution rating.

Research on attributions has demonstrated that ability and effort are the principally utilized attributions. Females' lower generalized expectancy for success is expected to influence the degree to which they will utilize ability attributions to explain their success outcomes. Females are hypothesized to employ ability attributions to a lesser degree than males, however a review of the research suggests that sex differences in the usage of ability attributions probably do not exist. The majority of the studies (Bar-Tal

& Frieze, 1977; Luginbuhl et al., 1975; McMahan, 1973; Simon & Feather, 1973; Wieggers & Frieze, 1977) have found no sex differences. Feather (1969) did report the hypothesized sex difference, however conclusions are limited by the methodology he used. The other studies showing sex differences have suggested that men utilize ability attributions more than women for success (Frieze, 1973) and that girls blame their failure on lack of ability more than boys (Nicholls, 1975).

The inconsistencies in the results of research on sex differences in luck and ability attribution usage are also found for the employment of effort attributions. A number of studies have reported no sex differences in effort attributions (Bar-Tal & Frieze, 1977; Luginbuhl et al., 1975; McMahan, 1973; Nicholls, 1975); while a sex by outcome interaction has been found in some studies. Males have been reported to attribute their failure more to lack of effort than females (Simon & Feather, 1973; Wieggers & Frieze, 1977), whereas females have been found to attribute their success more to effort than males (Erkut, Note 1; Wieggers & Frieze, 1977). It is of interest to note that the studies reporting sex differences in effort attributions have investigated attributions for actual academic performance (Erkut, Note 1; Simon & Feather, 1973; Wieggers & Frieze, 1977), while studies reporting no sex differences have used experimental tasks (Bar-Tal & Frieze, 1977; Luginbuhl et al., 1975; McMahan, 1973; Nicholls, 1975). The results indicate that sex dif-

ferences in effort attributions are equivocal.

Sex differences in the attribution of task difficulty have also been examined. Simon and Feather (1973) found that women attributed the outcome of their university examinations more to task difficulty than did men, moreover women made more task difficulty attributions when they failed than when they passed, while men did not differentiate. However, no sex differences in the utilization of task difficulty have been found by a number of researchers, (Bar-Tal & Frieze, 1977; Erkut, Note 1; Luginbuhl et al., 1975; McMahan, 1973; Nicholls, 1975; Wiegers & Frieze, 1977).

In summary, although the results of studies on causal attributions have been inconsistent, sex differences have been reported in some studies. Females appear to employ effort and luck attributions for success more than males. In addition, males tend to attribute their success to ability more than females, whereas females blame their failures on lack of ability more than males.

#### Female Attribution Patterns: Within-Sex Differences

Frieze and her associates (Frieze et al., in press) have contended that the contradictory data on sex differences for causal attributions may be partially due to the consideration of females and males as two homogeneous groups. This suggests that instead of the previous attempts to identify one differentiating pattern for females and males, a more worthwhile approach would be to relate causal attributions to in-

dividual differences for both females and males. In the present study, individual differences in achievement motivation and sex-role interpretation are considered to be important within-sex determinants of female attribution patterns.

Achievement motivation. Empirically and theoretically, achievement motivation has been recognized as an important variable in understanding individual differences in achievement behavior. Expectancies for success have also been found to be related to both persistence at a task and quality of performance (Crandall, 1969; Diggory, 1966; Feather, 1966). By extension, individual differences in achievement motivation or expectancies should be differentially related to causal attributions for achievement outcomes. This suggests that some of the inconsistent results in sex differences for causal attributions may be partially due to within-sex differences in achievement motivation and expectancies.

As previously mentioned, although some of the research has produced contradictory results, a few researchers have reported that women utilize luck attributions more (Bar-Tal & Frieze, 1977; Feather, 1969; Simon & Feather, 1973) and ability less (Feather, 1969) than men to explain success outcomes. When achievement motivation and expectancies are taken into consideration however, no sex differences were seen either for luck or ability attributions in the success condition for individuals high in initial confidence (Feather, 1969; Simon & Feather, 1973) or high in resultant achievement motivation (Bar-Tal & Frieze, 1977) as measured by the



Mehrabian Achieving Tendency Scale (Mehrabian, 1969). Consequently the sex differences in luck and ability attributions that have been reported in these three studies, occurred predominantly for failure outcomes and for women low in initial confidence (Feather, 1969; Simon & Feather, 1973) or resultant achievement motivation (Bar-Tal & Frieze, 1977). Furthermore, females high in achievement motivation were found to utilize ability attributions to explain their success outcomes to a greater extent than females low in achievement motivation, demonstrating a within-sex difference (Bar-Tal & Frieze, 1977; Feather, 1969; Simon & Feather, 1973, Wieggers & Frieze, 1977).

Consistent results have also been obtained for effort attributions when an individual's initial confidence (Simon & Feather, 1973), achievement motivation (Bar-Tal & Frieze, 1977), or achievement performance (Wieggers & Frieze, 1977) have been investigated. It was found that for success outcomes, high-achievement females made greater attributions to effort than did high-achievement males, whereas no sex differences were observed for low achievers. For failure outcomes, both high- and low-achievement males have been reported to use lack of effort attributions more than high- and low-achievement females. Although the sex by outcome by achievement motivation interactions have not been statistically significant in these studies, the results have consistently been in the same direction, with high-achievement females making greater attributions for success outcomes to

effort than high-achievement males.

The results of two of these studies also indicate that high-achievement women use effort as their principal attribution to explain success outcomes. Simon and Feather (1973) found that women with high initial confidence attributed the successful passing of an actual college examination to effort more than to ability, while women with low initial confidence did not differ in their effort and ability attributions. In addition, Bar-Tal and Frieze (1977) reported that although high-achievement-motivated women attributed their success on an experimentally manipulated task similarly to effort and to ability, when correlations between outcome on the experimental task and each attribution rating were calculated, the only significant correlation was with the effort rating. This was interpreted as suggesting that high-achievement-motivated women have a stronger belief in effort as a causal factor for success and failure.

The importance of achievement motivation in understanding females' utilization of both effort and ability attributions has been further demonstrated by the results of Murray and Mednick's study (1975) on black university students. In their study black students were classified into high- and low-resultant-achievement motivation, according to their scores on a modified version of the Mehrabian Achieving Tendency Scale. Attributions for their outcome on a digit-guessing task were measured by four Likert rating scales. Correlations between subjects' judgement of how successful

12

their outcome was on the experimental task and each of the four causal attributions were determined. The correlations between ability and outcome were found to be significantly higher for high-achievement-motivation women than for low-achievement-motivation women, indicating a within-sex differentiation. In addition, effort attributions were significantly correlated with outcome only for high-achievement-motivation women and not for low-achievement-motivation women or men. This suggests that high-achievement women might utilize effort attributions to explain their success outcomes more than both low-achievement women and men.

Related research indicates that university students tend to rely to a greater extent on effort attributions to explain the performance of women than men. Feldman-Summers and Kiesler (1974) investigated the attributions which university students utilized to explain the performance of hypothetical women and men in two different situations: first, on a problem solving task and second, as successful physicians. Female and male judges attributed more motivation to women than to men for their performance on a problem-solving task and as successful physicians.

The results of these studies suggest that females high in achievement motivation attribute their success to ability and effort to a greater magnitude than females low in achievement motivation whereas females low in achievement motivation blame their failures on lack of ability and poor luck to a greater extent than females high in achievement

motivation. Furthermore, females high in achievement motivation appear to principally utilize effort to explain their success outcomes. It is suggested that individual differences in achievement motivation are an important within-sex variable which should be investigated in research on females' causal attributions for achievement outcomes.

Sex-role interpretation. A second variable which should be examined when investigating sex differences in causal attributions for achievement behavior is an individual's sex-role interpretation, particularly for females. According to social norms, achievement behavior is traditionally considered to be masculine and not feminine (Broverman, Vogel, Broverman, Clarkson & Rosenkrantz, 1972), hence a female's sex-role interpretation is expected to be related to her attitudes towards achievement behavior in general and to her causal attributions for achievement behavior in particular. Consistent with this hypothesis is the finding that a female's interpretation of whether achievement behavior was appropriate for her sex role influenced her achievement motivation and behavior, (Alper, 1973, 1974).

Stein and Bailey (1973) have suggested that achievement behavior in females might be best explained by a theory of sex-typed achievement. They argued that for females, achievement behavior is channeled into sex-role appropriate areas. Females with a traditional orientation are expected to demonstrate achievement motivation and behavior in the area of social skills, while nontraditionally orientated females are

expected to display achievement on a wider range of activities including more masculine areas such as academic achievement. Stein and Bailey's contention concurs with the results of Peplau's study (1976), in which a within-sex dichotomy was found. Female college students, who had liberal sex-role attitudes had significantly higher educational and career aspirations, higher S.A.T. verbal scores and higher self-ratings of intelligence than did women who had traditional sex-role attitudes. Thus, it appears that women's sex-role orientation is an important mediating variable for achievement behavior, particularly for academic achievement.

O'Leary and Hammack (1975) investigated the differential effect of sex-role orientation for a group of academically achieving junior and senior high school females. Sex-role orientation was measured by the Wellesley Role Orientation Scale. The females' motive-to-avoid-success imagery was assessed in a variety of achievement contexts using female competitive success stories. Nontraditional females emitted significantly fewer success-avoidant themes than traditional females. The results suggest that females' achievement motivation, as measured by the arousal of motive-to-avoid-success imagery, is mediated by their sex-role orientation. Although many of Horner's original hypotheses (1968) have been questioned, many other researchers (Alper, 1973, 1974; Tresemer, 1973) have indicated that females' motive to avoid success fluctuates according to their sex-role interpretation.

