<table>
<thead>
<tr>
<th>Components</th>
<th>Specific information to identify</th>
<th>Evaluative comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background &amp;</td>
<td>Comments</td>
<td>(+) Researchers cite a wide range of relevant and current literature pertaining to</td>
</tr>
<tr>
<td>Motivation</td>
<td></td>
<td>women and leadership roles.</td>
</tr>
<tr>
<td>Comments?</td>
<td>Just make a couple of strengths</td>
<td>(+) Researchers clearly connected their study with prior research (Kreuzer, 1992).</td>
</tr>
<tr>
<td></td>
<td>and weaknesses comments…no need</td>
<td>(+) Establishes need for further research in determining the psychological factors</td>
</tr>
<tr>
<td></td>
<td>to spend a lot of time on</td>
<td>that contribute to women’s leadership aspirations.</td>
</tr>
<tr>
<td></td>
<td>analysis of this section for this</td>
<td>(-) Researchers claim that a woman’s leadership aspirations before they enter the</td>
</tr>
<tr>
<td></td>
<td>paper (you’ve done that for</td>
<td>work world is directly related to their performance in the work world, without</td>
</tr>
<tr>
<td></td>
<td>two already)...but you will</td>
<td>providing supporting research or further exploring the claim.</td>
</tr>
<tr>
<td></td>
<td>need to read it so you</td>
<td>(-) Researchers don’t cite any literature about post-boomer generational</td>
</tr>
<tr>
<td></td>
<td>understand what is going on.</td>
<td>differences in exposure to leadership styles.</td>
</tr>
<tr>
<td>Research Problem/</td>
<td>Purpose (Stated)</td>
<td>“… to enrich the literature on predictors of women’s leadership aspirations by</td>
</tr>
<tr>
<td>Purpose of Study/</td>
<td></td>
<td>determining whether our other explanatory variables constitute more influential</td>
</tr>
<tr>
<td>Research</td>
<td>Research Questions (Inferred from Hypotheses)</td>
<td>factors in the development of women’s leadership aspirations than gender role.”</td>
</tr>
<tr>
<td>Question(s)/</td>
<td>Hypotheses? Stated or implied?</td>
<td>• “What factors contribute to women’s leadership aspirations?”</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>If not directly stated, but</td>
<td>• Do Connectedness Needs, Self-esteem, and Fears of Negative Evaluation account for</td>
</tr>
<tr>
<td></td>
<td>implied what do you think</td>
<td>a significant amount of the variance in Leadership Aspirations above and beyond that</td>
</tr>
<tr>
<td></td>
<td>it is/they are?</td>
<td>of Gender Role Orientation (Femininity)?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do Femininity and Fears of Negative Evaluation correlate negatively with Leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aspiration?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Do Connectedness Needs and Self-esteem correlate positively with Leadership</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aspiration?</td>
</tr>
<tr>
<td>Hypotheses (Stated)</td>
<td>These hypotheses were stated twice; they were addressed in conjunction with the</td>
<td>These hypotheses were stated twice; they were addressed in conjunction with the</td>
</tr>
<tr>
<td></td>
<td>literature review, and stated</td>
<td>literature review, and stated again explicitly right before the Method section.</td>
</tr>
<tr>
<td></td>
<td>again explicitly right before</td>
<td>• Femininity &amp; Leadership Aspirations</td>
</tr>
<tr>
<td></td>
<td>the Method section.</td>
<td>• Inverse (negative) correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Femininity will account for a significant amount of variance in predicting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leadership Aspirations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Connectedness Needs &amp; Leadership Aspirations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Positive correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Connectedness Needs will account for a significant amount of variance in predicting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leadership Aspirations above and beyond gender role orientation (femininity)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Self-esteem &amp; Leadership Aspirations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Positive correlation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Self-esteem will account for a significant amount of variance in predicting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leadership Aspirations above and beyond gender role orientation (femininity) and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connectedness Needs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fears of Negative Evaluation + Leadership Aspirations</td>
</tr>
</tbody>
</table>
- Inverse (negative) correlation
- Fears of Negative Evaluation will account for a significant amount of variance in predicting Leadership Aspirations above and beyond gender role orientation (femininity) and Connectedness Needs, and Self-esteem

- Age and Education Level
  - Age: No significant correlation with Leadership Aspirations
  - Age and Education Level will not account for a significant amount of the variance in Leadership Aspirations when the other variables are controlled for.

