Name: Md Allama Ikbal Sijan

**Hierarchical Linear Modeling**

Psyc 741, Spring 2025

**Due Date**: February 10th (by 11:00 AM)

**Session 3 – In-Class Assignment**

For this in-class assignment, you will be executing and interpreting a null (intercept-only) multilevel model in R. See the Session 3 R tutorial slides for guidance.

You will be completing the following questions, some of which involve conducting analyses in R. You will hand in the answers to the questions; enter them into this word document. Some of the answers involve you copying and pasting your R code. However, you also need to submit your *complete* R code too (saved as a .R script file). Submit both this completed document and your R script file to the submission portal for the Session 3 In-Class Assignment on Canvas.

This assignment uses the **lq2002.sav** SPSS data file on Canvas. These data focus on leadership climate within Army companies.

1. Import the lq2002 data file into RStudio.
2. Execute a null multilevel model with **company** as the group/cluster variable and perceived leadership climate (**LEAD**) as the dependent variable. Make sure that maximum likelihood (ML) is used as the estimator. Paste your R syntax below.

null\_model <- lmer(LEAD ~ (1|COMPID), REML = FALSE, data = df)

summary(null\_model)

1. Report the following fit statistics from the null model:
   1. AIC: 4888.2
   2. BIC: 4905.0
   3. Log-likelihood: -2441.1
2. Report the following sample sizes from the data:
   1. Number of individual participants: 2042
   2. Number of groups: 49
3. Report the following variance components from the model output:
   1. Between-group variance: 0.07225
   2. Within-group variance: 0.61516
4. Based on your responses from Q5 above, calculate and report the intraclass correlation coefficient (ICC) and decide if multilevel modeling does seem necessary for this data.

ICC = 0.07225/ (0.07225 + 0.61516) = 0.1051047

1. Report the fixed effect for the intercept below.

The fixed effect (intercept) is 3.04, and it is statistically significant, t(44.64)=69.49, p<.001.