Kinsell-Rainey and Deichmann (Note 2) examined both between- and within-sex differences in achievement expectations for neutral and sex-linked tasks. Female and male college students were classified by the Bem Sex Role Inventory and were included in the study if they were androgynous or stereotypic. Only between-sex differences were reported for the neutral tasks, with men having higher expectations of success than women. The predicted within-sex differences were found on sex-linked tasks. For the masculine tasks, men had higher expectations than women. Stereotypic men however, had significantly higher expectations than did androgynous men, whereas androgynous women had higher expectations than stereotypic women. For the females tasks, women as a group had higher expectations than the men. Androgynous and stereotypic men did not differ significantly, while stereotypic women had higher expectations than androgynous women.

In recent work investigating attribution patterns of black women, Murray and Mednick (1975, 1977) have reported that black women high in achievement motivation attribute their success outcomes both to ability and effort, rather than predominantly to effort, which is the typical female pattern for high-achievement females. They suggested that the differences in attribution patterns between black and white women may occur because black women consider achievement behavior to be sex-role appropriate. The low incidence of motive to avoid success reported for black women appears to support this interpretation. Murray and Mednick con-

cluded that future research on causal attributions should take into account an individual's sex-role interpretation.

In Wiegers and Frieze's investigation (1977) of sex differences in expectations and attributions for an academic task, the female subjects were differentiated according to the traditionality and nontraditionality of their career and college aspirations. Nontraditional females had higher expectations for success and perceived themselves as having greater scholastic ability than traditional females. When the rank orderings of causal attributions were analyzed, ability attributions were employed more by the nontraditional female to explain success outcomes, while luck attributions were used more by traditional females. These results tend to suggest that females are not homogeneous and that only the very traditional females possess the low expectancy pattern hypothesized by Jackaway (1975).

In summary the results of a number of studies suggest that sex-role interpretation is an important variable for the investigation of achievement motivation and achievement behavior in females. Androgynous or nontraditional females tend to utilize ability attributions to explain their success outcomes more than stereotypic females, while traditional or stereotypic females employ more effort and luck attributions. Therefore individual differences in sex-role interpretation appear to be an important within-sex variable for females' causal attributions for achievement outcomes.

### Present Study

The present study is designed to investigate the relation between causal attributions for success and individual differences in achievement level and sex-role interpretation in females. In order to broaden our understanding of female achievement behavior, this study also examined the relation between attribution patterns and actual achievement behavior. While expectations have been found to be related to achievement behavior (Crandall, 1969; Feather & Simon, 1973), the relation between attribution patterns and actual achievement behavior needs to be directly investigated. Of particular interest is whether achievement behavior is differentially associated with the utilization of ability attributions for success (i.e., the characteristic male attribution pattern) or the utilization of effort attributions for success (i.e., the characteristic female attribution pattern).

The first hypothesis states that college females, who are high in achievement level should attribute success outcomes more to ability and effort than college females low in achievement level. Previous research which has investigated females with high and low initial confidence, achievement motivation or achievement performance has suggested that high-achievement females employ ability attributions for success more than low-achievement females. Although these results have not always been significant, they have all been in the predicted direction.

The second hypothesis predicts that college women high



in achievement level should attribute success outcomes more to effort than to ability. Previous research has indicated that for women high in achievement, outcomes are correlated with effort rather than with ability attribution ratings. Moreover, observations of professional women suggest that women who succeed in careers attribute their success principally to effort (Frieze, in press).

The third hypothesis predicts that androgynous college females should attribute success outcomes more to ability than stereotypic college females, whereas stereotypic college females should attribute success outcomes more to effort or luck than androgynous college females. It is anticipated that androgynous college females should define the female sex role as encompassing achievement behavior, therefore they should be more apt to take pride in their successful outcomes and should attribute these outcomes to their own ability.

The fourth hypothesis states that androgynous women high in achievement level should attribute success outcomes more to ability than the remaining three groups of women. The interaction of achievement level and sex-role interpretation is expected to yield significant results. The attribution pattern of androgynous college females high in achievement is expected to resemble that of high-achievement college males.

The fifth hypothesis predicts that stereotypic women high in achievement level should attribute success outcomes

more to effort than androgynous women high in achievement level. Effort is the traditionally acceptable cause of female success, therefore it is expected to be used more by stereotypic women high in achievement level.

The sixth hypothesis states that women, regardless of their achievement level and sex-role interpretation, who attribute success outcomes to ability should demonstrate more achievement behavior than women who utilize effort attributions. High expectancies for success have been found to be related to high levels of achievement behavior and to attributions of ability, therefore women who predominantly utilize ability attributions to explain success outcomes are expected to demonstrate higher achievement behavior.

## METHOD

Design

The design of the present study involves two independent variables, achievement level and sex-role interpretation. The achievement variable is divided into high and low levels, while the sex-role interpretation variable is divided into androgynous and stereotypic, thereby resulting in four groups. Furthermore, the design includes five dependent variables: subjects' ratings of causal attributions for ability, effort, task difficulty, luck, and mood. These five dependent variables are measured for academic work in general and for a specific experimental task.

Subjects

The subjects were recruited from undergraduate students attending psychology and sociology courses at Concordia University and education courses at McGill University. Of the students asked to volunteer, approximately 95% participated in the present study. The subjects were tested during their regularly scheduled classes. The study used two testing sessions and of the 228 women tested, only 115 were present for both sessions. Thirteen of these subjects were eliminated because of incomplete or invalid responses, hence the final sample consisted of 102 females. Of the 152 men tested, 79 completed the Bem Sex Role Inventory (BSRI) and

were used along with the 102 females to determine the feminine and masculine medians for the BSRI. The male data did not receive any further analysis in the present study.

Grade point averages (GPAs) for the previous college year were obtained for the 102 women with 72 of the GPAs being verified from college records, while records were not available to verify the remaining 30 GPAs. The means of the verified and unverified GPAs did not differ significantly, therefore their data were combined. The 102 females were divided at the mean into high and low achievers. There was no significant difference in verbal intelligence as measured by the Wide Range Vocabulary Test (Atwell & Wells, 1937) in the high and low achievers, suggesting that the difference in GPA was not due to verbal intelligence.

The 102 females were classified by the BSRI into groups containing 26 androgynous females, 31 stereotypic feminine females, 15 stereotypic masculine females, and 30 undifferentiated females. The within-sex analyses conducted in this study however, utilized only the androgynous and stereotypic feminine females. Females were classified as androgynous if they scored above both the feminine (i.e.,  $F = 5.51$ ) and masculine (i.e.,  $M = 4.84$ ) medians, while females were categorized as stereotypic feminine if they scored above the feminine median and below the masculine median on the BSRI. In order to increase the cell frequency to a minimum of 15 subjects for each of the four groups, four borderline stereotypic masculine females (i.e.,  $F = 5.46$ ,  $M = 5.00$ ;  $F = 5.50$ ,

M = 5.56; F = 5.23, M = 6.38; F = 5.23, M = 5.31) were considered as androgynous and one undifferentiated female (i.e., F = 5.15, M = 2.88) was classified as stereotypic feminine. Therefore 62 females, classified as either androgynous or stereotypic feminine, were included in the within-sex analyses. These subjects were classed into the following four groups: 15 high achievement and androgynous females, 17 high achievement and stereotypic feminine females, 15 low achievement and androgynous females, and 15 low achievement and stereotypic feminine females.

The four groups of females used in this study did not differ significantly in age or in SES as measured by father's occupation on the Blishen Occupation Scale (Blishen, 1967). There were no significant differences in the four groups of females in the number of day and evening students, in the number of full- and part-time students, or in the number of students in honors, majors, and other program classifications. Breakdown according to the three courses (i.e., Psychology, Sociology, and Education) from which subjects were obtained did not differ for each of the four groups. No subjects were lost due to matching criteria. A detailed description of the four groups of females is presented in Appendix A.

#### Measure of Verbal Intelligence

The Wide Range Vocabulary Test was administered to the subjects as a measure of verbal intelligence (Atwell & Wells, 1937). This test consists of 100 multiple choice items.

Normative data are available for grade six through college junior on the 100 items. In the present study however, the test was used to match subjects on verbal intelligence and not to measure individual differences, therefore only the middle sixty items were administered since the extreme items were either too easy or too difficult. See Appendix B for the sixty items presented to the subjects. Subjects' scores (i.e., the number of incorrect responses) were relatively normally distributed with a range between 2 and 34, a mean of 14.22, and a standard deviation of 7.24.

#### Measure of Achievement Level

Students completed a biographical questionnaire, in which they were asked to state their grade point average for the previous college year. This questionnaire is presented in Appendix C. The students' grade point averages were approximately normally distributed and ranged between 1.26 and 3.80; with a mean of 2.74 for the verified GPAs and between 1.93 and 3.67, with a mean of 2.86 for the unverified GPAs.

#### Measure of Sex-Role Interpretation

The Bem Sex Role Inventory was administered as a measure of sex-role interpretation (Bem, 1974). The BSRI contains twenty feminine personality characteristics (e.g., affectionate, gentle), twenty masculine characteristics (e.g. self-reliant, independent), and twenty neutral charac-

teristics (e.g., truthful, happy). The twenty neutral characteristics serve as filler items and as a social desirability measure. The response format is a seven-point scale ranging from 1 ("never or almost never true") to 7 ("always or almost always true"). Each individual's responses provide a femininity, masculinity, and social desirability score. The BSRI is presented in Appendix D.