**Comments**
(+): Research purpose and research hypotheses clearly stated.
(-): Research questions not clearly stated.
(+/-): Null hypotheses for the various statistical tests not clearly stated, but they are easily inferred as a matter of convention (see references to null and alternative hypotheses below).
(-): Researchers did not report results for the correlation between Education Level and Leadership Aspirations as was indicated in the *Data Analysis* section.
### Research Design

- **What is the general research design type** (pre-experimental, experimental, quasi-experimental, ex-post facto)
- **What is the specific research design type within the general design type** (based on the X’s and O’s terminology)

**What are the measures/variables that represent your X’s and O’s?**

---

#### Control Variables
- Gender is a control variable in this study, as all participants are female.

#### Potential Threats to IV? (associated with this kind of design)
- We cannot apply standard tactics for counteracting threats to Internal Validity to this type of study: control group, random assignment, pre-tests.

---

### Sample

- **Kind of sample: How was the sample chosen?**
- **Sample size?**
- **Through what statistics was it described?**
- **Population of interest?**
- **Comments?**

**Potential Threats to IV/EV?**

---

### Sample Type

- **Volunteer:** Students were persuaded to participate in the study with extra-credit points, but turning in the survey was still optional.
- **Non-probability:** The researchers indicated that they solicited student participation from “across several disciplines,” but not all.
- **Convenience:** All students who turned in complete surveys were included in the sample, no screening criteria were set up by the researchers.

**Sample Description**
- **213 of 256 total students turned in complete surveys, and were therefore included in the sample.**
- **Researchers gave us data on a large range of demographic characteristics (age, race, education level, major).**
- **Researchers achieved a relatively high response rate for the surveys (83%).**
- **They told us that the students were incented to participate with extra credit, which shows an effort on the part of the researchers to mitigate the risk of a poor response rate.**
- **(+-) Researchers gave us some examples of the classes in which the survey was distributed, but didn’t identify all of them.**
- **(-) Didn’t tell us how many total female students at the university, or if there was a group from which the 256 students were selected from.**
- **(-) Not everyone reported her Major (94%) or her SES (not even enough to report on).**
- **(-) Additional demographic variables would have been interesting to capture, such as current and past levels involvement in leadership activities (as in extra-curricular activities), or employment status and**

---

### Research Design

- **Ex-Post Facto Design**
- **Correlational (Simple Predictive?)**

**Independent and Dependent Variables**

In a strictly correlational design, the order of the variables does not matter. But because the researchers are also interested on how a number of variables explain another, we will identify the former as independent variables, and the latter as the dependent variable.

<table>
<thead>
<tr>
<th>Ox</th>
<th>Oy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feminine Gender Role</td>
<td>Leadership Aspirations</td>
</tr>
<tr>
<td>Connectedness</td>
<td>Leadership Aspirations</td>
</tr>
<tr>
<td>Fear of Negative Evaluation</td>
<td>Leadership Aspirations</td>
</tr>
<tr>
<td>Self-Esteem</td>
<td>Leadership Aspirations</td>
</tr>
<tr>
<td>Age</td>
<td>Leadership Aspirations</td>
</tr>
<tr>
<td>Education Level</td>
<td>Leadership Aspirations</td>
</tr>
</tbody>
</table>
work history, which could have impacted Leadership Aspirations.  

