

Introduction

- Natural categories often assumed to be organised around a family resemblance (overall similarity) structure (Rosch & Mervis, 1975).
- Therefore seems plausible that people would have preference for overall similarity (OS) sorting.
- However, when people free classify stimuli (are given no feedback on their responses) people tend to sort by a single-dimension (1-D; e.g. Medin et al., 1987).
- Recent work, though, suggests OS sorting can be increased by reduced time pressure (Milton et al., 2008); spatially separable dimensions (Milton & Wills, 2004), and prior sorting of different stimuli by OS (Milton & Wills, 2009).

Current study

- Eye movements highly correlated to cognitive processes involved in categorization (Rehder & Hoffman, 2005).
- First eye tracking study to investigate free classification.
- Aim was to better characterise pattern of eye movements in OS and 1-D sorting.
- Predictions based on hypothesis that **OS sorting a more time-consuming analytic process than 1-D sorting** (Milton & Wills, 2004).
- Predicted more fixations and greater quantity of information processed for OS than 1-D sorting.

Method

- 31 participants asked to free classify 6 blocks of 10 stimuli.
- Eye movements measured using the Eyelink II system.
- Used abstract structure developed by Medin et al. (1987; Fig. 1).

Category A				Category B			
D1	D2	D3	D4	D1	D2	D3	D4
1	1	1	1	0	0	0	0
1	1	1	0	0	0	0	1
1	1	0	1	0	0	1	0
1	0	1	1	0	1	0	0
0	1	1	1	1	0	0	0

Fig. 1

- Participants sort stimuli (Fig. 2) into 2 groups in way that seems most natural.
- Match-to-standards procedure used (Fig. 3). 2 prototype stimuli and 1 to-be-classified stimuli (target stimulus) presented.
- Red boxes in Fig. 3 indicate region of interests for eyetracking analyses. Red boxes not presented during experiment.