Normative data (Bem, 1974) has shown that the femininity and masculinity scores of the BSRI are empirically independent (average  $r = -.03$ ), thereby providing some support for the measurement of femininity and masculinity as two independent dimensions. Bem's conclusion that femininity and masculinity, as measured by the BSRI, are two unidimensional factors has however recently been challenged. A number of researchers (Gaudreau, 1977; Moreland, Montague, Gulanick & Harren, in press; Tetenbaum, Note 3; Waters, Waters & Pincus, 1977) have factor analyzed the BSRI and the results have demonstrated four orthogonal dimensions. These four factors have been interpreted as the expressive factor, the instrumental factor, the sex of subject factor, and the maturity/self-sufficiency factor. These results suggest that in order to increase the homogeneity and interpretability of the femininity and masculinity scales, certain items should be deleted from the BSRI. In the present study, the scoring of the BSRI was adjusted accordingly. Eight items were dropped from the femininity scale (i.e., shy, flatterable, loyal, feminine, soft-spoken, gullible,

childlike, do not use harsh language) and two items were added (i.e., friendly, tactful), whereas four items were deleted from the masculinity scale (i.e., athletic, analytical, self-sufficient, masculine). The feminine median on the total 20 feminine items was 4.87 which compares with Bem's (1974) feminine median of 4.76, while the adjusted feminine median was 5.51. The masculine median on the total 20 masculine items was 4.83 as compared to Bem's masculine median of 4.89 and the adjusted masculine median was 4.84.

Although adequate reliability and validity have been demonstrated for the original form of the BSRI (Bem, 1974), they have not been determined for the adjusted BSRI used in this study. Psychologists who have factor analyzed the BSRI however, suggest that the adjustments would improve the homogeneity of the femininity and masculinity scales.

Recently, researchers (Spence, Helmreich & Stapp, 1975; Bem, in press) have recommended a fourfold classification of subjects as either feminine (i.e., high feminine-low masculine), masculine (i.e., high masculine-low feminine), androgynous (i.e., high feminine-high masculine), or undifferentiated (i.e., low feminine-low masculine). The distinction between high-high and low-low scores appears to have discriminate validity (Bem, 1977, in press; Bem, Martyna & Watson, 1976), therefore it has been suggested that the classification androgynous be reserved only for subjects who score high in both femininity and masculinity. For the present study, females were classified as androgynous if they were high feminine-high



masculine and as stereotypic if they were high feminine-low masculine.

#### Measure of Causal Attributions

The attribution questionnaires measured subjects' ratings on five attributions: ability, effort, task difficulty, luck, and mood. The design of the attribution items has been adapted from Kukla (1972) and Bar-Tal and Frieze (1977). Each of the five attributions was measured independently by a seven-point Likert type scale ranging from 1 (Not at all) to 7 (Very much). Attribution research has demonstrated that this seven-point scale provides sufficient range and discriminability. The last item of the attribution questionnaires required subjects to rate the relative importance of the five attributions by allocating percentage values to each of the five attributions such that they totaled a hundred percent. The questionnaire measuring subjects' attributions for success in academic work is presented in Appendix E, while the questionnaire measuring subjects' attributions for performance on the experimental task is presented in Appendix F.

#### Generation Anagram Task

The experimental task consisted of the generation anagram task previously used by Clark and McClelland (McClelland et al., 1953), Veroff (Veroff, Wilcox & Atkinson, 1953) and Horner (1968). Subjects with high-achievement motivation have been found to produce more anagrams in an allotted 12-

minute period than subjects with low-achievement motivation, particularly during the middle portion of the task. As performance differentiation has been reported primarily between the fourth and eighth minutes, subjects in the present study were only given ten minutes to complete the generation anagram task. The generation anagram task is presented in Appendix G.

### Procedure

The experiment was conducted in two-testing sessions and students were approached separately for each testing session. An experimenter, with permission of the class instructor, approached students in their regularly scheduled classes. All subjects were tested in mixed-sex classes composed of between ten and fifty students. Testing sessions were conducted by one of three female experimenters.

In the first testing session, students were informed that participation would involve completion of a short vocabulary test and a booklet containing personality questionnaires. Subjects were requested to identify the two booklets by a code consisting of the first initial of their last name and the last four digits of their residential phone number. This method of identification ensured the confidentiality of the subjects and permitted the matching of subjects in the two experimental sessions. The first booklet contained the Wide Range Vocabulary Test and subjects were allowed ten minutes to complete the test. At the end of ten minutes, the booklets were collected and the second booklet was distributed.

The second booklet contained the Bem Sex Role Inventory, the questionnaire on attributions for academic work, and the biographical questionnaire. Time required for the second booklet was approximately twenty minutes. Booklets were collected and subjects were informed that the experimenter would return for a debriefing and discussion session when the results of the study had been analyzed.

Approximately three weeks after the initial testing session, students in the same classes were asked to participate in a research study on creativity. For this session, each of the three female experimenters tested students in different classes than they had in the first testing session. The subjects were asked to identify the two booklets used in this testing period by a code consisting of the last five digits of their university number. This method of identification ensured the confidentiality of the subjects and permitted the matching of subjects' booklets from the first and second testing session through information on students' course cards.

The first booklet contained the generation anagram task and the attribution questionnaire. The generation anagram task was introduced to the subjects as a measure of creative ability. The subjects were informed that the goal of the task was to make as many words as possible in ten minutes using the letters of a master word which would be given to them. A sample master word (i.e., university) and possible solution words were presented. Before commencement of the

actual experimental task, subjects were informed that the experimenter would say "Check" at the end of each minute at which time the subjects were to put a check mark after the last word they had written and then continue on working.

The subjects were then given the master word (i.e., generation) and the experimental task commenced.

After completion of the generation anagram task, subjects filled out the post-task attribution questionnaire in which they were asked to state whether they personally perceived their performance on the generation anagram task to be a success or failure. The questionnaire assessed five causal attributions (i.e., ability, effort, task difficulty, luck, and mood) for success or failure on the experimental task. On completion, booklets were collected and the second booklet was distributed.

The second booklet contained the post-experiment questionnaire. This questionnaire measured subjects' previous experience with the experimental task in order to assess whether subjects had a generalized or a specific expectancy for the task. The subjects' perceptions of the amount of sex-typing in the task situation were also examined. The last section inquired whether subjects had received any information concerning this research study and whether they had perceived the purpose of the research or any relation between the two testing sessions. The post-experiment questionnaire is presented in Appendix H.

Examination of the post-experiment questionnaire indi-

cated that none of the participants had discerned the purpose of the study and only one had perceived a relation between the two testing sessions. This participant however, was excluded from the study on the basis of her sex-role interpretation.

The subjects were thanked for their participation and were informed that a debriefing and discussion session would be given when the results of the study had been analyzed.

## RESULTS

In order to investigate the relation between females' attributions for success and individual differences in achievement level and sex-role interpretation, 2 x 2 (Achievement Level x Sex-Role Interpretation) analyses of variance were performed for each of the five dependent variables: subjects' ratings of the causal attributions of ability, effort, task difficulty, luck, and mood. These analyses were performed on the subjects' attributions for academic work in general and for a specific experimental task. An investigation of the two intercorrelational matrices of the five dependent variables revealed a paucity of significant correlations. Consequently, due to this lack of correlation among dependent variables, an univariate approach was followed (Harris, 1975). The intercorrelational matrices are displayed in Appendix I. In addition, Scheffé tests were used for post hoc analysis and since the predictions specified direction, all were one-tailed.

Subjects were divided at the mean into high and low achievement level groups. The androgynous and stereotypic females high in achievement level did not differ significantly from each other on GPA, nor did the androgynous and stereotypic females low in achievement level. On the other hand, the androgynous females high and low in achievement did differ significantly from each other on GPA,  $t(28) = 8.55$ ,  $p < .001$ , as did the stereotypic females high and low

in achievement,  $t(30) = 9.80, p < .001$ . As was expected, subjects who rated their performance on the experimental task as a success had a significantly higher total task output than the subjects who rated their performance as a failure,  $t(60) = 3.77, p < .001$ . Performance on the experimental task was approximately normally distributed and ranged from 18.00 to 81.00, with a mean of 39.47, and a standard deviation of 11.33. Females' attributions for success on the experimental task were analyzed for 42 of the 62 females included in this study. Eighteen subjects were eliminated because they rated their performance on the experimental task as a failure and two subjects were eliminated because they had daily experience with anagram-type tasks. The 42 subjects reported having either weekly or monthly experience with anagram-type tasks. The subjects consisted of eight androgynous females high in achievement, 14 stereotypic females high in achievement, ten androgynous females low in achievement, and ten stereotypic females low in achievement. The number of subjects per group did not differ significantly. The subjects also perceived the experimental task as being equally appropriate for females and males and stated that both sexes would tend to perform in a similar manner.

The first hypothesis predicted that college females, who are high in achievement level, should attribute success outcomes more to ability and effort than college females low in achievement level. As can be seen in Table 1, high- and low-female achievers did not differ in the amount they

Table 1  
 Attributions for Academic Success  
 Mean Ratings and Summary of Separate Analyses of Variance

Group	n	Dependent Variables				
		Ability	Effort	Task	Luck	Mood
		Mean Ratings				
High Achievement						
Androgynous	15	6.53	6.33	5.33	2.67	4.40
Stereotypic	17	5.71	6.06	5.29	2.47	4.82
Low Achievement						
Androgynous	15	5.93	6.33	4.93	2.87	5.53
Stereotypic	15	5.93	6.07	5.40	2.67	5.20
Source of Variance <sup>a</sup>		F Values				
Achievement		.51	.00	.22	.28	2.77
Sex-Role		3.61*	1.25	.45	.27	.02
Ach. x Sex-Role		3.40*	.00	.67	.00	.72

<sup>a</sup>df = 1,58

\* p < .10



attributed their academic success to ability or to effort. Moreover, Table 2 demonstrates that for the experimental task no differences occurred in the amount of ability attributions made by high and low achievers. There was however, a tendency for females high in achievement to attribute their success to effort more than females low in achievement,  $F(1,38) = 3.23, p < .10$ . The Scheffé test indicated that only stereotypic females high in achievement utilized the effort attribution to a greater extent than androgynous females low in achievement,  $F(1,38) = 4.20, p < .05$ . Therefore the only difference found in the ability and effort attributions of high and low achievers for success at academic work and on the experimental task was that high-achievement females tended to make greater effort attributions for the experimental task than low-achievement females.