Population of Interest  
- Because this was not a random sample, the population in question is abstract.  
- We can only make inferences to a population that contains students like the ones included in this sample (see Threats to Internal Validity).
(-) It would have been good to know the % of college students that were female at this particular university to better understand the landscape.  
(-) Some %s about the other demographic variables looked at in this study (age, race, etc.) in the university at large would have been helpful in understanding the context of the sample. 

Threats to Internal Validity  
- Not a random sample.  

Threats to External Validity  
- Cannot generalize past one like the students in this sample.  
- The sample is predominantly “European American” (94%) thus threatening generalization to the greater female college student population in the U.S.  

Comments  
(-) Researchers could have investigated why there was not a 100% return rate. There may have been a systematic reason why some students didn’t return their surveys. 
(-) Researchers could have investigated why a large amount of students did not report SES data.

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Comments</th>
</tr>
</thead>
</table>
|            | (+) They let us know that the students received extra-credit and a candy bar for participation.  
|            | (+) Let us know how the surveys were delivered (one or two researchers), and how they were returned (participants dropped them off at a designated location).  
|            | (-) Since the students returned the surveys at their convenience, the potential for cross-talk among participants or influence from non-participants is increased.  
|            | (-) There was not a controlled time limit for the surveys, which could have had an effect on the students’ responses.  
|            | (-) Researchers do not tell us the specific classes the participants were chosen from.  

Threats to Internal Validity  
- Because students were given incentives, we might question their motives in participating.  
- Because the surveys were not necessarily completed in a controlled environment, we may question whether the subjects’ responses were influenced by outside sources.  

Threats to External Validity  
- Research only done at one mid-western university, so the sample might not be reflective of the wider female college student population.

<table>
<thead>
<tr>
<th>Instruments/Measures/Variables</th>
<th>Comment on description of Scales</th>
</tr>
</thead>
</table>
| Demographic Questionnaire | 13-item questionnaire covered basic information: age, sex (?), race/ethnicity, college major, SES, etc.  
| (-) Why would they capture sex in a study of women’s leadership aspirations? (Small ding, maybe just an oversight on their part). |
(and if relevant, sub-scales)

For this paper for each instrument just need to comment on whether they have given you sufficient information to be able to understand and interpret the results. Tell us on what basis you are making your assessment.

Make some general comments about the quality of the instruments i.e. with respect to reliability and validity

Potential Threats to IV/EV?

(+/-) Glad the researchers told us that they had a low response on the SES data, but they did not investigate why that might have been the case.

All Following Scales:
(+/-) Gave us authors and citations. 
(+/-) Gave us number of items for each instrument.
(+/-) Gave us the scale of measurement.
(-) No reliability or validity information for this particular study/sample.

Career Aspiration Scale (CAS: O’Brien et al., 1996)
(+/-) Gave us example questions to examine content validity.
(+/-) Test-retest reliability (.82) coefficient from past experiments high enough for research purposes.
(-) Researchers reported a “Internal validity” coefficient with the value of (.79). To the best of my knowledge, there is no such thing, and this is probably an internal consistency reliability coefficient.
(+/-) Gave us possible range (0-24).

Bem Sex Role Inventory (BSMI: Bem, 1974, 1981)
(-) Did not give us example questions to allow us to examine content validity.
(+/-) Internal reliability (.78) and test-retest reliability (.90) coefficients from past experiments high enough for research purposes.
(-) Told us that the score were standardized, but did not tell us how, or provide us with the possible range.

Connectedness Scale (CS: Welch, 1997)
(+/-) Gave us example questions to examine content validity.
(+/-) Construct Validity: strong negative correlations with measure of self-criticism, depression and neediness, strong positive correlations with empathy, intimacy, and expressiveness.
(+/-) Gave us possible range (0-200).
(+/-) Internal consistency reliability: (Crombach’s) alpha coefficients of .95 and .94.
(-) No test-retest reliability coefficients reported.

