2020

The effect of pre-exposure on overall similarity categorization

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Supplemental Materials

Section A

Supplemental Table 1 displays across experiments 2a, 2b, and 3, the proportion of sorts where participants who categorized unidimensionally used the same dimension consistently.

Supplemental Table 1

Proportion of Unidimensional Sorts Where Participants Used their Most Commonly Employed Dimension.

	Mean Proportion	Standard Deviation
Experiment 2a		
Same-stimuli/Perceptually easy	.90	.20
Same-stimuli/Perceptually difficult	.92	.19
Unrelated-stimuli/ Perceptually easy	.76	.29
Unrelated-stimuli/ Perceptually difficult	.86	.23
Experiment 2b		
Same-stimuli/Perceptually easy	.80	.26
Same-stimuli/Perceptually difficult	.63	.34
Unrelated-stimuli/ Perceptually easy	.88	.22
Unrelated-stimuli/ Perceptually difficult	.82	.25
Experiment 3		
Same-stimuli/Spatially integrated	.87	.20
Same-stimuli/Spatially separable	.80	.30
Unrelated-stimuli/Spatially integrated	.65	.31
Unrelated-stimuli/Spatially separable	.71	.23

In Experiment 2a, there was no statistically significant effect of perceptual difficulty, $F(1,47) = 2.07$, $p = .157$, $\eta^2_p = .04$, spatial integration, $F(1,47) = .80$, $p = .375$, $\eta^2_p = .02$, and no interaction between perceptual difficulty and spatial integration, $F(1,47) = .36$, $p = .554$, $\eta^2_p = .01$ on the consistency of unidimensional sorting.

In Experiment 2b, there was a trend for the same-stimuli condition to have less consistency in the dimension used than in the unrelated-stimuli condition but this was not

statistically significant, $F (1,57) = 3.89$, $p = .053$, $\eta^2_p = .06$. There was no statistical effect of perceptual difficulty, $F (1,57) = 2.49$, $p = .120$, $\eta^2_p = .04$, and no statistically significant interaction between pre-exposure and perceptual difficulty, $F (1,57) = .63$, $p = .431$, $\eta^2_p = .01$.

Turning to Experiment 3, there was again a trend for participants in the same-stimuli condition to have less consistency in the dimension they used than participants in the unrelated-stimuli but this was not statistically significant, $F (1,44) = 3.84$, $p = .056$, $\eta^2_p = .08$. There was no statistical effect of spatial integration, $F (1,44) = .001$, $p = .982$, $\eta^2_p < .001$, and no statistically significant interaction between pre-exposure and spatial integration, $F (1,44) = .75$, $p = .39$, $\eta^2_p = .02$.

Section B

Supplemental Table 2 shows the distribution of Other sorts into either failed overall similarity, failed unidimensional or other idiosyncratic strategies across all experiments. Classifications were determined based on analysis of the self-reports participants supplied.

Supplemental Table 2

The Proportion of Other Sorts whose Self-Reports Best Fit an Attempted Overall Similarity, Unidimensional or Other strategy.

	OS	UD	Other	Number of Other sorts
Experiment 1				
Same-stimuli	.46	.38	.15	13
Unrelated-stimuli	.33	.23	.43	60
Experiment 2a				
Same-stimuli/Perceptually easy	.63	.25	.13	16
Same-stimuli/Perceptually difficult	0	.79	.21	24
Unrelated-stimuli/ Perceptually easy	.15	.38	.46	13
Unrelated-stimuli/ Perceptually difficult	.07	.69	.24	29
Experiment 2b				
Same-stimuli/Perceptually easy	.78	.11	.11	18
Same-stimuli/Perceptually difficult	.09	.45	.45	11
Unrelated-stimuli/ Perceptually easy	.23	.27	.50	26
Unrelated-stimuli/ Perceptually difficult	.14	.50	.36	14
Experiment 3				
Same-stimuli/Spatially integrated	.37	.21	.42	19
Same-stimuli/Spatially separable	.13	.33	.53	15
Unrelated-stimuli/Spatially integrated	.43	.17	.40	35
Unrelated-stimuli/Spatially separable	.29	.41	.29	17

Note. Some participants had multiple Other sorts that were included in this results table.

To provide a measure of the extent to which participants consistently reported using the same strategy or switched to alternative strategies, we calculated the proportion of sorts where participants reported using the same strategy. This information is presented for all experiments in Supplemental Table 3.

Supplemental Table 3

Proportion of Sorts Where Participants Self-Report Using the Same Strategy.