The second hypothesis stated that college women high in achievement level should attribute success outcomes more to effort than to ability. Repeated measurement t-tests were conducted on high achievers' effort and ability attributions to determine whether female high achievers utilized effort attributions more than ability attributions to explain their success, both for academic work and for the experimental task. It can be seen in Table 3 that when attributions were measured by Likert rating scales, women high in achievement did not differ in the amount they attributed their academic success to effort and ability. On the other hand, when attributions were determined

Table 2

Attributions for Experimental Task Success  
Mean Ratings and Summary of Separate Analyses of Variance

Group	n	Dependent Variables				
		Ability	Effort	Task	Luck	Mood
		Mean Ratings				
High Achievement						
Androgynous	8	5.00	5.38	3.88	2.13	4.50
Stereotypic	14	4.71	5.50	3.07	2.29	5.29
Low Achievement						
Androgynous	10	4.30	4.50	2.30	1.80	4.50
Stereotypic	10	5.00	5.10	3.80	1.50	4.00
Source of Variance <sup>a</sup>		F Values				
Achievement		.12	3.23*	.39	3.03*	2.09
Sex-Role		.17	.94	.44	.04	.08
Ach. x Sex-Role		1.02	.41	5.11**	.46	1.48

<sup>a</sup> df = 1,38

\*  $p < .10$

\*\*  $p < .05$

Table 3

T Tests for Differences between Effort and Ability Attribution  
 Mean Ratings for Success by High Achievers  
 as Measured by Two Different Attribution Scales

Attribution Scale	Attribution Mean Ratings				
	Effort	Ability	df	t	p
Likert Scales					
Academic Work	6.19	6.09	31	.50	.32
Experimental Task	5.45	4.82	21	1.91	.03
Percentage Scale					
Academic Work	45.97	20.25	31	5.36	.001
Experimental Task	34.55	27.32	21	1.52	.08

using a percentage rating scale, women high in achievement attributed their academic success to effort to a greater degree than to ability,  $t(31) = 5.36$ ,  $p < .001$ . Moreover, when women's attributions were measured for success on the experimental task, greater attributions were made to effort than to ability both when rated by Likert scales,  $t(21) = 1.91$ ,  $p < .05$ , and when assessed by a percentage rating scale,  $t(21) = 1.52$ ,  $p < .10$ . These findings provide some support for the second hypothesis.

The third hypothesis predicted that androgynous college females should attribute success outcomes more to ability than stereotypic college females, whereas stereotypic college females should attribute success outcomes more to effort or luck than androgynous college females. Table 1 indicates that there was a tendency for androgynous women to attribute their academic success to ability more than stereotypic women,  $F(1,58) = 3.61$ ,  $p < .10$ . Table 2 demonstrates that androgynous and stereotypic women did not differ significantly from each other in their ability attributions for success on the experimental task. Moreover, androgynous and stereotypic women did not differ significantly from each other in their use of effort and luck attributions for academic or experimental task success. Hence, the only difference found in the ability, effort, and luck attributions of androgynous and stereotypic women for academic work and for the experimental task was that androgynous women tended to make greater ability attributions for academic success than

did stereotypic women.

The fourth hypothesis stated that androgynous women high in achievement level should attribute success outcomes more to ability than the remaining three groups of women. It can be seen in Table 1 that for the ability attribution, the achievement level by sex-role interpretation interaction approached significance for academic success,  $F(1,58) = 3.40, p < .10$ . The Scheffé test indicated that androgynous women high in achievement utilized the ability attribution to a greater extent than the other three groups of women: stereotypic women, high in achievement,  $F(1,58) = 7.01, p < .05$ , androgynous women low in achievement,  $F(1,58) = 3.47, p < .10$ , and stereotypic women low in achievement,  $F(1,58) = 3.47, p < .10$ . It can be seen in Table 2 that for the ability attribution, the achievement level by sex-role interpretation interaction was not significant for the experimental task. Thus, although the fourth hypothesis was not supported for the experimental task, it received some support for academic work.

The fifth hypothesis predicted that stereotypic women high in achievement level should attribute their success more to effort than androgynous women high in achievement level. Tables 1 and 2 indicate that the achievement by sex-role interpretation interaction was not significant for effort attributions for academic success or for experimental task success. Hence, androgynous and stereotypic women high in achievement did not differ from each other in their

effort attributions either for academic work or for the experimental task.

The sixth hypothesis stated that women, regardless of their achievement level and sex-role interpretation, who attribute success outcomes principally to ability should demonstrate more achievement behavior than women who primarily utilize effort attributions. In order to determine principal attributions, subjects allocated percentage weights to each of the five attributions such that they totaled 100%. Subjects were classified as utilizing one principal attribution if they allocated to that attribution at least 50% of the total weight and 20% more than any other attribution. Subjects' principal attributions were determined separately for academic work and for the experimental task. Only effort and ability attributions were classified as principal attributions by a sufficient number of women to permit statistical analysis. For a complete breakdown of the number of women who were classified as utilizing one of the five attributions as a principal attribution see Appendix J. To determine whether women who attribute principally to ability demonstrate more achievement behavior than women who primarily utilize the effort attribution,  $2 \times 5$  (Principal Attribution  $\times$  Time Period) repeated measurements analyses of variance were performed on subjects' output for each of the five two-minute periods of the experimental task. In addition,  $t$  tests for independent groups were done on the difference between women who attributed principally to ability and those

who attributed principally to effort for total task output and for their actual GPAs. The variances of the women who utilized ability as a principal attribution to explain academic success and the women who used effort did not differ significantly, despite a large difference in the sample sizes of the two groups (Boneau, 1960).

It can be seen in Table 4 that women who attributed their academic success principally to ability and women who attributed principally to effort did not differ significantly from each other on experimental task output per interval, on total task output, or on their GPAs. Similarly, Table 5 indicates that women who attributed their success on the experimental task principally to ability and women who attributed principally to effort did not differ significantly from each other on experimental task output per interval or on total task output. Thus, the hypothesis that women who attribute success outcomes to ability demonstrate more achievement behavior than women who utilize effort attributions was not supported.

#### Supplementary Finding

A supplementary finding of this study was that subjects' ratings of their attribution utilization was affected by the type of scale used to measure the five attributions, both for academic success and for experimental task success, as can be seen in Table 6. When subjects' attribution utilization was measured using percentage ratings, no significant

Table 4  
 Mean Performance Scores as a Function of  
 Two Principal Attributions for Academic Success  
 F Values and t Tests

	Principal Attribution			
	Ability <u>n</u> =12		Effort <u>n</u> =47	
Output/Interval	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
First	16.33	(6.39)	13.74	(7.65)
Second	7.58	(2.39)	8.74	(3.80)
Third	6.75	(1.82)	6.53	(2.70)
Fourth	6.75	(2.56)	5.55	(2.35)
Fifth	4.17	(2.37)	4.43	(2.33)

Analysis of Variance Summary Table

Source of Variance	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>
Between Subjects				
Principal Attribution (A)	1	12.76	12.76	.40
Error (between)	57	1831.38	32.13	
Within Subjects				
Interval (B)	4	3515.17	878.79	65.89*
A x B	4	78.98	19.74	1.48
Error (within)	228	3041.05	13.33	

	Principal Attribution					
	Ability <u>n</u> =12		Effort <u>n</u> =47		<u>t</u>	<u>p</u>
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Total Output	41.58	(9.47)	39.00	(13.33)	.63	.53
GPA Scores	2.71	(1.07)	2.66	(.82)	.17	.87

\*p < .001

(D)



Table 5  
 Mean Performance Score as a Function of  
 Two Principal Attributions for Experimental Task Success  
 F Values and t Tests

Output/Interval	Principal Attribution			
	Ability $n=12$		Effort $n=13$	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
First	15.33	(7.83)	13.62	(3.97)
Second	8.25	(3.17)	8.38	(2.57)
Third	5.58	(2.23)	5.62	(2.02)
Fourth	7.25	(3.05)	5.54	(2.90)
Fifth	3.25	(1.91)	5.31	(2.66)

Analysis of Variance Summary Table

Source of Variance	<u>df</u>	<u>SS</u>	<u>MS</u>	<u>F</u>
Between Subjects				
Principal Attribution (A)	1	1.81	1.81	.07
Error (between)	23	607.98	26.43	
Within Subjects				
Interval (B)	4	1584.59	396.15	41.53*
A x B	4	61.42	15.36	1.61
Error (within)	92	877.59	9.54	

	Principal Attribution					
	Ability $n=12$			Effort $n=13$		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>t</u>	<u>P</u>
Total Output	39.67	(13.89)	38.46	(8.74)	.26	.80

\* $p < .001$

Table 6  
 Within-Sex Differences in Attribution Ratings  
 as a Function of the Measurement Scale Used

Success on	F Values				
	Ability	Effort	Task	Luck	Mood
Likert Scales					
Academic Work <sup>a</sup>					
Achievement	.51	.00	.22	.28	2.77
Sex-Role	3.61*	1.25	.45	.27	.02
Ach. x Sex-Role	3.40*	.00	.67	.00	.72
Experimental Task <sup>b</sup>					
Achievement	.12	3.23*	.39	3.03*	2.09
Sex-Role	.17	.94	.44	.04	.08
Ach. x Sex-Role	1.02	.41	5.11**	.46	1.48
Percentage Scale					
Academic Work <sup>a</sup>					
Achievement	1.25	1.71	.34	.02	1.72
Sex-Role	.00	.19	1.21	.00	.11
Ach. x Sex-Role	.11	.28	2.20	.02	2.38
Experimental Task <sup>b</sup>					
Achievement	.07	.59	.40	.20	.14
Sex-Role	.38	.00	.80	.50	.20
Ach. x Sex-Role	.69	.46	.53	.65	.11

<sup>a</sup>  $df = 1,58$

<sup>b</sup>  $df = 1,38$

\*  $p < .10$

\*\*  $p < .05$

within-sex differences were found for any of the five attributions for either academic or experimental task success. When attribution utilization was measured using five Likert scales, a few within-sex differences were found in college females' attribution utilization. Since in the present study different scales yielded different results, it is suggested that the discrepant results of previous studies on sex differences in attribution patterns may be partially due to the choice of measurement scale.