Rosenberg’s Self-Esteem Scale (Rosenberg, 1965)
(+/-) Gave us example questions to examine content validity.
(+/-) Internal consistency reliability (.77) and test-retest reliability (.85) coefficients from past experiments high enough for research purposes.
(-) Did not give us possible range.

(+/-) Gave us example questions to examine content validity.
(+/-) Internal reliability (.92) and test-retest reliability (.94) coefficients from past experiments high enough for research purposes.
(+/-) Clarified meaning of high score (subject worries more about negative evaluation).
(+/-) Gave us possible range (0-120).

Threats to Internal Validity
• Not a lot of validity information provided for each instrument, except for perhaps the Connectedness Scale. If the instruments aren’t measuring accurately, then we have to question the results.

Threats to External Validity
• We need to ask if there are any biases in the instruments. Perhaps stereotypical feminine vs. masculine traits differ across cultures? Could be a threat if trying to generalize past American students.
Results: Descriptive Statistics
(Given in Table 1)

- What do you see and what can you say from the results given in Table 1?
- What do you think about the Table?

<table>
<thead>
<tr>
<th>Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership Aspirations: 16.64 on a scale of 0-24. These students overall fall toward the high end of the scale.</td>
</tr>
<tr>
<td>Feminine Gender Role: 52.05. Although we know that the raw score range can fall from 20-140, the researchers indicate that these scores are converted to standard scores, but do not indicate the formula for the transformation. Without knowing the standard score range, we cannot make a good assessment here.</td>
</tr>
<tr>
<td>Connectedness Needs: 148.87 on a scale of 0-200. These students overall fall toward the high end of the scale.</td>
</tr>
<tr>
<td>Self-Esteem: 30.86. We can guess that the potential range for these scores is 0-40, or maybe 5-50, although it could be something else. Since we can’t know for sure, we cannot make a good assessment here.</td>
</tr>
<tr>
<td>Fear of Negative Evaluation: 35.68 on a scale of 1-120. Overall these students fall on the low end of this scale.</td>
</tr>
</tbody>
</table>

Distribution
Using the formula of mean ± 3SDs, we will try to make an estimation of the distribution of the scores.

- Leadership Aspirations: Skewed
- Feminine Gender Role: We cannot assess (not knowing the potential range)
- Connectedness Needs: Appears normal
- Fear of Negative Evaluation: Appears normal
- Self-Esteem: We cannot assess (not knowing the potential range)

Comments
(+): The table is clearly labeled, and the researchers distinguish here between the dependent variable and the “predictor,” or independent variables.
(-): Could have given us the actual score range, and the medians and modes to help us assess normality and direction of skewness.

Results: Correlation
(Given in Table 2)

(You are welcome to go beyond the information/questions we request/ask here to show us what you really understand)

- What kind of correlation coefficients do you think these are? Was this the appropriate statistical procedure to use for assessing bi-variate relationships among the variables?
- Pick out an

<table>
<thead>
<tr>
<th>Type of Correlation Coefficients</th>
</tr>
</thead>
</table>
| (-): Unfortunately, we cannot determine the correlation procedure used here! The researchers don’t make reference to it in the text or the table, and we don’t have a reference to a variable in the table (eg. “r”) to try to infer it. The best guess is that these are Pearson product-moment correlation coefficients:
- Variables: because this is the appropriate procedure to use with two continuous variables like the ones we have here.
- Sample Size: the sample size is above 30, making it appropriate for r.
- Independence:
- Normality:
But we can’t know for sure. |

Significant Correlation Coefficient
- Fears of Negative Evaluation & Feminine Gender Role: correlation coefficient (r? See above.) = .32, p < .01.
- Null Hypothesis - H₀: ρₓᵧ = 0.00
- Alternative Hypothesis - H₁: ρₓᵧ ≠ 0.00
- We reject the null hypothesis that there is no correlation between Fear of Negative Evaluation and Feminine Gender Role because the p value is less than our alpha value (α = .05). This means that it is very unlikely that our sample comes from a population where there is no correlation between these two variables.
interesting significant correlation coefficient.  
--Describe the correlation coefficient.  
--State the null hypothesis.  
--State the alternative hypothesis.  
--What is the decision?  On what basis are you making the decision?.  
--What is the substantive conclusion about the correlation?  And what does the correlation tell you (hint: lo-lo/hi-hi)  

Pick out a non significant correlation coefficient.  And do the same as above.  

