

ITEMS ON THE LEFT ARE BETTER REMEMBERED

Sergio Della Sala (1), Stephen Darling (2) & Robert H Logie (1)

We report evidence of a new phenomenon from three experiments: a leftward bias when people try to *remember* visually presented information. Experiments 1 and 2 showed lateral leftward biases in memory in a large (total N>60000) sample of participants, with data collected via the British Broadcasting Corporation (BBC) web site. Experiment 3 replicated the findings of a leftwards bias in short-term memory with a more intensive data collection.

Experiment 1

A total of 37773 participants took part in this study online. Participants observed colored (red, green, blue or yellow) geometrical shapes (square, triangle, circle or rhombus), one on the left and one on the right of the screen, presented for two seconds. After one second they were asked to recall the correct combination of features (color, shape and location) of each item by selecting from a range of shapes and colors on the screen. Of the total, 5264 participants selected incorrect color-shape combinations on either the left or right item only. Of these, 4908 errors were made on the right hand item and 356 were made on the left, $\chi^2(1) = 3936.30$, $p < .01$, $P_{rep} > .99$, ES $\Phi = .86$. Participants were free to recall the items in any order, and of those making an error, 4772 recalled the left item first, whilst 492 recalled the right item

first. The possibility that the bias arose from order of recall was assessed in a follow up experiment in which 24377 of the participants viewed two trials, each comprising three geometric colored shapes, one at the top of the display, one at the bottom and one laterally either on the left (on one trial) or on the right (on the other trial) of the midpoint, presented for two seconds.

Of the 23268 participants that recalled items in the correct locations on both three-item displays, 10903 made errors in color-shape combinations on one or other, but not both, of the lateral items, and errors were more frequent for the stimulus presented on the right (5897) than on the left (5006), McNemar Test: $\chi^2(1) = 72.81$, $p < .001$, $P_{rep} > .99$, ES $\Phi = .08$. Because there was only one lateralised item for any one trial, the bias cannot be attributed to the order of recall. The generality of this result was explored in two further experiments.

Experiment 2

Experiment 2 involved 24850 new participants who viewed two trials in which three colored animal shapes were presented. One item was shown at the top of the display, one at the bottom and one laterally either on the left or on the right of the midpoint depending on the trial, again presented for two seconds. As for Experiment 1, participants were asked to recall the color, shape and location of each item.

Of 22805 participants that recalled items in the correct locations on both trials, 10208 participants made errors in color-shape combinations on one or other, but not both, of the lateral items. These errors were more frequent for the stimulus presented on the right (5339) than on the left (4869), McNemar Test: $\chi^2(1) = 21.64$, $p < .001$, $P_{rep} > .99$, ES $\Phi = .05$.

Experiment 3

Experiments 1 and 2 were clear in showing a lateral bias in visual memory. However, there were relatively few trials for each participant, even if large numbers of participants were involved, and these were only some of the trials from a more complex experiment. Therefore, we carried out a follow up web-based experiment incorporating multiple, fully counterbalanced trials, with half of the participants viewing arrays that were mirror images of those seen by the remainder. The 144 participants completed 20 trials, each with two geometrical shapes, each in a different color, with one on the left and one on the right of the screen (Figure 1). Each array was shown for 2 seconds. After 1.5s, participants were asked to recall the color and shape of both items from a selection on screen. More errors were made for items presented on the right (mean = 1.64, s.d. = 1.35) than on the left (mean = .83, s.d. = 2.06, $t(143) = 6.07$, $p < .001$, $P_{rep} > .99$, ES $d = .47$). Participants recalled the right hand item first more frequently than the left (mean number of trials starting recall on the left = 7.67 vs. right = 12.33: $t(143) = 4.20$, $p < .001$, $P_{rep} > .99$, ES $d = .70$). This order preference is opposite to that in Experiment 1, yet the lateral bias is in the same direction, namely that items presented on the left were remembered better than items presented on the right. This further demonstrates that the lateral bias was not a consequence of the order in which participants chose to respond at retrieval.

Figure 1 about here

Taken together, the three experiments provide evidence for a lateral bias towards the left when participants carried out memory binding tasks. The implications are striking: items are remembered better if they are on the left.

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(1) Human Cognitive Neuroscience and Centre for Cognitive Ageing and Cognitive Epidemiology, Psychology, University of Edinburgh, Edinburgh; (2) Psychology Subject Area, School of Social Sciences, Media and Communications, Queen Margaret University, Edinburgh. Correspondence should be addressed to Sergio Della Sala (sergio@ed.ac.uk).

(Figure 1). Illustration of a trial from Experiment 3 showing the fixation, presentation, delay and response screens.