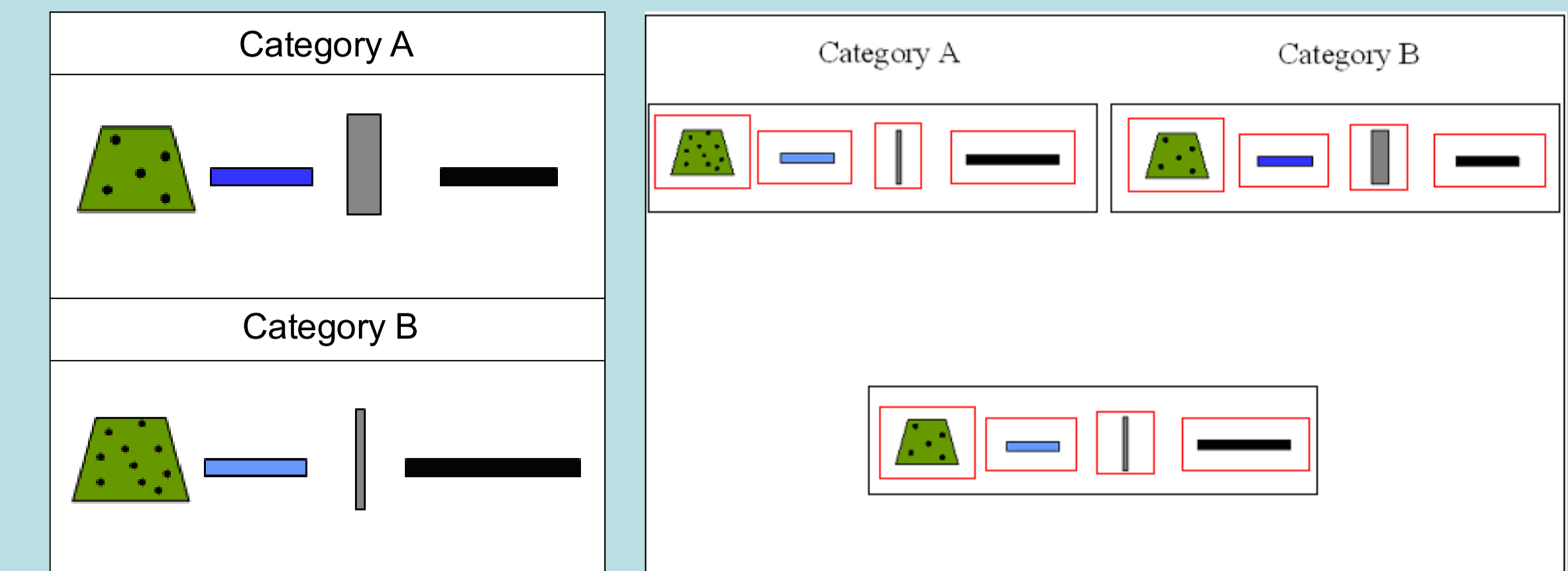


Fig. 2

Fig. 3

Behavioral Results

- A bias toward OS sorting (Fig. 4), consistent with Milton & Wills's (2004) finding that spatially separable stimuli encourage OS sorting.

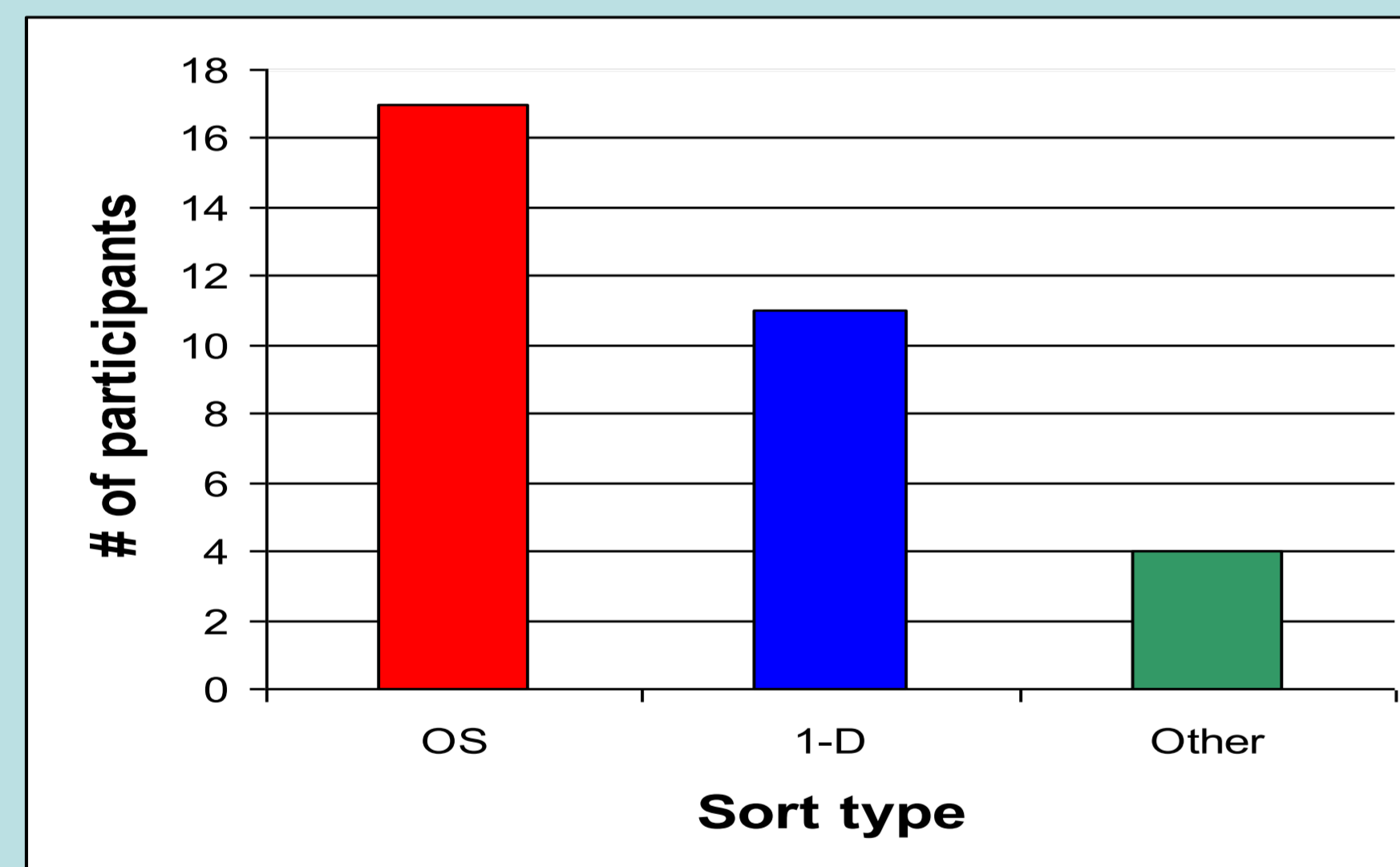


Fig. 4

- OS sorters took significantly longer to sort the stimuli than 1-D sorters ($p < .001$; Fig. 5).

