Age-related decline in visual working memory: The effect of non-target objects during a delayed estimation task

Supplementary Materials

We found no effect of delay manipulation in both Experiments 1 and 2. Below are the results which include the delay condition as one of the factors. The pairwise comparisons results were excluded from the reports below, because they yielded the same findings as in the main analyses.

Experiment 1.

Probability of reporting the correct target value (p_t): To test the role of set size, delay, and age on reporting the correct target color, we ran a 3 (set size: 1, 2, 3) x 3 (delay: 800ms, 1200ms, 1600ms) x 2 (age: older, younger) ANOVA on the p_t data, where the set size and delay were entered as repeated measures and age was a between-subject variable (Figure S1). The results showed a significant main effect of set size, $F(2, 116) = 48.9$, $p < .001$, $\eta_p^2 = .458$, a significant main effect of age, $F(1, 58) = 16.9$, $p < .001$, $\eta_p^2 = .226$, and a significant Set Size x Age interaction, $F(2, 116) = 9.50$, $p < .001$, $\eta_p^2 = .141$. The main effect of delay, $F(1, 116) = 2.08$, $p = .130$, $\eta_p^2 = .035$, Set Size x Delay interaction, $F(4, 232) = 1.44$, $p = .221$, $\eta_p^2 = .024$, Delay x Age interaction, $F(2, 116) = 2.43$, $p = .092$, $\eta_p^2 = .040$, and three-way interaction, $F(4, 232) = 1.24$, $p = .294$, $\eta_p^2 = .021$, were not significant.

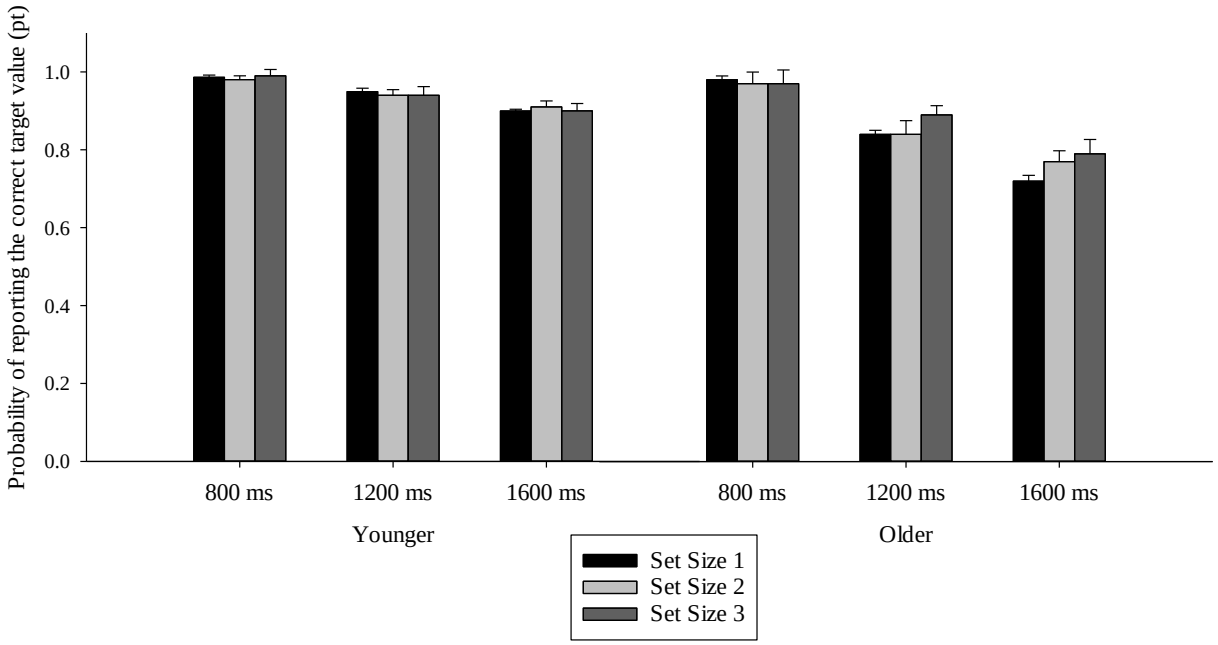

Figure S1: The probability of reporting the target color value (p_t) across set-sizes, delays, and ages in Experiment 1.

