**Questions to answer for Campbell & Ramey (1994) reading:**

1. Research Questions
   1. What is/are the authors’ research question(s)? Think about the big, underlying question as well as the specific one which they are able to answer in the context of the present study.
      * Does attendance in high-quality early education affect later measured academic ability, rates of retention and special education identification?
        + How does this differ by whether students received ongoing support during their elementary years?
   2. What are their answers to the research question(s)?
      * Makes a difference for full scale and verbal IQ (but not Performance IQ); students who attended preschool and school-age treatment had higher levels of special education referral; some evidence that students who attended PS had lower rates of retention
2. Data and Sample
   1. Describe the study’s sample (From what geographic area were participants recruited? What were the criteria for inclusion? What are some of the characteristics of the individuals in the study? To whom do these results generalize?)
      * Poor (primarily Black) children in NC (based on High Risk Index and cut point)
      * Often teen mothers with limited education and median earned income of 0; full term infants free from conditions having known genetic or infection-related links to mental retardation
   2. What are the outcomes the authors examine? How are these outcomes measured?
      * IQ (WISC, WJ); special education (0/1/2), retention (1/0)
   3. What does one row in the researchers’ dataset represent? Can you construct a table that recreates the basics of how this dataset is structured (replace var1 and subsequent columns with the variables you would expect to see in this dataset)?

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| id | var1 |  |  |  |  |  |  |  |  |
| 1 |  |  |  |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |  |  |  |

1. Methodology
   1. Describe the research design of the study. Be prepared to explain what the EE, EC, CE and CC conditions were. What are the benefits of designing the study in such a fashion?
      * Randomized into ECE (E/C) and then into school support/intervention (E/C) resulting in a 2x2 design
      * Can test various contrasts, but harms power
   2. On pg. 691, the authors describe a multivariate test of the intensity/duration hypothesis, a test of the effect of pre-school treatment, and a test of the effect of school-age treatment. Explain these tests using language we have developed in this course. What purpose do these tests serve for the authors?
      * *The authors discuss creating two factors from the various outcome measures. It’s not critical you understand what is happening here. For now, it’s sufficient to recognize that they have collapsed most of their outcomes to a composite measure of students’ verbal achievement.*
      * *The linear trend they describe involves creating a variable assigning different treatment durations different numbers (control=0, school-age=3, preschool=5, preschool+school-age=8) and using this to generate linear estimates*
      * These are ANOVAs testing for whether there were group differences across the 4 experimental conditions (duration) and separate tests of the preschool and school-age treatment (2 groups)
   3. What are the null hypotheses for the analyses presented in the first panel of Table 5 (WISC-R: Verbal IQ)?
      * There is no difference, on average in the population, between the Verbal IQ scores of students who participate in different intensity of Abecedarian treatment.
        + Same when adjusting for their mother’s IQ
      * There is no difference, on average in the population, between the Verbal IQ scores of students who did participate in the Abecedarian pre-school treatment and those who did not.
        + Same when adjusting for their mother’s IQ
      * There is no difference, on average in the population, between the Verbal IQ scores of students who did participate in the Abecedarian school-aged treatment and those who did not.
        + Same when adjusting for their mother’s IQ
2. Results
   1. What are the magnitude of the differences in students’ full scale IQ scores (measured at age 12) across the experimental conditions?
      * CC: 89.14
      * CE: 87.71
      * EC: 94.23
      * EE: 93.32
   2. Look at the numbers 7.62 and 0.007 in the third row of Table 5. What do these numbers represent? Contrast them with the adjacent numbers 9.97 and 0.002.
      * The F-statistic of 7.62 (and associated p value of 0.007) tells us it is unlikely that the difference in Verbal IQ observed in our sample is drawn from a population in which there were no differences between those who participated in preschool and those who did not.
      * The F-statistic of 9.97 (and associated p-value of 0.002) shows that the difference is even greater when adjusting for maternal IQ
   3. Review the third line in Table 6 labeled “Special education.” What do each of the numbers in this row represent?
      * Proportion of students in each treatment group
      * .07: p-value for Chi-Square test that there are no differences between observed and expected referrals into SpEd by pre-school treatment status
      * … NS p-value for SA treatment
      * .04 p-value for pre-school and school-age treatment (more likely to be in SpEd)
3. Threats to validity/Methodological improvements
   1. In your mind, what are the most serious threats to internal validity in the design of this study?
   2. What about threats to external validity?
   3. Where are some instances in which our more modern toolkit of statistical analysis could use different versions of the General Linear Model to produce more easily interpretable results?