## DISCUSSION

The results of this study indicated that college women who differ in achievement level and in sex-role interpretation vary somewhat in their attributions for academic and experimental task success. It was found that although the four groups of women investigated in this study did not differentially use all of the five attributions, a few significant differences in attribution usage were observed. No differences however, were found in actual achievement performance between women who attributed principally to ability and women who attributed principally to effort.

Although earlier research (Kukla, 1972; Weiner, 1972) has reported that achievement motivation was an important variable in differentiating the attributions of males, the results have not been as conclusive for females. The inconsistency of the female literature may possibly be due to the fact that achievement motivation has generally been measured by the Mehrabian Achieving Tendency Scale, which has not had high validity scores for females (Mehrabian, 1969). Therefore in the present study instead of measuring achievement motivation, college females were matched for intelligence and grouped according to their level of achievement performance. It was suggested that the two achievement levels would be differentially related to female attribution patterns. This proposition, however, was based on the results of studies that measured achievement motivation

(Bar-Tal & Frieze, 1977; Feather, 1969; Simon & Feather, 1973) and not on studies that measured actual achievement level. As the Mehrabian Achieving Tendency Scale had been previously given to the women in this study, correlations were determined between actual achievement level (i.e., GPA) and achievement motivation for the women as a whole and separately for each of the four groups. It was found that whereas for the women as a whole, actual achievement level and achievement motivation were not correlated, some positive correlations were obtained for subgroups. Actual achievement level and achievement motivation had positive correlations for androgynous women high in achievement level,  $r(15) = .39, p < .10$ , and for stereotypic women low in achievement level,  $r(15) = .36, p < .10$ . For stereotypic women high in achievement level and androgynous women low in achievement level, actual achievement level and achievement motivation were not correlated. The correlations indicate that for women as a whole there is no association between achievement motivation and actual achievement level, instead it appears that the degree of association differs for each of the four groups of women. The correlations suggest that for women, achievement motivation per se is not a good single predictor of achievement behavior. Therefore it is not surprising that in the present study the hypotheses relating to achievement level were not supported by the results. Future research might more profitably focus on actual achievement level rather than on the construct of

achievement motivation.

Wiegers and Frieze (1977) found that achievement level affected females' attribution patterns. They reported differences between high- and low-achieving females in attributions to ability and in attributions to effort for success on an experimental task presented as an academic test. In their study individuals were designated as high- and low-performance achievers if their actual GPA fell at least one-half standard deviation above or below their predicted GPA. Their predicted GPA was based on their Otis-Lennon intelligence score. In the present study a mean split of GPA scores was used to classify women as high and low achievers, with the two groups not differing in their verbal intelligence. The results of the present study suggest that the mean split might not have provided sufficient differentiation between high and low achievers. Furthermore, the inconsistent results of a number of earlier studies on female achievement would indicate that perhaps a 75 and 25 centile division would be necessary in order to have a meaningful distinction between high and low achievers.

In this study the lack of difference between high- and low-female achievers in their usage of both ability and effort attributions for academic success may be due to the fact that academic work was perceived as a composite of a number of academic courses. This suggests that academic work was too general an area of achievement in which to measure attributions. Individuals vary the attributions they

use to explain their success on academic courses dependent on whether the courses are interesting, difficult, well-instructed, et cetera. Thus, attributions should be measured for a specific course in order that an individual's perceptions of and attributions for several different courses do not interact and affect the measurement of attributions.

The results of the present study indicate that college female high achievers utilize effort attributions more than ability attributions to explain their success outcomes. This greater usage of effort attributions was not found for low achievers, who used effort and ability attributions to a similar degree in explaining their success outcomes.

These results are consistent with the conclusions reached by Simon and Feather (1973) and Bar-Tal and Frieze (1977). In contrast, the greater utilization of effort attributions for success outcomes by high achievers was not found in the Wieggers and Frieze study (1977). In fact, Wieggers and Frieze found that females, both high- and low-performance achievers, made greater attributions to ability than to effort for success on a simulated academic task.

It is possible that the different attribution patterns found in the Wieggers and Frieze study is due to the younger age of the female subjects (i.e., high school students).

The conclusion of the present study that college female high achievers make greater attributions to effort than to ability for their success outcomes while low achievers do not differ in their effort and ability attributions might

be explained by the fact that in academic situations high achievers may perceive their ability to be relatively constant. Consequently the cause of their success versus failure is principally due to the amount of effort expended.

This interpretation appears logical when one considers that in this study the women, who were classified as high and low achievers by a mean split of their GPAs, had been found not to differ significantly in their verbal intelligence. Therefore the principal distinction between these high- and low-GPA women would most likely be in effort expended and not in ability. It follows that women with high GPAs would make greater utilization of the effort attribution than the ability attribution to explain their success outcomes.

In the present study it had been hypothesized that sex-role interpretation was an important variable in differentiating women's attribution patterns for academic achievement. The results, however, indicate that androgynous women differ from stereotypic women only in their attributing of academic success to ability to a greater extent than stereotypic women.

This relative lack of difference between androgynous and stereotypic women may be partially due to the utilization of the BSRI as a means of categorizing the college females as androgynous or stereotypic. The BSRI is considered to be a general measure of sex-role interpretation and is not a specific measure of the acceptance of academic achievement as being sex-role appropriate. Only a very few of the feminine and masculine items in the BSRI refer even indirectly



to academic achievement (e.g., competitive, ambitious). The fact that sex-role interpretation and achievement level were found to be relatively independent in the present study suggests that sex-role interpretation as measured by the BSRI is not highly predictive of a female's attitudes towards academic achievement. Due to the complexity of female achievement behavior, a measure which relates specifically to females' attitudes toward academic achievement, rather than a general sex-role measure such as the BSRI, would be recommended.

Furthermore, the predictive ability of the BSRI is limited by the fact that it only yields broad typologies. In the present study where only androgynous and stereotypic feminine college females were utilized, both types of females were above the feminine median and only differed in whether their masculine score was above or below the masculine median. Thus only minimal differences affected their classification as androgynous or stereotypic.

Kelly and Worell (1977) have suggested that typologies are useful predominantly for gross validation purposes and that the predictability of sex-role orientation scales would be improved if a score could be determined rather than just a broad classification. Furthermore, Orlofsky, Aslin and Ginsburg (1977) have demonstrated that when a difference/median split procedure is used the BSRI is more predictive of females' sex-role ideology than when a median split procedure is used; as was used in the present study.

In addition the lack of difference between androgynous

and stereotypic women, except on the ability attribution, may be explicable on the ground that women no longer view female academic achievement in a negative manner (Chobot, Goldberg, Abramson & Abramson, 1974; Hough & Allen, 1975; Pheterson, Kiesler & Goldberg, 1971) as they have in the past (McClelland et al., 1953; Goldberg, 1968). Perhaps today females more generally accept academic achievement as being sex-role appropriate than they did at the time of the Broverman study (Broverman et al., 1972).

Although academic achievement may generally be viewed as an appropriate goal for women, it appears that acceptance of academic success as being due to one's own ability is dependent on the women's sex-role interpretation. It is possible that although stereotypic women have accepted academic achievement as sex-role appropriate they still have the tendency to be overly modest about their academic achievements. Frieze and her colleagues (Frieze et al., in press) have suggested that modesty may be a mediating factor affecting the attributions of some women. Moreover, Wieggers and Frieze (1977) found a greater utilization of ability attributions by nontraditional than traditional females and argued that only the traditional females demonstrate the low expectancy and attribution pattern put forward by Jackaway (1975). It is probable that the stereotypic women who are willing to accept responsibility for academic success have the tendency to attribute success largely to effort, which is a stereotypically acceptable

view of the cause of females' success. Stereotypic women appear to be unwilling to attribute their success outcomes to ability and instead disguise their ability and use effort attributions to explain their success. Hence, although academic achievement appears to have been accepted as sex-role appropriate by women, some women still have a fear of proclaiming their academic ability.

A principal hypothesis of the present study was that within-sex differences in women's attributions to ability and effort would be more predictable if achievement level and sex-role interpretation were both taken into consideration. Androgynous women high in achievement attributed their academic success more to ability than the other three groups, whereas the four groups of college women did not differ in their effort attributions. The results demonstrate that effort is an important attribution for all women in explaining academic success and is used to a similar degree by all four groups of women. Effort is an attribution which has generally been accepted by females as a cause of academic success. Females' socializers have predominantly used effort rather than ability attributions to explain young females' academic success (Parsons, Ruble, Hodges & Small, 1976). Consequently, only females who have experienced academic success in situations where they have not expended a large amount of effort would tend to utilize ability attributions. The presence of female models who attribute their own academic success to ability as well as

socializers who attribute the young females' academic success to ability would most likely be necessary in order for females to acquire the tendency to utilize ability attributions. It is possible that only the androgynous women high in achievement will have had the necessary experience, socializers, and female models needed to develop the use of the ability attribution, thus making it the principal attribution pattern which differentiates between college females. A worthwhile approach to the investigation of female achievement behavior would be to determine what variables distinguish females who are high attributors to ability for academic success from those who are low attributors to ability. Several variables which might be examined are the motive to avoid success, level of aspiration, choice of difficulty level of a task, and self-esteem.

