The purpose of this assignment is for you to become familiar with extracting information from a research article, gaining a further understanding of the Analysis of Covariance as it relates to the given study, as well as gaining additional insight to research design.

Review the applicable parts of the article *Family-Centered Intervention for Young Children at-risk for Language and Behavior Problems*, by Chao, P., Bryan, T., Burstein, K, and Ergul, C. (2006). You will not have to read the entire article to answer the following questions. Read the questions below and then make reference to the applicable sections in the article. **Your responses must be typed, with the exception of symbols.**

1. What do the authors indicate as the **purpose**, **hypothesis** and **goal** of the study?

   The **purpose** of this study was to examine whether active parent engagement in selecting and using routine-based activities has a positive effect on children’s language and appropriate behavior development.

   The **hypothesis** was that parents are more likely to implement an intervention when it focuses on child issues of concern, and when they can select activities that are compatible with their goals and fit the family’s daily routines.

   The **goal** was to empower parents to construct meaningful interventions for the child within the framework of daily family life.

2. Subjects were randomly assigned to a control and an intervention group. Indicate how many (and what gender) students made up each group? Then, **briefly** explain the difference(s) between the control group and the intervention group… for example, what were the children exposed to and what did their parents receive?

   The control group included 19 children (9 boys, 10 girls), whereas the intervention group consisted of 22 children (14 boys, 8 girls).

   Children in the control group participated only in the pre- and post-testing phases of the study. Their parents did not receive training and were not required to attend regular meetings or submit weekly and monthly assessments of their children.

   Parents of children in the intervention group, however, were trained to use the CBLA. Parents were taught to complete weekly assessments of their children by recording positive and negative events and to submit monthly summaries to project staff.
EPS 625 – INTERMEDIATE STATISTICS
RESEARCH ARTICLE REVIEW ASSIGNMENT – KEY
ANALYSIS OF COVARIANCE

3. While there were multiple dependent variables – this study did not use a multivariate statistical analysis. Instead, separate one-way analyses of covariance (ANCOVAs) were used.

   a. Identify (operational define) the five dependent variables (and their scales of measurement) used in the one-way ANCOVAs.
      
      TELD-3 Receptive Language, continuous scale
      
      TELD-3 Expressive Language, continuous scale
      
      TELD-3 Spoken Language Quotient, continuous scale
      
      ECBI Intensity Scale, continuous scale
      
      ECBI Problem Scale, continuous scale

   b. Identify (operational define) the independent variable (and its scale of measurement) used in the one-way ANCOVAs.
      
      Group Assignment (2 levels, Intervention and Control), categorical scale

   c. Identify (operational define) the covariate (and its scale of measurement) used in the one-way ANCOVAs.
      
      Pre-test (of the various scales used as DVs), continuous scale

4. In the Data Analysis section, the authors report testing the homogeneity-of-slopes assumption. What additional assumptions should be tested when using the one-way ANCOVA?

   Assumption of Independence
   
   Assumption of Normality
   
   Assumption of Homogeneity of Variance
   
   Linear Relationship between the Covariate and the Dependent Variable
5. Looking at the Results section, the authors report that the ANCOVA indicated significant group differences on the TELD-3 Receptive Language, $F(1, 38) = 4.68, p = .037$, partial $\eta^2 = .11$. Explain what each symbol and value indicate/represent.

- $F$: Indicates that we are using a $F$ Test (ANCOVA)
- $(1, 38)$: Indicates the between (1) and within (38) degrees of freedom associated with this $F$ Test
- $4.68$: Indicates the obtained $F$ statistic value ($F_{obt}$)
- $p = .037$: Indicates the probability of obtaining the given $F$ value by chance alone
- partial $\eta^2 = .11$: Indicates the omnibus effect size (measure of association) for the significant effect – approximately 11% of the total variance in the DV is being accounted for by the IV, controlling for the covariate.

6. In the Discussion section what do the authors report about the effect sizes for this study – and how they relate to traditional $\eta^2$ values?

Investigation of the effect sizes ranging from .11-.18 indicated a moderate to strong relationship between the intervention and child performance. Traditionally, $\eta^2$ values of .01, .06, and .14 are regarded as small, medium, and large effect sizes, respectively (Green, Salkind, & Akey, 2000).

7. On page 152 in the Discussion section, the authors discuss a limitation of their study related to generalization. What is this in reference to, what caution do they report, and what do they suggest for future research?

Another limitation related to the generalization of the results of this study was in reference to sample size.

Although the sample size of 15 cases per group is large enough to yield valid results in ANOVA (Green et al., 2000), generalization of the results of this study should be cautious due to potential non-normal population distributions.

Future research may need to include a larger sample size to increase statistical power.