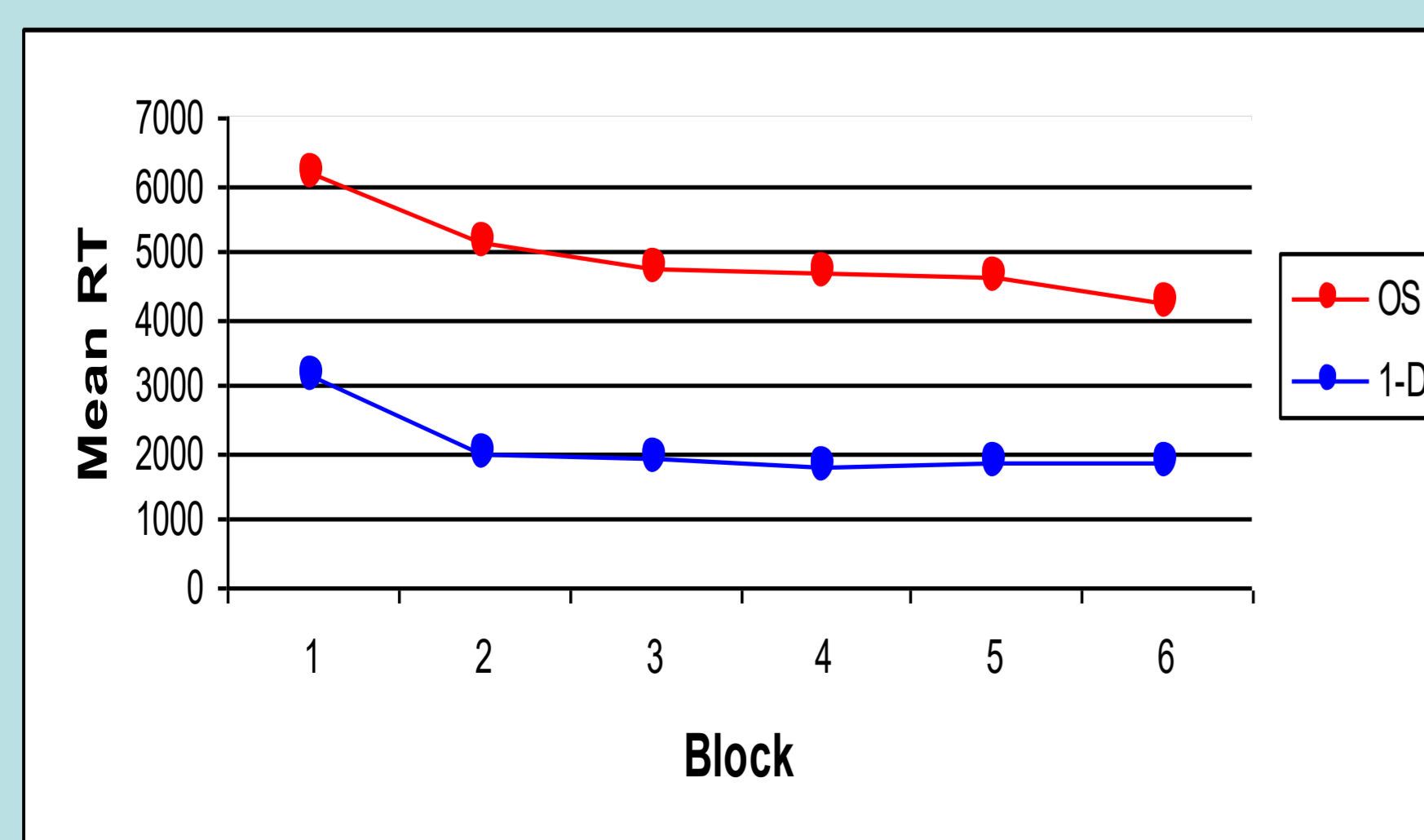


Fig. 5

Target stimuli

- OS sorters fixated target dimensions more than 1-D sorters ($p < .001$; Fig. 6).