	Mean Proportion	Standard Deviation
Experiment 1		
Same-stimuli	.87	.18
Unrelated-stimuli	.80	.17
Experiment 2a		
Same-stimuli/Perceptually easy	.85	.21
Same-stimuli/Perceptually difficult	.96	.11
Unrelated-stimuli/ Perceptually easy	.84	.25
Unrelated-stimuli/ Perceptually difficult	.94	.15
Experiment 2b		
Same-stimuli/Perceptually easy	.87	.19
Same-stimuli/Perceptually difficult	.88	.22
Unrelated-stimuli/ Perceptually easy	.90	.16
Unrelated-stimuli/ Perceptually difficult	.93	.17
Experiment 3		
Same-stimuli/Spatially integrated	.85	.15
Same-stimuli/Spatially separable	.87	.18
Unrelated-stimuli/Spatially integrated	.84	.20
Unrelated-stimuli/Spatially separable	.88	.15

In Experiment 1, there was no significant difference in consistency of the strategy self-reported between the same-stimuli and unrelated-stimuli conditions, $t(48) = 1.50$, $p = .140$. In Experiment 2a, there was no statistically significant effect of pre-exposure condition, $F(1,60) = 0.12$, $p = .734$, $\eta^2_p = .002$ and no statistically significant interaction between pre-exposure condition and perceptual difficulty, $F(1,60) = 0.01$, $p = .910$, $\eta^2_p < .001$. However, perceptually difficult stimuli were classified more consistently than perceptually easy stimuli, $F(1,60) = 4.55$, $p = .037$, $\eta^2_p = .07$.

In Experiment 2b, there was no statistically significant effect of pre-exposure, $F(1,79) = 1.22$, $p = .273$, $\eta^2_p = .02$, perceptual difficulty, $F(1,79) = 0.29$, $p = .593$, $\eta^2_p = .004$, and no interaction between pre-exposure and perceptual difficulty, $F(1,79) = 0.03$, $p = .866$, $\eta^2_p < .001$. Finally, in Experiment 3, there was no statistically significant effect of pre-exposure, $F(1,83) =$

0.03, p = .873, η^2_p < .001 spatial integration, F(1,83) = 0.73, p = .396, η^2_p = .01, and no interaction between pre-exposure and spatial integration, F(1,83) = 0.11, p = .743, η^2_p = .001.

Section C

Supplemental Table 4 displays the conditions in each experiment where 3+ participants were classified as sorting the majority of the blocks according to either an overall similarity (OS) or unidimensional (UD) strategy. Mean reaction time (RT) for each of these groups is displayed (the standard deviations are presented in brackets). The data shows a pattern across all experiments and in both same-stimuli and unrelated-stimuli conditions for overall similarity sorting to be numerically slower than unidimensional sorting.
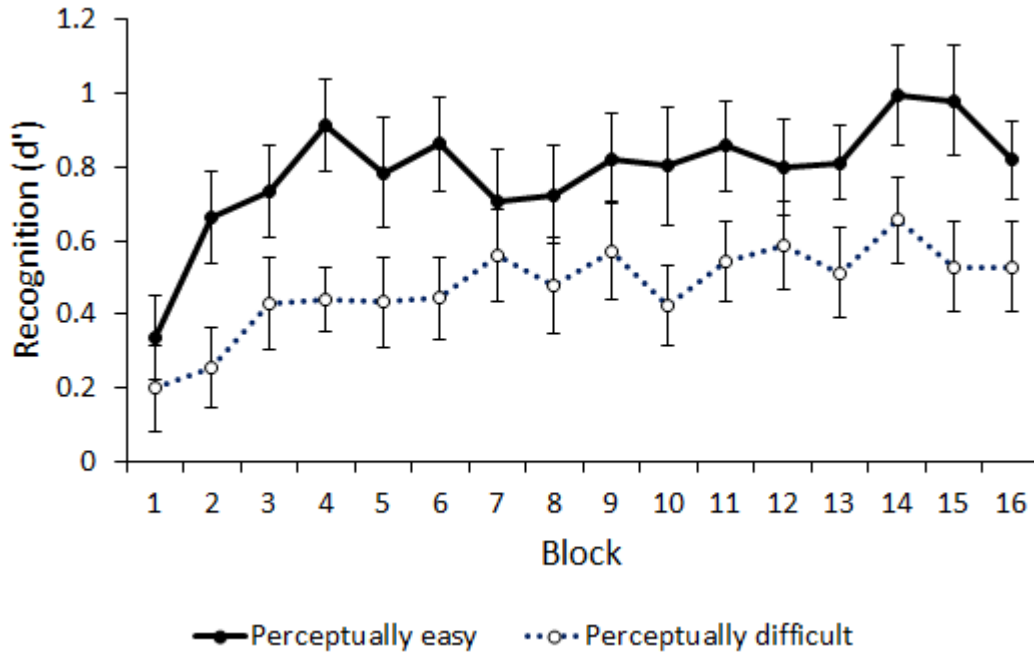
Supplemental Table 1

Mean Reaction Times (RT) for Participants Consistently Sorting by Either Overall Similarity or Unidimensional Sorting.