Researchers have suggested that high expectations for success are associated with attributions to ability and with high performance. The results from the present study however, demonstrate that no difference occurs in performance on an experimental task and in actual college GPAs between women who attribute their success to ability and those who attribute to effort. There remains the possibility however that women who attribute academic success principally to task difficulty, luck, or mood might differ in their performance from women who attribute to ability or effort. This was not examined in the present study since only a few women (i.e.,  $n = 6$ ) used one of these three attributions as a prin-

cipal attribution.

The lack of a differential effect of the use of ability and effort attributions on college females' academic performance found in the present study may be partially due to a sampling bias. Females were obtained from psychology, sociology, and education courses and it is possible that in these predominantly content courses, college females' GPAs would not be differentially affected by the use of ability and effort attributions. Perhaps in more mathematically or scientifically orientated courses a greater appreciation of the importance of ability would be recognized. Similarly it is possible that an undergraduate education has become accepted as an education goal for many young adults and the importance of ability in academic outcomes at the undergraduate level is perhaps not as salient as one would have previously expected. It is suggested that the usage of ability or effort as principal attributions by women in master's and doctoral programs might have a differential effect on academic performance. The present study however, demonstrates that for undergraduate females, the use of ability and effort attributions do not differentially affect academic achievement.

The purpose of the research contained in this thesis was twofold. First, this study investigated within-sex differences in the utilization of attributions by college females. It was found that when achievement level and sex-role interpretation were considered, androgynous women high

in achievement made greater attributions to ability for academic work than the other three groups.

The second purpose of this study was to examine the relation between actual achievement behavior and women's attributions. Surprisingly, the two principal attributions of ability and effort were found not to be differentially related to college females' achievement performance.

The paucity of significant results in the present study, as well as previous ones, may have arisen from the methodologies used. Before any definitive conclusions may be made in this area of research, the methodological problems would need to be resolved, perhaps partially in the manner discussed earlier in this paper. There remains the possibility that females demonstrate achievement behavior for such a variety of reasons that achievement level and sex-role interpretation do not account for a sufficient amount of the variability in female attribution patterns. A longitudinal approach examining the expectancies, attributions, and achievement behavior of females during different stages in their education and career may yield a more comprehensive picture of the factors affecting female attribution patterns. In addition, further research is needed in order to determine whether the lack of differences associated with the use of ability and effort attributions, reported in the present study, extends to various achievement situations.

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## Appendix A

## Matching Data for the Four Groups of Women

## Frequencies and Means

Matching Criteria	Group Classification			
	High Achievement		Low Achievement	
	Androgynous <sup>a</sup>	Stereotypic <sup>b</sup>	Androgynous <sup>a</sup>	Stereotypic <sup>b</sup>
<b>Age</b>				
Up to 20	3	4	2	4
21-25	6	5	7	7
26-30	2	4	0	2
31 and up	4	4	6	2
<b>SES</b>				
Class 1	0	0	0	0
2	7	1	5	4
3	2	7	0	3
4	3	2	2	2
5	2	2	2	3
6	1	5	4	3
7	0	0	2	0
<b>Time of Classes</b>				
Day	9	9	7	11
Evening	6	8	8	4
<b>Classification</b>				
Full Time	7	11	7	11
Part Time	8	6	8	4
<b>Univ. Program</b>				
Honors	2	1	0	1
Majors	10	10	13	10
Other	3	6	2	4
<b>Student's Course</b>				
Psychology	11	9	9	9
Sociology	3	6	6	2
Education	1	2	0	4
<b>Mean Data</b>				
Intelligence	15.13	13.65	14.13	14.93

a  $\bar{n}$  = 15b  $\bar{n}$  = 17



## Appendix B

## Wide Range Vocabulary Test

## Vocabulary Test

Instructions: This test is a measure of students' vocabulary. You will be given approximately ten minutes to complete this test. Try and do your best while working at a steady pace.

- |                           |                                                  |
|---------------------------|--------------------------------------------------|
| Sample: A street is a     | field hill road stream path                      |
| 1. Spinal pertains to     | fish collarbone architecture<br>backbone disease |
| 2. To fidget is to        | scream squirm forget mend<br>rest                |
| 3. To recognize is to     | talk overlook know ignore<br>seem                |
| 4. Transact refers to     | business bridges streetcars<br>theaters churches |
| 5. To achieve is to       | deceive ravage acknowledge<br>pass accomplish    |
| 6. To rumple is to        | sit iron dance wrinkle ride                      |
| 7. To take is to          | send please carry lose give                      |
| 8. A zone is an           | acre estate era area anti-<br>septic             |
| 9. A far country is       | away near beautiful strange<br>rich              |
| 10. Rickets is a kind of  | medicine disease furniture<br>game food          |
| 11. Temperature refers to | electricity dampness pressure<br>heat sunshine   |
| 12. A couch is a          | cold porch bed chair lie                         |
| 13. A ladle is a          | star crib dipper canoe lady                      |
| 14. A seafarer is a       | captain ship bird reprobate<br>sailor            |

## Appendix B (continued)

- |                             |                                                      |
|-----------------------------|------------------------------------------------------|
| 15. To resume is to         | stop continue start consider<br>smoke                |
| 16. Unfruitful means        | unproductive frosted bitter<br>unfaithful green      |
| 17. To forewarn is to       | forearm forbear forget forgive<br>foretell           |
| 18. To whirl is to          | eat laugh buzz wiggle cut                            |
| 19. Immune means            | exposed vast diseased inundated<br>protected         |
| 20. To seclude is to        | travel suspect withdraw linger.<br>mistrust          |
| 21. Rations refer to        | food logic soldiers banks<br>countries               |
| 22. A coiffure is a         | negligee headdress drink<br>bracelet box             |
| 23. To be ruthless is to be | pitiful punishing competitive<br>pitiless aggressive |
| 24. A denial is a           | refusal proposal declamation<br>cock confirmation    |
| 25. A lathe is a kind of    | bath building onion machine<br>clock                 |
| 26. Straddle refers to      | babies fighting position money<br>leather            |
| 27. Inquisition means       | punishment war pogrom riot<br>investigation          |
| 28. To relapse is to        | climb recover backslide stop<br>bend                 |
| 29. A kingdom is a          | monastery country palace capi-<br>tol fish           |
| 30. To recruit is to        | discount retreat enlist march<br>fight               |
| 31. A leer is a kind of     | dance beckoning vegetable<br>payment look            |

## Appendix B (continued)

32. To make a pun is to laugh rhyme joke fasten kick-
33. To coil is to ravel strike wave pin wind
34. A calyx is a term in physics chemistry orthopedics  
botany agronomy
35. To rejuvenate is to young happy beautiful silly  
make blonde
36. To foil is to arrest prevent avoid flavor  
squeal
37. A clubfoot is a kind of gadder plant society deformity  
animal
38. A bilge belongs to a wheelbarrow automobile ship  
tree fish
39. A flagstone is used pole weapon sundial tracing  
as a pavement
40. To shroud is to bury shiver shape cover worry
41. To be lenient is to be heavy tolerant languorous  
lithe dependent
42. To rile is to laugh consider anger draw envy
43. To assent is to dissent climb trust fortify  
agree
44. A dilemma is a problem horn controversy di-  
gression contradiction
45. Infallible means religion error permission  
without science legality
46. A zigzag path is narrow rough up-and-down back-  
and-forth roundabout
47. Harum-scarum means ambiguous Mohammedan elfish  
flighty frightened
48. An azalea is a kind of moss fish insect flower chiffon
49. One may incur speed measles spinach people  
debt

## Appendix B (continued)

50. To administer is to squander manage substitute  
judge partake
51. To exemplify is to enlarge exonerate illustrate  
distrust placate
52. Manifold means many duplicate multiform few  
simple
53. To dupe is to poison dress deceive demolish  
clean
54. A chalice is a kind of plate collar cup knight quest
55. A sot is bald neat shiftless stubborn  
insane
56. To indict is to charge prosecute arrest acquit  
sentence
57. Presentiment means foreboding gift official  
emotion chastisement
- 58: Avidity means greediness dampness dryness  
hatred honesty
59. Adjutant means bookkeeper officer marine  
initiation society
60. Anterior refers to back side front right left

Appendix C

Biographical Questionnaire

General Information Questionnaire

1. Your age: 20 and under \_\_\_\_\_  
21 to 25 \_\_\_\_\_  
26 to 30 \_\_\_\_\_  
31 and over \_\_\_\_\_

2. Your sex: Male \_\_\_\_\_  
Female \_\_\_\_\_

3. Father's Occupation: \_\_\_\_\_  
(If father retired or deceased, what was his most recent occupation?)

Father's Education: \_\_\_\_\_

4. Mother's Occupation: \_\_\_\_\_  
Full Time \_\_\_\_\_ Part Time \_\_\_\_\_

Mother's Education: \_\_\_\_\_

5. Your Occupation: \_\_\_\_\_  
(Your most recent full-time occupation)

6. The University Program which you are presently following:  
Honors \_\_\_\_\_  
Major \_\_\_\_\_  
Minor \_\_\_\_\_  
Other \_\_\_\_\_  
(please specify)

7. Your G.P.A. last year: \_\_\_\_\_

If you do not know your G.P.A., state the letter grade you received in each of your courses last year. Include half courses.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_

8. Day Student: \_\_\_\_\_  
Evening Student: \_\_\_\_\_

9. Full Time: \_\_\_\_\_  
Part Time: \_\_\_\_\_

Appendix D  
The Bem Sex Role Inventory

Personality Scale

Instructions: On the following page you will be shown a large number of personality characteristics. We would like you to use these characteristics in order to describe yourself. That is, we would like you to indicate, on a scale from 1 to 7, how true of you these various characteristics are. In deciding how true of you these various characteristics are, we would like you to compare yourself to other university students of your age. Please do not leave any characteristics unmarked.