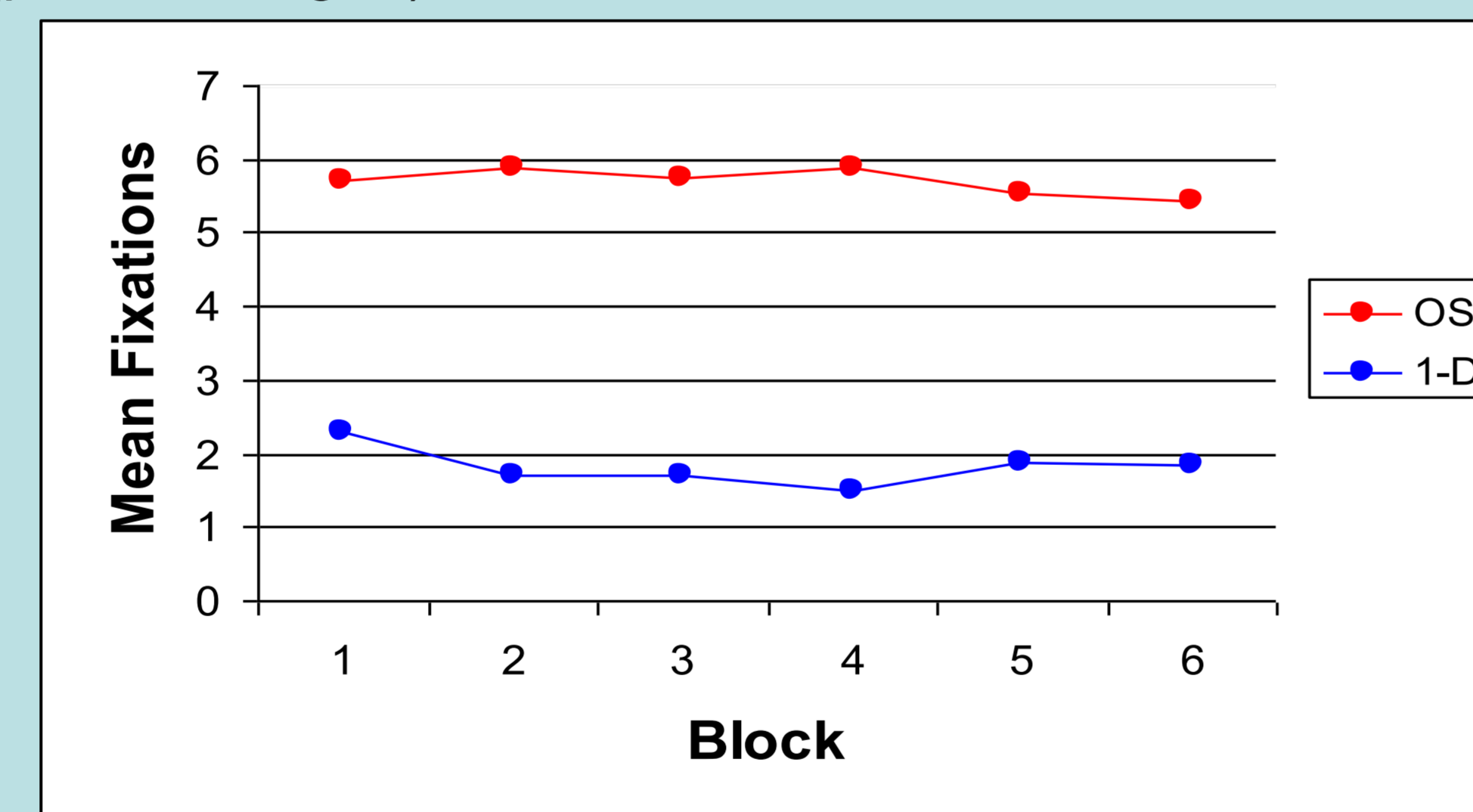


Fig. 6

- OS sorters fixated greater number of target dimensions (max = 4) than 1-D sorters ($p < .001$; Fig. 7).