How do the data in Table 2 inform the research questions?  

• There is a moderate positive correlation between Fear of Negative Evaluation and Feminine Gender Role.  
• If a woman’s Fear of Negative Evaluation is low, her Feminine Gender Role is low. If a woman’s Fear of Negative Evaluation is high, her Feminine Gender Role is high.  

Non-significant Correlation Coefficient  
• Fears of Negative Evaluation & Leadership Aspirations:  
  correlation coefficient ($r$) = .09  
• Null Hypothesis - $H_0$: $\rho_{xy} = 0.00$  
• Alternative Hypothesis - $H_A$: $\rho_{xy} \neq 0.00$  
• We fail to reject the null hypothesis that there is no correlation between Fear of Negative Evaluation and Leadership Aspirations because the $p$ value is not less than our alpha value ($\alpha = .05$). This means that it is sufficiently likely that our sample can come from a population where there is no correlation between these two variables.  
• There is a very weak (not statistically significant) positive correlation between Fear of Negative Evaluation and Leadership Aspirations.  
• If a woman’s Fear of Negative Evaluation is low, her Leadership Aspirations are low. If a woman’s Fear of Negative Evaluation is high, her Leadership Aspirations are high. But this relationship is so weak that we actually have to say that there is no correlation between Fear of Negative Evaluation and Leadership Aspirations.  

Conclusions  
• There was in fact a moderately negative correlation (.21, significant at $p < .01$) between Feminine Gender Role & Leadership Aspirations, although I wouldn’t categorize it as strong as per the research hypothesis.  
• Unfortunately, there was not a negative correlation between Fears of Negative Evaluation & Leadership Aspiration as proposed by the research questions, and the small correlation found was not statistically significant.  
• A moderate positive correlation was found between Connectedness & Leadership Aspirations (.19, $p < .01$) and between Self-Esteem & Leadership Aspirations (.15, $p < .05$). The researchers hypothesized that these would be strong correlations.  

Other Comments  
(-) It would have been useful if the researchers indicated that they had checked the scatter diagram for outliers, and to verify that there was in fact a linear relationship for each pair of variables, as they might have affected the outcomes.  
(-) For this large number of correlations, the researchers could have made an effort to reduce Type I error risk by performing a Bonferroni-type adjustment to determine a value for $\alpha$ (alpha). This would have set “the fence” lower than the .05 value shown in the table.
(-) What is going on with the two different values for the correlation between Feminine Gender Role & Age, and Fears of Negative Evaluation & Age? I see no indication in this table that the top half and bottom half should be different, as in pertaining to different subgroups. Unless labeled, those values should match!

(-) Education Level is addressed in the Regression Analyses. Why is it not included here?