Example: sly

Mark a 1 if it is never or almost never true that you are sly.

Mark a 2 if it is usually not true that you are sly.

Mark a 3 if it is sometimes but infrequently true that you are sly.

Mark a 4 if it is occasionally true that you are sly.

Mark a 5 if it is often true that you are sly.

Mark a 6 if it is usually true that you are sly.

Mark a 7 if it is always or almost always true that you are sly.

Thus, if you feel it is sometimes but infrequently true that you are "sly", never or almost never true that you are "malicious", always or almost always true that you are "irresponsible", and often true that you are "carefree", then you would rate these characteristics as follows:

Sly                    3

Malicious            1

Irresponsible        7

Carefree             5

## Appendix D (continued)

## Describe Yourself

1	2	3	4	5	6	7
never or almost never true	usually not true	sometimes but infre- quently true	occasion- ally true	often true	usually true	always or almost always true
Self reliant _____		Reliable _____		Warm _____		
Yielding _____		Analytical _____		Solemn _____		
Helpful _____		Sympathetic _____		Willing to take a stand _____		
Defends own beliefs _____		Jealous _____		Tender _____		
Cheerful _____		Have leader- ship abili- ties _____		Friendly _____		
Moody _____		Sensitive to the needs of others _____		Aggressive _____		
Independent _____		Truthful _____		Gullible _____		
Shy _____		Willing to take risks _____		Inefficient _____		
Conscien- tious _____		Understanding _____		Act as a leader _____		
Athletic _____		Secretive _____		Childlike _____		
Affectionate _____		Make deci- sions easily _____		Adaptable _____		
Theatrical _____		Compassionate _____		Individualistic _____		
Assertive _____		Sincere _____		Do not use harsh language _____		
Flatterable _____		Self-suffi- cient _____		Unsystematic _____		
Happy _____		Eager to soothe hurt feelings _____		Competitive _____		
Strong personality _____		Conceited _____		Love children _____		
Loyal _____		Dominant _____		Tactful _____		
Unpredict- able _____		Soft-spoken _____		Ambitious _____		
Forceful _____		Likeable _____		Gentle _____		
Feminine _____		Masculine _____		Conventional _____		

Appendix E

Measure of Causal Attributions for Academic Work

Attitudes Toward Academic Work

Instructions: Please answer the following questions as best you can, even if you are not entirely sure of your response. Please be as honest as possible in your responses, since this is part of a larger study which will be used to help people develop better attitudes towards their academic work. The following questions are only for research purposes and your responses will not be seen by anyone except the researcher.

- (1) When you have personally perceived your academic work to be a success, how much do you think your ability has influenced the outcome?

Not at all 1 2 3 4 5 6 7 Very much

- (2) When you have personally perceived your academic work to be a success, how much do you think your mood has influenced the outcome?

Not at all 1 2 3 4 5 6 7 Very much

- (3) When you have personally perceived your academic work to be a success, how much do you think your degree of effort in studying has influenced the outcome?

Not at all 1 2 3 4 5 6 7 Very much

- (4) When you have personally perceived your academic work to be a success, how much do you think your luck has influenced the outcome?

Not at all 1 2 3 4 5 6 7 Very much

- (5) When you have personally perceived your academic work to be a success, how much do you think the difficulty level of the work has influenced the outcome?

Not at all 1 2 3 4 5 6 7 Very much



## Appendix E (continued)

- (6) When you have personally perceived your academic work to be a failure, how much do you think your ability has influenced the outcome?

Not at all Very much  
 1            2            3            4            5            6            7

- (7) When you have personally perceived your academic work to be a failure, how much do you think your mood has influenced the outcome?

Not at all Very much  
 1            2            3            4            5            6            7

- (8) When you have personally perceived your academic work to be a failure, how much do you think your effort in studying has influenced the outcome?

Not at all Very much  
 1            2            3            4            5            6            7

- (9) When you have personally perceived your academic work to be a failure, how much do you think your luck has influenced the outcome?

Not at all Very much  
 1            2            3            4            5            6            7

- (10) When you have personally perceived your academic work to be a failure, how much do you think the difficulty level of the work has influenced the outcome?

Not at all Very much  
 1            2            3            4            5            6            7

- (11) How much do you think each of the following five factors will influence your overall grade for the 1977-78 academic year? Assign percentage values to each of the five factors such that the total percentage equals 100 percent.

Your degree of effort in studying	_____ %
Your mood during the tests	_____ %
The difficulty level of the work	_____ %
Your luck on the tests	_____ %
Your ability level for the work	_____ %
	100 %

## Appendix F

## Measure of Causal Attributions

## for the Experimental Task

## Attitudes Towards the Creativity Index

- (1) Do you personally consider your performance on the Creativity Index a success or failure?

success \_\_\_\_\_  
failure \_\_\_\_\_

- (2) If you consider your performance on the Creativity Index a success, is it

Very successful							Barely successful
7	6	5	4	3	2	1	

OR

- If you consider your performance on the Creativity Index a failure, is it

Very much a failure							Barely a failure
7	6	5	4	3	2	1	

- (3) How much do you think the effort you made during the Creativity Index influenced your performance on the Creativity Index?

Not at all							Very much
1	2	3	4	5	6	7	

- (4) How much do you think your mood while taking the Creativity Index influenced your performance on the Creativity Index?

Not at all							Very much
1	2	3	4	5	6	7	

- (5) How much do you think your ability influenced your performance on the Creativity Index?

Not at all							Very much
1	2	3	4	5	6	7	

## Appendix F (continued)

- (6) How much do you think your luck influenced your performance on the Creativity Index?

Not at all Very much  
 1            2            3            4            5            6            7

- (7) How much do you think the difficulty level of the Creativity Index influenced your performance on the Creativity Index?

Not at all Very much  
 1            2            3            4            5            6            7

- (8) How much do you think each of the following five factors influenced your performance on the Creativity Index? Assign percentage values to each of the following factors such that the total percentage equals 100 percent.

Your degree of effort \_\_\_\_\_ %

Your mood during the Creativity Index \_\_\_\_\_ %

The difficulty level of the Creativity Index \_\_\_\_\_ %

Your ability level \_\_\_\_\_ %

Your luck on the Creativity Index \_\_\_\_\_ %

100 %

## Appendix G

## Generation Anagram Task

## Creativity Index

Instructions: This test is a measure of creative ability. Your task will be to make as many words as possible using the letters of a master word which will be presented to you.

For example: If the master word was UNIVERSITY, possible smaller words would be: VISIT, YES, IT, SIT, SENT and so on. The word NEVER would not be acceptable since there is only one "E" in the master word.

At the end of each minute, I will say "CHECK" and you are to put a check mark after the last word you have written: Indicate the last word completed at the time I say check and then GO ON WORKING.

Do not start until told to do so.

## Appendix G (continued)

G E N E R A T I O N

1.	31.
2.	32.
3.	33.
4.	34.
5.	35.
6.	36.
7.	37.
8.	38.
9.	39.
10.	40.
11.	41.
12.	42.
13.	43.
14.	44.
15.	45.
16.	46.
17.	47.
18.	48.
19.	49.
20.	50.
21.	51.
22.	52.
23.	53.
24.	54.
25.	55.
26.	56.
27.	57.
28.	58.
29.	59.
30.	60.

## Appendix H

## Post-Experiment Questionnaire

- (1) How frequently do you do tasks which are similar to the Creativity Index? Tasks which are considered to be similar are cross-word puzzles, anagrams and Scrabble.

every day      once a week      once a month      once a year

- (2) To what extent do you think the Creativity Index is more appropriate for males or females?

More appropriate for males	2	3	4	5	6	7	More appropriate for females
----------------------------------	---	---	---	---	---	---	------------------------------------

- (3) To what extent do you think males and females tend to perform differentially on the Creativity Index?

Males much better than females	1	2	3	4	5	6	7	Females much better than males
--------------------------------------	---	---	---	---	---	---	---	--------------------------------------

- (4) Have you received any previous information concerning this research study?

Yes \_\_\_\_\_ No \_\_\_\_\_

- (5) Please indicate below what you think this research is about.

## Appendix H (continued)

(6) Do you think this research study is related to any other research which has been conducted at this university?

Yes \_\_\_\_\_

No \_\_\_\_\_

(7) If yes, please specify what other research you think this study is related to and in what way.

(8) If yes, do you think your above impression has affected your answers in any way?

Yes \_\_\_\_\_

No \_\_\_\_\_

If yes, please specify how you think your answers have been affected and why.

