

Title: Sleep duration and risk for obesity in Mexican American children
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Subject: Analysis plan

Analysis includes using 2-way repeated measures ANOVA. First, I will test for order effects (8 hr condition assigned first versus second) including the order main effect and the sleep-condition-by-order interaction. Non-significant order effects will be dropped and the model refit, as appropriate. If some order effects are retained in the model, then I will perform custom contrasts within each order condition, e.g., 8 v. 10.5 hrs within each order condition; and across order conditions, e.g., 8 hrs in the 8-hr-first condition versus 8 hrs in the 10.5-hr-first condition. These models will mostly focus on differences between sleep conditions.

I can use the usual sleep condition to categorize children in terms of the regular sleep duration, which can be used as either as a continuous or a categorical (e.g., ≤ 9 v. > 9 hrs) covariate in the regression models. This would allow testing the interaction between usual sleep duration (whether categorical or continuous) and assigned sleep duration (8 v. 10.5 hrs). If order effects are operating, i.e., significant condition-by-order interaction, then I will test 3-way interactions: condition-by-order-by-X, where X is a variable derived from the regular sleep condition, i.e., either continuous covariate or binary.

I will average Thursday and Friday dietary intake (e.g., caloric intake) and PA within week 2 and week 3, using week 1 dietary intake and PA as covariates. I will also test all 4 assessments of dietary intake and PA (Thursday and Wednesday for week 2 and week 3) in a single repeated measures model, using week 1 assessments (Thursday and Friday) as covariates. Time can be treated as a continuous or categorical variable (week 2-Wed.; week 2-Thurs; week 3-Wed.; week 3-Thurs). If categorical, I can then compare dietary intake and PA within each day of the week (e.g., Wed. and Thurs.) within each assigned sleep condition.

Missing data, I will examine data for patterns of missingness, using Mplus. All missing data patterns, including key variables, will be examined using χ^2 and t-tests for demographic differences. MPlus will also be used to examine potential pathways to weight status because MPlus uses *full likelihood maximum likelihood* function, which does not use listwise deletion for missing data. This method is preferred as it accommodates missing data based on the assumption that data are missing at random.