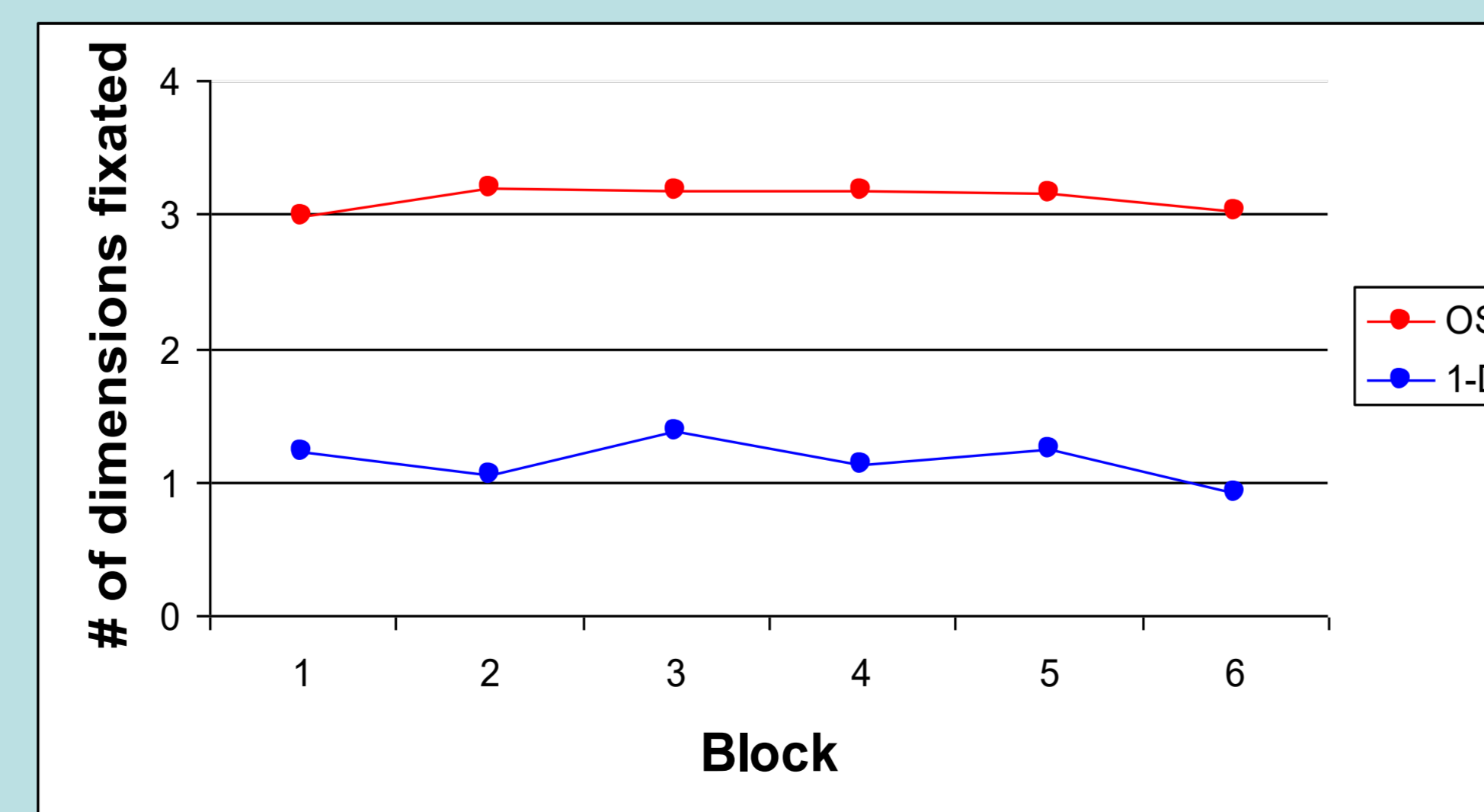


Fig. 7

- Consistent with dimensional summation hypothesis (Milton & Wills, 2004) that participants use an analytic majority features decision rule to sort by OS.

Category prototypes

- OS sorters made more fixations to category prototypes than 1-D sorters ($p < .001$; Fig. 8).