	OS sorters (N)	Mean OS RT (ms)	UD sorters (N)	Mean UD RT (ms)
Experiment 1				
Same	11	5580.77 (1792.81)	6	2006.83 (761.84)
Experiment 2a				
Unrelated/ Easy	4	4174.89 (1140.98)	7	2033.93 (734.28)
Experiment 2b				
Same/ Easy	13	5670.74 (2358.36)	3	3554.96 (930.12)
Unrelated/ Easy	8	6195.11 (2639.87)	10	2699.68 (1256.27)
Experiment 3				
Same/ Integrated	14	5184.81 (2321.03)	7	3272.08 (2176.12)
Same/ Separable	10	8899.12(5483.39)	6	2037.96 (1110.11)
Unrelated/ Separable	12	6909.33 (2718.98)	5	2707.23 (977.39)

Note. Same = same-stimuli; Unrelated = unrelated-stimuli. Easy = Perceptually easy. Integrated = Spatially integrated; Separable = Spatially separable.
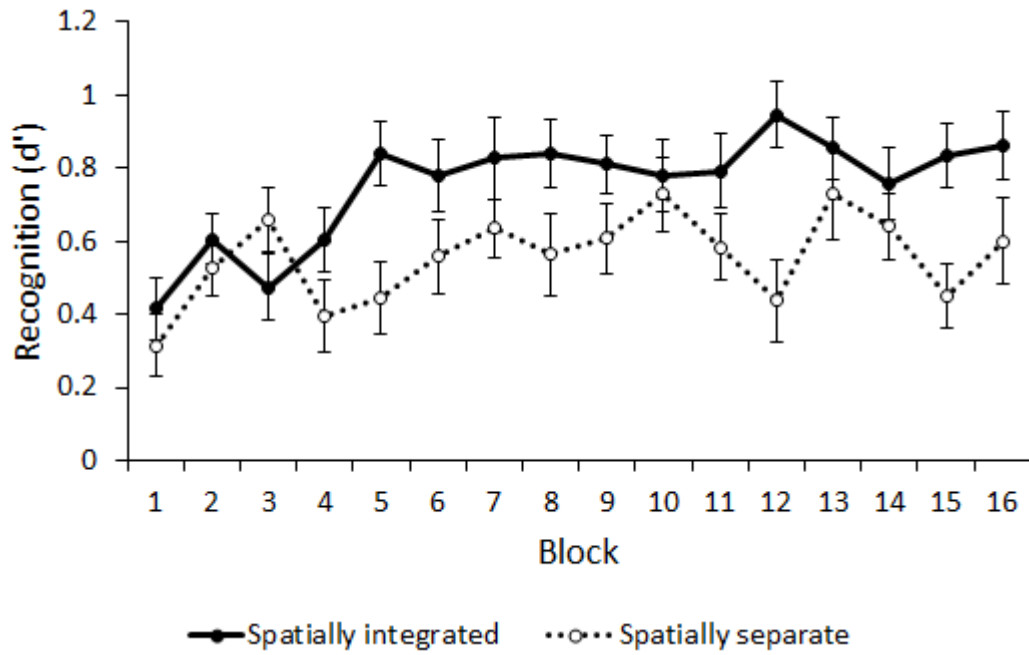
Section D

Supplemental Figure 1. Mean accuracy across conditions for the running-recognition phase in Experiment 2a.
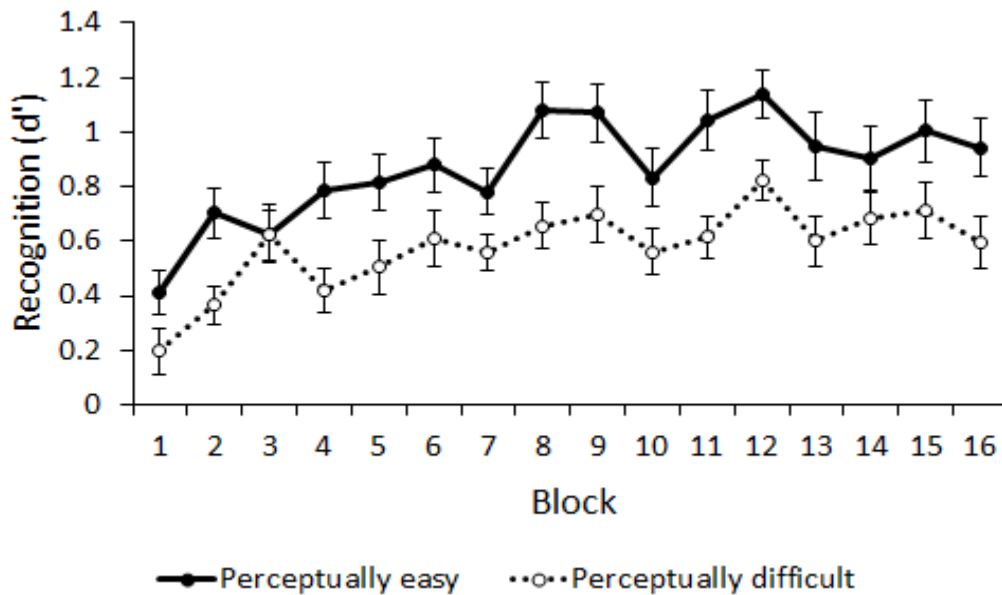
Supplemental Figure 2. Mean accuracy across conditions for the running-recognition phase in Experiment 2b.

Supplemental Figure 3. Mean accuracy across conditions for the running-recognition phase in Experiment 3.