Title will go here: Something with a colon maybe

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Abstract

Abstract will go here. . .

*Keywords:* Keyword1; Keyword2; Keyword3; Keyword4

[INSERT TITLE HERE]

Task switching is commonly used by researchers to empirically investigate cognitive control. In this paradigm, participants are presented with a pair of simple yet contrasting tasks and must alternate between completing them (i.e., performing an addition task on trial one but a subtraction task on trial two). [SENTENCE HERE?] Previous research has found that when individuals are forced to alternate between tasks, their reaction times are slower, and they typically commit more errors relative to completing each task separately [CITE].

[PARAGRAPH HERE ON VARIOUS TASK SWITCHING PARADIGMS?]

[STROOP]

While several task-switching paradigms have been made available (see XXXX for a review), for the present study we chose to focus on paradigms which allow for a direct comparison of local and global switch costs [CITE HERE]. These tasks present participants with blocks containing switch and non-switch trials interspersed within the same block (referred to as switch blocks) and pure blocks in which all trials use only one set of task instructions [CITE]. [EXPAND] The *global switch cost* refers to…[LOCAL SWITCH COSTS]

[EXPLAINATIONS OF SWITCH COSTS]

[SEWIT AND OTHERS?]

The Consonant-Vowel Odd-Even task (CVOE; Minear & Shah, 2008) is a simple task-switching paradigm that allows the measurement of both local and global task switching costs. In switch tasks such as the CVOE, individuals with mild cognitive impairment perform worse relative to younger and non-impaired adults on switch trials relative to a set of pure trials in which the task does not change. Additionally, work by Huff et al. (2015) has shown that global switch costs (switch trials compared to pure trials) increase as a function of age and AD, suggesting that…[EXPAND]. [ADD A SENTENCE OR TWO HERE ON WHY THE CVOE SPECIFICALLY IS USEFUL]

Previous work on task switching using the CVOE paradigm has traditionally presented trials using an *alternating runs* pattern. In this presentation sequence, subjects complete the same type of trial twice before the instructions switch participants to the second task (i.e., the pattern of trials would be CV, CV, OE, OE, CV, CV). The result of this pattern is that every other trial (following the initial trial) is a switch trial, as it occurs following a change in the task set. [POTENTIAL PROBLEMS WITH THIS – PREDICTABILITY!]

**Distributional Analyses of RTs**

[WORDS HERE – DISCUSS EX-GAUSS AND VINCENTILES]

[TRANSITION – SET UP HYPOTHESES SEGUE INTO METHODS] The present study expands on previous CVOE task switching studies by incorporating both an alternating runs switch task and a randomized switch task (i.e., CV, OE, OE, OE, CV, OE) in which no discernable pattern of task switching can be detected.

**Alternating Runs vs. Random Switching**

[WORDS HERE] Overall, we expected that mean error rates and RTs would be higher on Switch Blocks relative to Pure Blocks. Furthermore, we expected that participants would particularly struggle with the switch task when switching occurred at non-predictive intervals due to the lack of pattern. We anticipated that these difficulties would result in higher error rates and greater RTs for random switch trials relative to alternating runs switch trials.

Regarding switch costs, we expected that local costs would be higher on the random switch task relative to the alternating runs. [WHY?] Global costs [GLOBAL COSTS PREDICTION]

**Method**

**Participants**

A total of 100 undergraduate students were recruited from the University of Southern Mississippi’s undergraduate research pool. Data from 11 participants were removed due to excessive error rates in either the Pure or Switch Blocks (i.e., mean error rates within a block that were > 3 *sd*s above the mean), which indicated that participants did not correctly follow task instructions. A sensitivity analysis conducted with *G\*Power* [CITE] indicated that our final sample of 89 participants was sufficient to detect XX effects [STATS]. All participants were native English speakers who reported normal or corrected to normal vision.

**Materials**

A series of bivalent stimulus pairs (e.g., A 15) were randomly generated using the following process. First an even number of consonants and vowels were created. These letters were always selected from A, D, E, H, I, J, O, P, S, or U. Next, numbers were randomly selected between 1-99, with the constraint that half of the numbers selected were always even. To create the pairs, half of the consonants were paired with an odd number, while the remaining half were paired with even numbers. This process was then repeated for vowels. This resulted in an equal number of each of the four possible pair types (Consonant-Odd, Consonant-Even, Vowel-Odd, Vowel-Even) within each block. Letters and numbers repeated within blocks, however, pairs were arranged within each block such that repeats did not occur on consecutive trials.

**Procedure**

The CVOE task presented participants with two sets of instructions, which differed as a function of block (Pure Blocks) or trial (Switch Blocks). For each trial, participants [MENTION E-PRIME IN LAB, 4 BLOCK STRUCTURE, KEY PRESSES, INSTRUCTIONS FOR PURE AND SWITCH (AND THEIR PATTERNS) 10 PRACTICE TRIALS, FIGURE OUT HOW MANY TOTAL TRIALS PER BLOCK] “Trials were such that correct responses were distributed equally between the d key and the k key.” Following the design of Huff et al. (2015), blocks were always ordered such that participants completed the two Pure Blocks before completing the two Switch Blocks. The total experiment took approximately 30 minutes to complete.

**Pure Blocks.** [EXPAND]

**Switch Blocks.** [EXPAND]

**Results**

For all analyses, a *p* < .05 significance level was used. Partial- eta squared (xx) and Cohen’s *d* effect size estimates were computed for all significant analyses of variance (ANOVAs) and *t*-tests, respectively. Additionally, we supplemented all standard null-hypothesis significance testing with a Bayesian estimation of the strength of evidence in favor of the null

hypothesis, which compares a model that assumes a significant effect to one that assumes a null effect (Masson, 2011; Wagenmakers, 2007). This analysis returns a probability estimate termed *p*BIC (Bayesian Information Criterion) which represents the likelihood that the null hypothesis is retained. Therefore, all null effects are supplemented with a *p*BIC estimate. [REF THE TABLES/FIGURES FOR ERROR RATES AND RTS] [APPENDIX?]

Following the design of Huff et al. (2015), RT analyses only utilized correct trials. Additionally, we employed a trimming procedure to reduce the likelihood of RT analyses being disproportionately influenced by extreme scores. RT outliers were defined as any responses three standard deviations above or below of each participants’ respective mean. Overall, this trimming procedure eliminated xx% of Pure Block trials, xx% of nonswitch trials, and xx% of switch trials.

The following analyses first examine mean error rates as a function of trial type (pure, alternating switch, alternating nonswitch, random switch, and random nonswitch). We then assess mean RTs as a function of trial type. Finally, [DISTRIBUTIONAL STUFF HERE]

**Mean Error Rates**

[ANOVAS]

**Mean RTs**

[ANOVAS]

**Vincentile Plots**

[VINCENTILES] [WILL NEED TO RUN ANOVAS]

**Ex-Gaussian Distribution of RTs**

[EX-GAUSS]

**General Discussion**

[SUMMARY PARAGRAPH – MAIN ANALYSES]

[SUMMARY PARAGRAPH – DISTRIBUTIONAL ANALYSES]

[SOMETHING HERE]

[AGING IMPLICATIONS]

[FUTURE DIRECTIONS]

**Summary and Conclusion**

[WORDS HERE]

References