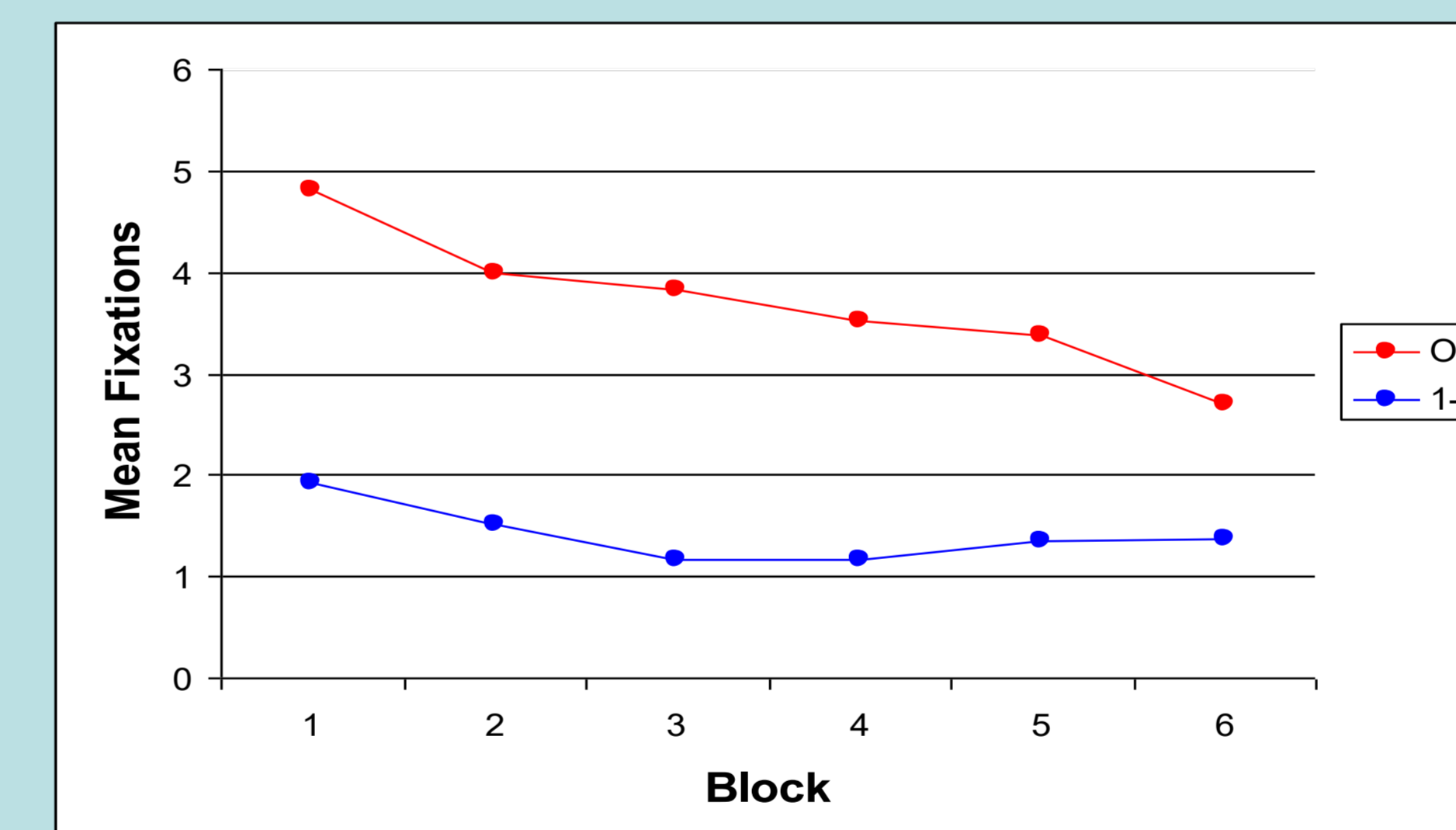


Fig. 8

- OS sorters fixated a greater number of prototype dimensions (max = 4) than 1-D sorters ($p < .001$; Fig. 9).