<table>
<thead>
<tr>
<th>Results: Regression Analyses (Table 3)</th>
<th>Research Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>(We want to see that you understand what the numbers in the table mean. Remember if you make a statement, show us what statistic you are using to justify your answer.)</td>
<td>The regression analysis addresses the issue of variance accounted for by multiple variables. This should indicate to us whether or not Connectedness Needs, Fears of Negative Evaluation, and Self-Esteem are strong indicators for Leadership Aspirations above and beyond Feminine Gender Role.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable: Leadership Aspirations</td>
</tr>
<tr>
<td>Independent Variables: Feminine Gender Role, Connectedness Needs, Self-esteem, and Fears of Negative Evaluation, Age, Education Level</td>
</tr>
<tr>
<td>The independent variables are labeled predictor variables as a matter of convention, this study is explanatory in nature.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Design Requirements &amp; Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Dependent Variable: true.</td>
</tr>
<tr>
<td>Two or More Independent Variables: true.</td>
</tr>
<tr>
<td>Sample Size ≥ 10 times the number of independent variables: true.</td>
</tr>
<tr>
<td>Independence: there is no systematic relationship between a pair of scores between one student and another. The sample was designed to be independent, but there because of the procedures, there was an opportunity for students to talk about the surveys as they were filling them out (threat to internal validity).</td>
</tr>
<tr>
<td>Normality: Not all of the variables in this study are normally distributed.</td>
</tr>
<tr>
<td>Homoscedacity: Cannot tell without looking at a scatter plot.</td>
</tr>
<tr>
<td>Linearity: Cannot tell without looking at a scatter plot.</td>
</tr>
<tr>
<td>We will assume that since the assumptions for correlation have been met, that the last two assumptions for regression have also been met.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Analysis of the R²'s:</th>
</tr>
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<tbody>
<tr>
<td>For each block, what is the regression model being tested?</td>
</tr>
<tr>
<td>What do the R²'s tell you? What do they mean?</td>
</tr>
<tr>
<td>- What would the statistical null and alternative hypothesis be for each R² (give just one example)</td>
</tr>
<tr>
<td>- What test statistic would they need to</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficient of Multiple Determination = R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1: Feminine Gender Role</td>
</tr>
<tr>
<td>Block 2: Feminine Gender Role, Connectedness</td>
</tr>
<tr>
<td>Block 3: Feminine Gender Role, Connectedness, Fear of Negative Evaluation</td>
</tr>
<tr>
<td>Block 4: Feminine Gender Role, Connectedness, Fear of Negative Evaluation, Self-Esteem</td>
</tr>
<tr>
<td>All Variables: Feminine Gender Role, Connectedness, Fear of Negative Evaluation, Self-Esteem, Age, Education Level</td>
</tr>
<tr>
<td>R² tells us the total amount of variance in Leadership Aspirations that can be accounted for the variables in the model being tested.</td>
</tr>
<tr>
<td>Null Hypothesis - H₀: R² = 0</td>
</tr>
<tr>
<td>Alternative Hypothesis - H₁: R² ≠ 0</td>
</tr>
<tr>
<td>An F test should be performed on each R² to determine whether or not it is significant.</td>
</tr>
<tr>
<td>As the researchers did not report the F observed value for each block, we will assume that the p value reported in the next</td>
</tr>
</tbody>
</table>
produce?
- What information tells you whether or not the R² is statistically significant or not?
- What is your substantive conclusion for each?

• Through the blocks the R²’s are changing. What does that mean substantively? How would you test these changes statistically (just give one example)
  - What would the statistical null and alternative hypothesis be for each R² (give just one example)
  - What test statistic would they need to produce?
  - What information would they need to provide to help you evaluate (make a decision) about the test statistics?

Without the statistical tests provided for R², what would your subjective interpretation of the change in R² from Block 1 to Block 4?

How do the R²’s and change in R²’s inform the research question(s)

column to the right is telling us the significance level for each R². We will have to assume that α = .05 for each R², as the researchers did not report otherwise.

• **Block 1:** Feminine Gender Role accounts for 4% of the variance in Leadership Aspirations.
• **Block 2:** Feminine Gender Role and Connectedness account for 11% of the variance in Leadership Aspirations.
• **Block 3:** Feminine Gender Role, Connectedness and Fear of Negative Evaluation account for 14% of the variance in Leadership Aspirations.
• **Block 4:** Feminine Gender Role, Connectedness, Fear of Negative Evaluation and Self-Esteem account for 16% of the variance in Leadership Aspirations.

**All Variables:** Feminine Gender Role, Connectedness, Fear of Negative Evaluation, Self-Esteem, Age and Education Level account for 16% of the variance in Leadership Aspirations.

