Replication of Darby and Sloutsky (2015) analysis

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Abstract

Something about memory interference. Savings... Retroactive interference....Catastrophic interference... Eight objects. cartoon characters Winnie the Pooh or Mickey Mouse. Either the phases came one right after the other, or there was a 48 hour delay. Overlapping means that of the pairs objects that appeared in the first phase, they'd appear, one of them would, combined with different items in phase two, and then in phase 3 the paired items from phase 1 would appear paired again.

Three different combos of potential delay between phases or not. Experiment 1 there was no delay between any of the three phases. Experiment 2 there was just a delay between phase 2 and phase 3 consisting of 48 hours. For experiment 2, the delay of 48 hours was after phase 1. ...so my hypothesis just from this information would be that experiment 2 delay after phase 1 would have the highest accuracy ? I base this on the fact that if the delay occurs after phase 2, then phase 2 shit can be interfering with phase 1 shit. whereas, for experiment 2, kids ain't got enough time to consolidate the shit given in phase 2 ? s

Keywords: keywords

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Importing data

```
## Warning: package 'dplyr' was built under R version 4.0.5
```

```
## Warning: package 'ggplot2' was built under R version 4.0.5
```

```
## [1] "Experiment_1_No_Delay"            "Experiment_1_Delay_After_Phase_2"
## [3] "Experiment_2_Delay_After_Phase_1"
```

```
## # A tibble: 30 x 4
## # Groups:   Block, Phase [15]
##    Block Phase Pair_type     Avg
##    <dbl> <dbl> <chr>       <dbl>
##  1     1     1 overlapping  0.6
##  2     1     1 unique       0.56
##  3     1     2 overlapping  0.48
##  4     1     2 unique       0.7
##  5     1     3 overlapping  0.64
##  6     1     3 unique       0.88
##  7     2     1 overlapping  0.91
##  8     2     1 unique       0.88
##  9     2     2 overlapping  0.78
## 10     2     2 unique       0.93
## # ... with 20 more rows
```

Methods

Attempt to reproduce figure 3 ? page 14, darby and sloutsky

3 bars experiment 1 - no delay experiment 1 - delay after phase 2 **located ?

experiment 2 - delay after phase 1

Conditions to Variables : delay and no delay w/ overlapping and unique levels

Can I just stick to experiment 1 ?!

```
## # A tibble: 25 x 2
##    Subject AvgAccuracy
##      <dbl>       <dbl>
##  1    3049       0.95
##  2    3052       0.75
##  3    3053       0.817
##  4    3056       0.933
##  5    3066       0.833
##  6    3068       0.85
##  7    3069       0.85
##  8    3070       0.85
##  9    3073       0.8
## 10    3082       0.883
## # ... with 15 more rows
```

```
## # A tibble: 25 x 2
##    Subject AvgAccuracy
##      <dbl>       <dbl>
##  1    3049       0.933
##  2    3052       0.833
##  3    3053       0.9
##  4    3056       0.917
##  5    3066       0.917
```

```
##  6    3068       0.917
##  7    3069       0.817
##  8    3070       0.917
##  9    3073       0.917
## 10    3082       0.983
## # ... with 15 more rows

##
##  Paired t-test
##
## data:  Experiment_1_No_Delay_overlapping$AvgAccuracy and Experiment_1_No_Delay_unique
## t = -4.4053, df = 24, p-value = 0.0001885
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.07929933 -0.02870067
## sample estimates:
## mean of the differences
##                  -0.054
```

Participants.

Power curve - Simulation-based power analysis. ###SAMPLE TEXT We will first estimate the overall mean reaction time, and the standard deviation of the mean reaction from the data. The overall mean was r null_distribution overall_meanRT, and the overall standard deviation was r null_distribution$overall_sd .

To conduct the simulation we generate data for each subject using the rnorm function. Each subject contributed had two mean RTs in the congruent condition (sitting and standing), and two mean RTs in the incongruent condition (sitting and standing). There were 50 subjects, for the congruent condition we sample 2 scores for each subject from the

above normal distribution (100 total scores), and 2 scores for each subject from the above normal distribution for the incongruent condition (100 total scores). To model the Stroop effect, we systemically increase the mean in the incongruent condition by a proportion of the standard deviation. We use effect-sizes of .05, .1, .2, .4, .5, and .8; which range from small to large. For each effect-size, we run 100 simulated experiments, and save p-value for the main effect of congruency for each simulated experiment. Then, for each effect-size, we find the proportion of experiments that resulted in $p<.05$. The proportion of experiments that reject the null is the power of the design to detect an effect of each size. The simulation below finds that this design had power of .8, to detect an effect of d=.4. It had power of .99 to detect effects of d=.8 or larger. The full power-curve for this design is displayed in Figure 2. Darby and Sloutsky (2015)

Results. Now let's talk about those freakin results. So for the no-delay condition the authors found that accuracy significantly decreased (rewrite cause this is similar to actual wording)... $t(24) = 6.82$. $p < .001$. They found a Cohen's $d = 1.39$. For unique pairs there was not significance. $p = .46$.

References

Darby, K. P., & Sloutsky, V. M. (2015). When delays improve memory: Stabilizing memory in children may require time. *Psychological Science*, *26*(12), 1937–1946.

Table 1

Block	Phase	Pair_type	Avg
1.00	1.00	overlapping	0.60
1.00	1.00	unique	0.56
1.00	2.00	overlapping	0.48
1.00	2.00	unique	0.70
1.00	3.00	overlapping	0.64
1.00	3.00	unique	0.88
2.00	1.00	overlapping	0.91
2.00	1.00	unique	0.88
2.00	2.00	overlapping	0.78
2.00	2.00	unique	0.93
2.00	3.00	overlapping	0.85
2.00	3.00	unique	0.93
3.00	1.00	overlapping	0.91
3.00	1.00	unique	0.88
3.00	2.00	overlapping	0.91
3.00	2.00	unique	0.93

Table 1 continued

Block	Phase	Pair_type	Avg
3.00	3.00	overlapping	0.89
3.00	3.00	unique	0.96
4.00	1.00	overlapping	0.92
4.00	1.00	unique	0.93
4.00	2.00	overlapping	0.88
4.00	2.00	unique	0.97
4.00	3.00	overlapping	0.93
4.00	3.00	unique	0.92
5.00	1.00	overlapping	0.93
5.00	1.00	unique	0.92
5.00	2.00	overlapping	0.91
5.00	2.00	unique	0.97
5.00	3.00	overlapping	0.95
5.00	3.00	unique	0.94