Experiment 2 analyses

General notes

* Maybe since we have the data, we could include the phonological facilitation effect in the analyses but just say from the beginning that our a priori predictions pertain to the general and semantic interference effects (or baseline/overall naming times, when applicable) and that the phonological facilitation effect is exploratory and that we have no a priori predictions about it (but we included it for future comparisons with old people).
* I’ve been thinking more about these within-task measures of attention/inhibition. If we see that those measures predict naming times or interact with interference effects but the independent measures of those skills don’t, is the idea that attention or staying on task *during that particular task* is important for suppressing distractors during picture naming, but that general attention abilities don’t necessarily matter for picture naming? I made some suggestions below for looking at a measure of intra-individual variability on the task.
* Relatedly, I was wondering if it might make sense to include the delta plot slope analyses of Experiment 2 after all because we find that the relationship between the slope of the slowest delta segment and the semantic interference effect changes with the speed demands of the task. I think that really supports the findings from our meta-analyses showing that this measure can’t be used to index individual differences in inhibition ability. In this case, though, we would show that we can get the relationship to change within an individual and within the same task, which is even more evidence that we can’t use that measure for this purpose.

1. Experiment 1 data
   1. Suggested additional analysis: do cognitive skills predict \*baseline\* reaction times in word production?
      1. Analysis: predict reaction times of baseline condition only, cognitive skills as fixed effects
      2. Several papers (Jongman et al., 2015a, 2015b; Shao et al., 2012) have shown that cognitive skills (attention, inhibition) predict picture naming latencies, but they did not use a PWI task. This analysis could serve as a conceptual replication of those findings.
   2. Do cognitive skills predict reaction times in word production or interact with distractor condition?
      1. Analysis we reported in supplementary materials of EEG paper
2. Experiment 2 data
   1. Sanity check: do we replicate interference and facilitation effects?
      1. Analysis with interference and facilitation contrasts predicting reaction times (like in EEG paper) but with only the normal speed block
   2. Do interference (or facilitation) effects change with task difficulty?
      1. Analysis: reaction times as DV, fixed effects: speed block\*(gen int1+gen int2 + sem int+ phon fac)
      2. Prediction: we expect interference effects to diminish with the faster block; no specific predictions for phonological facilitation effect
   3. Do cognitive skills predict baseline reaction times (i.e., do we replicate the sustained attention main effect from Exp. 1?)
      1. Analysis: Baseline RTs as DV, fixed effects of cognitive measures; only data from normal speed block included
   4. Are cognitive skills more strongly related to picture naming times when task is more difficult?
      1. Analysis: RTs as DV, fixed effects: speed block\*(CTET+Flanker+Simon+Span)
   5. Do cognitive skills interact with interference or facilitation effects?
      1. Analysis RTs as DV, fixed effects of interference and facilitation contrasts, cognitive skills, and their interactions; only data from normal speed block included
   6. Do cognitive skills modulate interference or facilitation effects when task is more difficult?
      1. Analysis: RTs as DV, fixed effects: speed block/((c.gen.int1 +c.gen.int2+ c.phon+c.sem)\*(Slope\_Flanker\_c+Slope\_Simon\_c+CTET\_Hit\_c+Span\_Mean\_c))
      2. I think nesting the interactions of cognitive skills and interference/facilitation effects within speed group might make this more interpretable. Otherwise, I think we’d have potential three-way interactions with continuous variables, which are not very intuitive to interpret.
3. Within-task measure of attention to task: intra-individual variability in reaction times
   1. Does intra-individual variability in response times interact with interference or facilitation effects?
      1. Analysis, using only normal speed block:
         1. Intra-individual variability measure: mean of residuals from a linear model predicting response times with fixed effects of condition (RT ~ Condition)
         2. Model predicting response times with fixed effects of interaction and facilitation contrasts, intra-individual variability, and their interaction
   2. Does intra-individual variability in response times differ between fast and slow blocks? If we see that this measure differs depending on the task difficulty (within-participant variability may decrease in the fast block), that might suggest either that the task is encouraging participants to pay more attention (fewer long trials/lapses of attention in fast block) or we’re interfering with the alignment of target/distractor processing. In any case, it would mean that this measure is specific to the task, rather than a more general attention ability.
      1. Analysis, using both speed blocks:
         1. Intra-individual variability measure: mean of residuals from a linear model predicting response times with fixed effects of condition, speed block, and their interaction (RT ~ Condition\*Speed)
         2. Model predicting intra-individual variability measure, fixed effect of speed block
   3. Does intra-individual variability in response times modulate interference or facilitation effects more when task is more difficult?
      1. Analysis, using both speed blocks:
4. Intra-individual variability measure: mean of residuals from a linear model predicting response times with fixed effects of condition, speed block, and their interaction (RT ~ Condition\*Speed)
5. Model predicting response times with fixed effects of interaction and facilitation contrasts, intra-individual variability, and their interaction, nested within speed block (RT ~ speed block/((c.gen.int1 +c.gen.int2+ c.phon+c.sem)\*(intra-individual variability)