**Change in R² = ΔR²**

- The change in R² between blocks shows us how much of the variance in leadership aspirations is accounted for by the variables added to the second block.
- Testing ΔR² would allow us to determine which combination of independent variables are the best indicators of leadership aspirations.
- The difference between R² values (ΔR²) could be tested using a version of the F-testing procedure, which would tell us whether or not this difference was statistically significant.
- Null Hypothesis - H₀: ΔR² = 0
- Alternative Hypothesis - Hₐ: ΔR² > 0
- We would need to know the value of the change in R², as well as the significance of each ΔR² (p value).
- Without knowing whether or not the changes in the coefficient of multiple determination are statistically significant between blocks, I would surmise that Block 4 is the best-fit model for leadership aspirations. In Block 4, we see that the combination of Feminine Gender Role, Connectedness Needs, Fear of Negative Evaluation, & Self-Esteem account for 16% of the variance in Leadership Aspirations. The addition of Age and Education Level did not have an effect on the R² value, so ΔR² = 0 between Block 4 and the All Variables block. This indicates that these last two variables aren’t significant indicators for Leadership Aspirations.

**Beta Weights**

(-) If these are in fact standardized regression coefficients, they should be labeled as “Beta Weights” not just β.

- The value of the Beta Weight tells us for every 1 unit change in X (in the example below, Connectedness Needs), what the increase is in Y (Leadership Aspirations).

**Example Beta Weight**

- Beta Weight for Connectedness Needs in Block 4 (.07).
- Null Hypothesis - H₀: β = 0
- Alternative Hypothesis - Hₐ: β ≠ 0
- The null hypothesis states that if all other variables (in this case, Feminine Gender Role, Fear of Negative Evaluation, and Self-Esteem) are held constant, Connectedness Needs will not produce?
**Analysis of the β’s:**

- What is the general meaning of β’s? (I believe these are standardized regression coefficients, but boo! The authors never say)

Using one example related to one of their research questions (connectedness needs):

- What is the null hypothesis and alternative hypothesis in statistical and verbal lingo being tested?
- What is the t? What does the value of t mean?
- What is the decision in regards to the hypotheses? On what basis are you saying so? And what does the decision mean substantively?
- What does the Beta for your example mean substantively?

- For each step, what are the individual variables that contribute significantly to the prediction?
- In the end, what is the best prediction model for College Women’s Leadership Aspirations?
- Of the significant variables, which variable contributes the most to the account for any of the variance in Leadership Aspirations. It also asks the question: Does our sample come from a population where the β = 0?

- The t value (t_{observed} = 3.33) indicates that a two-tailed t-Test was performed on the Beta Weight to determine its statistical significance.
- The asterisks under the Sig t column indicate that this finding was significant at the .01 level (p < .01). I interpret the .001 value as the actual p value.
- We reject the null hypothesis based on the fact the t-Test resulted in a statistically significant finding. According to the p value for the t-Test, it is very unlikely that our sample came from a population for which the variance in Connectedness Needs (holding the other variables constant) is actually 0.
- We can now say that Connectedness Needs does account for a significant portion of the variance in Leadership Aspirations in this model.
- Given a score for Connectedness Needs, we can now predict a score for Leadership Aspirations for an individual.

**Regression Models**

**Significant Variables by Model:**

- **Block 1:** Feminine Gender Role
- **Block 2:** Feminine Gender Role, Connectedness
- **Block 3:** Feminine Gender Role, Connectedness, Fear of Negative Evaluation
- **Block 4:** Feminine Gender Role, Connectedness, Fear of Negative Evaluation, Self-Esteem
- **All Variables:** Feminine Gender Role, Connectedness, Fear of Negative Evaluation, Self-Esteem

**Best Model:**

- Based on the information available in the table, we should select Block 4 as the best model for the Leadership Aspiration, on the basis that it contains the variables that account for the most variance.
- This finding may be a bit suspect, however, because the p value for this block is right at the .05, which we have assumed to be our cut off point for significance. If we determine that this block is significant based on the R² value, we will be taking a risk on making a Type I error (see comments below).
- In this model, Feminine Gender Role (at β = -.17) contributes most to the prediction.