## Appendix I

Correlation Coefficients of the Five Dependent Variables  
for Academic and Experimental Task Success

Dependent Variables	Dependent Variables				
	Ability	Effort	Task	Luck	Mood
Academic Success					
Ability	-	-	-	-	-
Effort	.41**	-	-	-	-
Task	.36**	.06	-	-	-
Luck	-.12	-.25	-.10	-	-
Mood	.20	.31*	.02	.14	-
Experimental Task Success					
Ability	-	-	-	-	-
Effort	.41**	-	-	-	-
Task	.36**	.28*	-	-	-
Luck	.14	.19	.19	-	-
Mood	.29*	.20	-.14	-.07	-

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



## Appendix J

The Number of Women who Utilized a Principal Attribution to Explain Academic and Experimental Task Success

Principal Attribution	For Success On	
	Academic Work	Experimental Task
Ability	12	12
Effort	47	13
Task	1	3
Luck	0	0
Mood	0	2

## Appendix K

## Raw Data for Androgynous High Achievers

Subj	GPA	BSRI		Academic Work					Experimental Task				
		Fem	Masc	Abil	Eff	Task	Luck	Mood	Abil	Eff	Task	Luck	Mood
1	2.90	5.54	4.88	6	5	5	4	2	4	4	3	2	5
2	3.29	6.31	6.31	6	7	6	6	7	5	5	4	1	5
3	3.20	5.99	5.56	7	7	6	1	4	5	5	4	1	5
4	3.67	5.77	5.50	7	7	5	2	3	2	6	3	2	2
5	3.50	6.77	6.56	7	5	7	2	2	1	4	1	1	7
6	3.50	5.69	5.44	5	5	6	4	5	5	5	3	3	7
7	3.00	5.54	5.44	7	7	4	2	6	3	7	2	3	6
8	3.05	6.69	5.38	6	7	5	2	2	6	6	6	3	6
9	2.80	6.69	5.50	7	6	6	3	7	5	4	3	4	5
10	3.25	5.23	6.38	7	7	7	1	1	7	5	4	1	5
11	3.40	6.23	5.25	7	7	4	1	7	1	4	4	4	7
12	3.00	5.50	5.56	6	6	5	1	2	4	7	3	1	2
13	3.25	6.08	5.81	6	5	3	5	4	7	6	7	3	2
14	3.08	6.15	5.98	7	7	6	2	7	4	6	2	3	5
15	2.90	5.77	4.88	7	7	5	4	7	5	5	4	3	5

## Appendix L

## Raw Data for Stereotypic High Achievers

Subj	GPA	BSRI		Academic Work				Experimental Task					
		Fem	Masc	Abil	Eff	Task	Luck	Mood	Abil	Eff	Task	Luck	Mood
1	3.50	5.77	4.69	6	5	4	3	4	5	4	3	4	3
2	3.00	6.23	3.75	6	7	5	2	3	5	3	3	1	6
3	3.00	5.69	3.94	6	7	5	2	6	5	5	5	4	6
4	2.80	6.31	4.38	6	6	7	2	6	7	7	2	1	7
5	3.38	6.08	4.19	5	7	6	2	5	2	6	3	1	4
6	2.78	5.92	4.42	5	6	5	2	3	4	4	4	1	5
7	3.00	6.08	4.50	7	5	6	1	5	6	7	6	5	4
8	3.50	5.77	4.44	6	6	6	3	7	5	5	1	3	7
9	3.30	6.38	4.63	4	7	2	2	6	5	6	1	2	6
10	3.36	5.85	4.63	6	7	7	2	6	6	7	5	4	4
11	3.00	5.89	4.08	5	6	4	1	5	2	3	2	1	3
12	3.00	5.69	4.00	5	5	4	2	5	4	5	3	2	4
13	3.50	5.77	3.94	7	6	5	6	6	3	6	2	2	7
14	3.00	5.85	3.56	6	5	7	2	3	4	5	3	3	7
15	3.67	6.46	4.50	4	4	4	4	1	7	7	1	1	7
16	3.00	5.69	4.81	7	7	7	5	6	2	4	2	1	5
17	3.80	6.15	4.63	6	7	6	1	5	6	4	5	2	3

## Appendix M

## Raw Data for Androgynous Low Achievers

Subj	GPA	BSRI		Academic Work					Experimental Task				
		Fem	Masc	Abil	Eff	Task	Luck	Mood	Abil	Eff	Task	Luck	Mood
1	2.00	5.62	5.69	6	6	5	1	6	7	7	3	1	7
2	1.50	5.70	5.06	6	7	7	1	7	1	1	1	1	1
3	2.00	6.69	5.63	7	7	7	1	1	7	7	1	1	1
4	2.70	5.54	5.13	6	6	4	3	6	6	6	4	2	6
5	1.26	6.00	5.06	7	7	4	3	4	4	5	1	1	5
6	2.40	5.92	4.88	7	6	4	3	6	4	6	4	3	6
7	2.15	5.62	6.31	4	4	5	4	5	3	2	3	3	3
8	2.40	5.46	5.00	5	6	5	7	5	5	4	1	1	7
9	2.50	6.08	5.81	7	7	4	1	7	5	4	2	2	4
10	2.40	6.85	6.43	7	7	6	5	6	3	4	2	2	3
11	2.40	6.85	5.19	5	5	6	5	7	5	6	4	1	4
12	1.75	6.23	5.81	7	7	4	4	7	5	5	1	4	2
13	2.13	5.62	5.81	4	7	4	1	6	3	6	5	1	6
14	2.50	5.62	5.44	6	6	6	1	6	5	5	2	3	5
15	2.00	5.23	5.31	5	7	3	3	4	5	4	1	1	7

## Appendix N

## Raw Data for Stereotypic Low Achievers

Subj	GPA	BSRI		Academic Work				Experimental Task					
		Fem	Masc	Abil	Eff	Task	Luck	Mood	Abil	Eff	Task	Luck	Mood
1	2.23	5.85	4.38	4	4	5	3	4	5	4	3	1	5
2	2.02	5.62	4.50	6	5	4	3	4	4	2	4	3	2
3	2.00	6.39	3.63	5	7	4	2	5	4	5	2	3	4
4	2.00	5.99	4.56	7	6	6	3	3	7	6	5	1	2
5	2.00	6.23	3.94	6	7	5	5	7	6	5	7	2	6
6	2.00	6.31	4.69	6	6	5	2	3	3	4	1	1	3
7	2.60	6.69	4.81	7	7	7	1	7	7	7	1	1	7
8	2.00	6.23	4.56	7	7	7	2	7	6	6	5	1	4
9	2.20	6.31	4.00	6	5	7	2	6	6	5	5	1	5
10	2.50	6.23	4.19	6	7	5	2	5	4	6	4	1	2
11	2.00	5.62	4.00	6	7	5	1	6	5	6	4	1	6
12	2.20	6.31	3.13	6	7	5	4	6	3	3	3	2	1
13	2.40	5.15	2.88	5	5	6	3	3	3	6	3	2	5
14	2.70	6.46	4.06	6	5	4	3	6	5	3	3	2	5
15	2.50	6.69	4.00	6	6	6	4	6	6	5	3	1	4

Appendix O  
 Performance on the Generation Anagram Task  
 of Subjects whose Principal Attribution  
 for Academic Success was Ability

Subject	Interval				
	First	Second	Third	Fourth	Fifth
1	16	7	9	12	2
2	6	3	11	5	3
3	11	9	5	6	9
4	16	7	5	5	4
5	12	4	6	10	2
6	17	10	7	5	6
7	23	7	6	9	4
8	13	7	6	5	1
9	15	9	7	5	6
10	23	11	6	6	7
11	30	10	8	9	3
12	14	7	5	4	3

## Appendix P

Performance on the Generation Anagram Task  
of Subjects whose Principal Attribution  
for Academic Success was Effort

Subject	Interval				
	First	Second	Third	Fourth	Fifth
1	16	2	3	6	4
2	13	6	11	7	5
3	17	14	4	3	10
4	8	9	7	3	6
5	17	8	4	7	6
6	3	4	7	3	5
7	8	4	5	4	0
8	22	6	10	3	0
9	14	5	3	3	1
10	34	12	13	9	7
11	38	18	12	8	5
12	5	10	3	2	3
13	6	9	8	9	1
14	5	13	4	7	5
15	16	10	13	7	4
16	5	6	7	5	3
17	7	4	2	4	1
18	8	6	3	3	2
19	4	3	3	3	4
20	19	10	5	4	3
21	4	4	6	3	2
22	22	9	10	7	3
23	10	13	9	5	7
24	7	12	5	8	5

## Appendix P (continued)

Subject	Interval				
	First	Second	Third	Fourth	Fifth
25	14	9	7	3	7
26	10	9	3	4	3
27	9	9	6	5	5
28	9	17	5	9	3
29	23	9	5	7	6
30	14	8	7	8	2
31	29	11	7	10	7
32	15	16	6	10	6
33	16	9	7	3	8
34	10	11	7	5	3
35	8	4	7	6	7
36	12	13	8	9	4
37	11	10	10	4	2
38	15	9	5	7	4
39	7	15	5	7	7
40	8	5	6	5	6
41	20	6	9	7	8
42	12	6	4	1	5
43	14	7	5	7	3
44	10	10	8	7	9
45	29	7	8	6	3
46	8	4	8	2	4
47	15	10	7	6	4



Appendix Q  
Performance on the Generation Anagram Task  
of Subjects whose Principal Attribution  
for Task Success was Ability

Subject	Interval				
	First	Second	Third	Fourth	Fifth
1	16	7	9	12	2
2	16	7	5	5	4
3	6	9	8	9	1
4	12	4	6	10	2
5	8	6	3	3	2
6	8	5	2	4	3
7	13	7	6	5	1
8	21	8	4	6	5
9	10	9	3	4	3
10	29	11	7	10	7
11	15	16	6	10	6
12	30	10	8	9	3

Appendix R  
 Performance on the Generation Anagram Task  
 of Subjects whose Principal Attribution  
 for Task Success was Effort

Subject	Interval				
	First	Second	Third	Fourth	Fifth
1	19	8	7	5	4
2	17	14	4	3	10
3	17	10	7	9	4
4	17	8	4	7	6
5	11	9	5	6	9
6	14	5	3	3	1
7	15	10	3	2	3
8	8	6	4	4	6
9	9	9	6	5	5
10	18	9	9	12	5
11	14	7	5	7	3
12	10	10	8	7	9
13	8	4	8	2	4