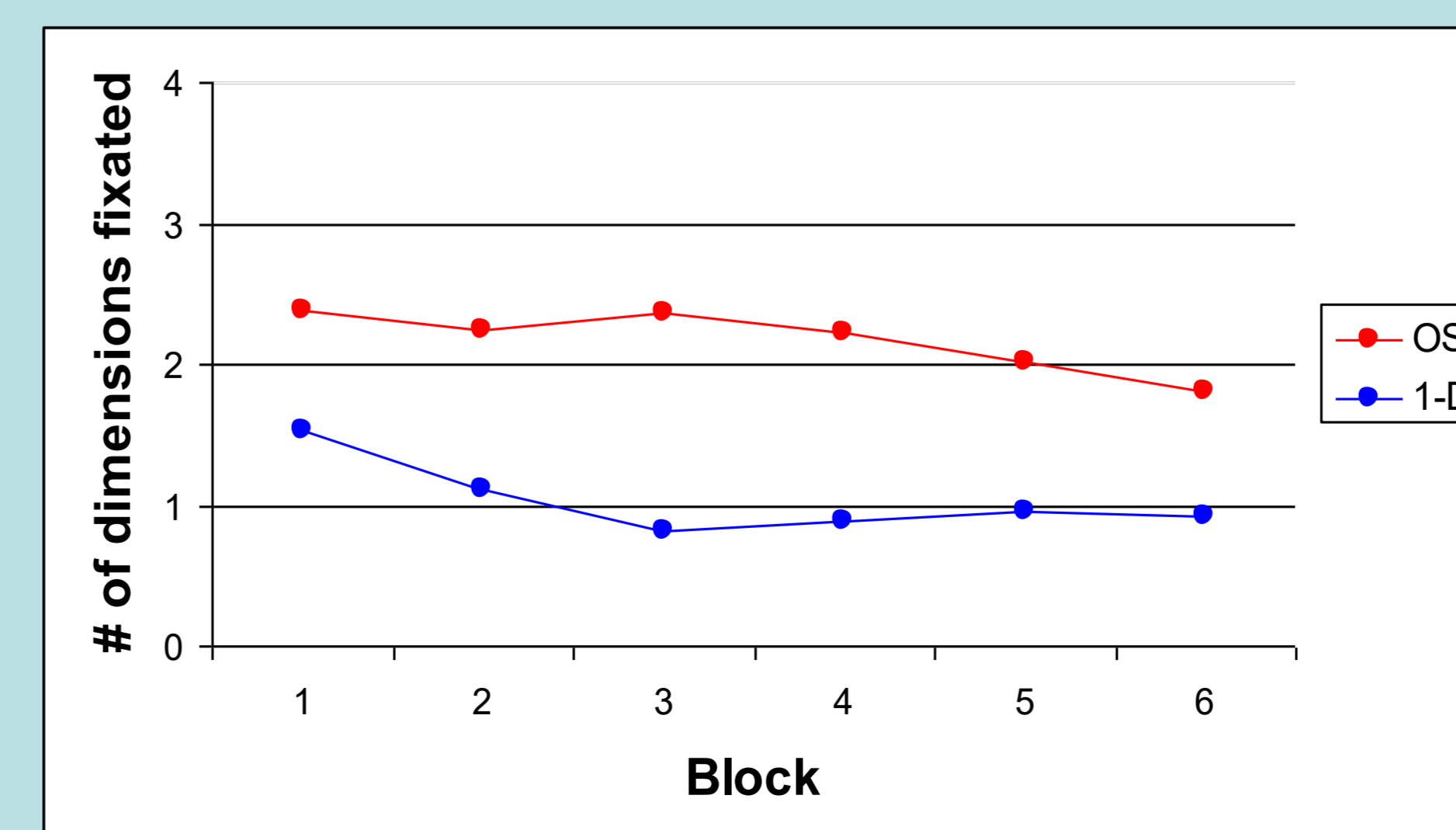


Fig. 9

Conclusions

- OS sorting is a more time-consuming process than 1-D sorting.
- OS sorters fixated more of the dimensions for both the target and prototype stimuli than 1-D sorters.
- This is consistent with idea that **OS sorting result of a dimensional summation, analytic strategy**.
- 1-D sorters fixated a single dimension from outset. Consistent with models such as SUSTAIN which propose individuals predisposed to simple rules.
- Results support neuroimaging findings (Milton et al., 2009) by showing a qualitative difference between OS and 1-D sorting.

References

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Acknowledgments

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