**Results:**

- As expected, the researchers did find that all 4 variables in combination and separately explained a portion of the variance in College Women’s Leadership Aspirations.
- Unfortunately, according to the Beta Weights in Block 4, Feminine Gender Role does appear to supercede the other variables as an indicator for Leadership Aspirations.
- This explanation can only apply to college women like the ones in this sample.
- As the results of a hierarchical regression can turn out differently depending on the set-up of the blocks, and as Block 4 landed right on the fence of our decision rule, the researchers might consider using this data-set again with a different hierarchical
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### Analysis

- Can you think of any methodological or statistical reasons why results might have come out the way they did? Why confirmed or not confirmed researcher’s expectations or prior research?
- Can you think of substantive reasons why results might have come out the way they did? Why confirmed or not confirmed researcher’s expectations or prior research?
- Intervening variables that might explain the results?
- What are some limitations of the study? (issues of internal and external validity)
- What is an example of a next research step/question you might propose to follow up this study? (For example, what might be some moderator variables that would be interesting to study further? Or that they could have analyzed in this study? Or what might another study do to address the limitations of the current study?)

### Analysis of Statistical Results

(-) As noted several times above, the researchers left themselves open to Type I error, that could have been avoided by applying a Bonferroni-type adjustment to determine the alpha level for the $R^2$ values, or by using adjusted $R^2$ values (for example).

(+) They attempted to control for Feminine Gender Role by using that as the first variable in all of the Blocks, so they could better see the effect of the other variables.

### Analysis of Substantive Results

- It does seem as though Feminine Gender Role is still a strong indicator for Leadership Aspirations. This is contrary to their initial hypotheses, although it was looked at in the prior research.

### Intervening Variables

- Connectedness: perhaps a value on connectedness and interpersonal relationships on the part of the student provides them with a network of social, academic, and professional contacts that then encourage the student to take part in leadership activities.
- Fear of Negative Evaluation: perhaps this fear stems from past experiences of failure or ridicule while in a public forum, which would then in turn effect whether or not that person would seek leadership positions in college.

### Limitations of the Study

(-) The major limitation is in the type of sample used for this study that external validity. The results can only apply to female college students like the ones in this study. Some salient characteristics are race (94% white), education level (51% first-year students), and location (co-ed Midwestern liberal-arts college).

### Moderator Variables

- Education Level: 1st through 4th year – they could have seen if Leadership Aspirations seemed to be different by the year in college.
- The researchers could have investigated why there was not a 100% return rate. There may have been a systematic reason why some students didn’t return their surveys.
- Researchers could have investigated why a large amount of students did not report SES data.

### Next Steps

- This study was performed at a Co-Ed institution. I wonder how the results might have differed at an all-female institution.
- What about previous experience in leadership positions? Perhaps childhood experiences (student government, clubs officers, or Girl Scouts) influence college students’ leadership aspirations as well.

### Overall Impressions and Comments

I thought that overall this was an interesting study, and well supported by previous research. There were some weaknesses in the sample, however, that seriously impact the reach of the conclusions. The procedure used, namely self-report instruments completed outside of a controlled environment, also has a negative impact on the study. Unfortunately, the statistical results did not support the hypothesis that Connectedness Needs, Fear of Negative Evaluation, and Self-Esteem would supercede Feminine Gender Role as indicators for college women’s Leadership Aspirations in this study.
| The researchers indicated that it was their desire to provide useful indicators to student development professionals about what factors influence women college students to even have leadership aspirations. Efforts to create a greater segment of the female student population that is interested in leadership opportunities might be able to use this study as a guide, but it appears to me that a student’s position on these scales is not only determined by their experiences in college, have their roots in childhood experiences. |