Probability of reporting a non-target value (p_n): To determine the nature of the errors participants had for SS2 and SS3, we compared p_n values with a 2 (set size: 2, 3) x 3 (delay: 800ms. 1200ms, 1600ms) x 2 (age: older, younger) mixed ANOVA (Figure S2). The results showed a significant main effect of set size, $F(1, 58) = 15.3$, $p < .001$, $\eta_p^2 = .209$, a significant main effect of age, $F(1, 58) = 7.11$, $p = .010$, $\eta_p^2 = .109$, and a significant Set Size x Age interaction, $F(1, 58) = 7.84$, $p = .007$, $\eta_p^2 = .119$. The main effect of delay, $F < 1$, Set Size x Delay interaction, $F(2, 116) = 2.00$, $p = .140$, $\eta_p^2 = .033$, Delay x Age interaction, $F < 1$, and three-way interaction, $F < 1$, were not significant.

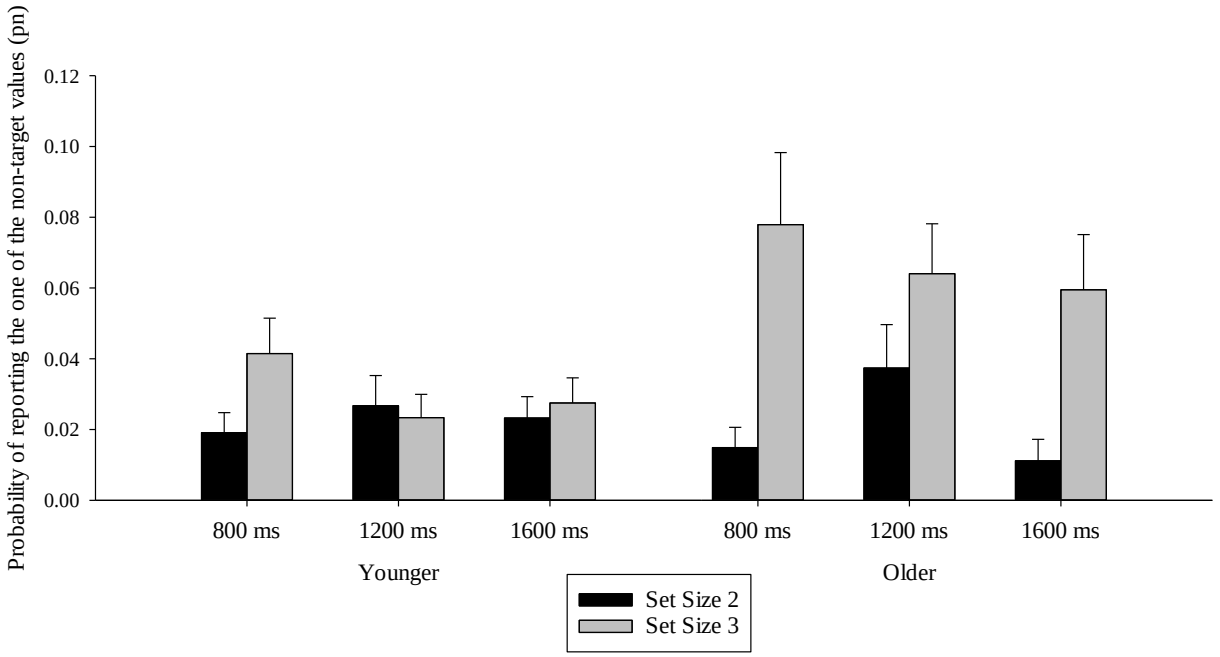

Figure S2: The probability of reporting a non-target color value (p_n) across set-sizes, delays, and ages in Experiment 1.

Probability of reporting a random color value/guessing (p_r): To determine whether older adults are more likely to randomly guess during an incorrect trial than younger adults, we compared p_r values with a 3 (set size: 1, 2, 3) x 3 (delay: 800ms, 1200ms, 1600ms) x 2 (age: older, younger) mixed ANOVA (Figure S3). We found a significant main effect of set size, $F(2, 116) = 27.2$, $p < .001$, $\eta_p^2 = .319$, a significant main effect of age, $F(1, 58) = 16.07$, $p < .001$, $\eta_p^2 = .217$, and a significant Set Size x Age interaction, $F(2, 116) = 6.81$, $p = .002$, $\eta_p^2 = .105$. The main effect of delay, $F < 1$, Delay x Age interaction, $F(2, 116) = 1.88$, $p = .158$, $\eta_p^2 = .031$, Set Size x Delay interaction, $F < 1$, and the three-way interaction, $F(4, 232) = 1.07$, $p = .370$, $\eta_p^2 = .018$, were not significant.

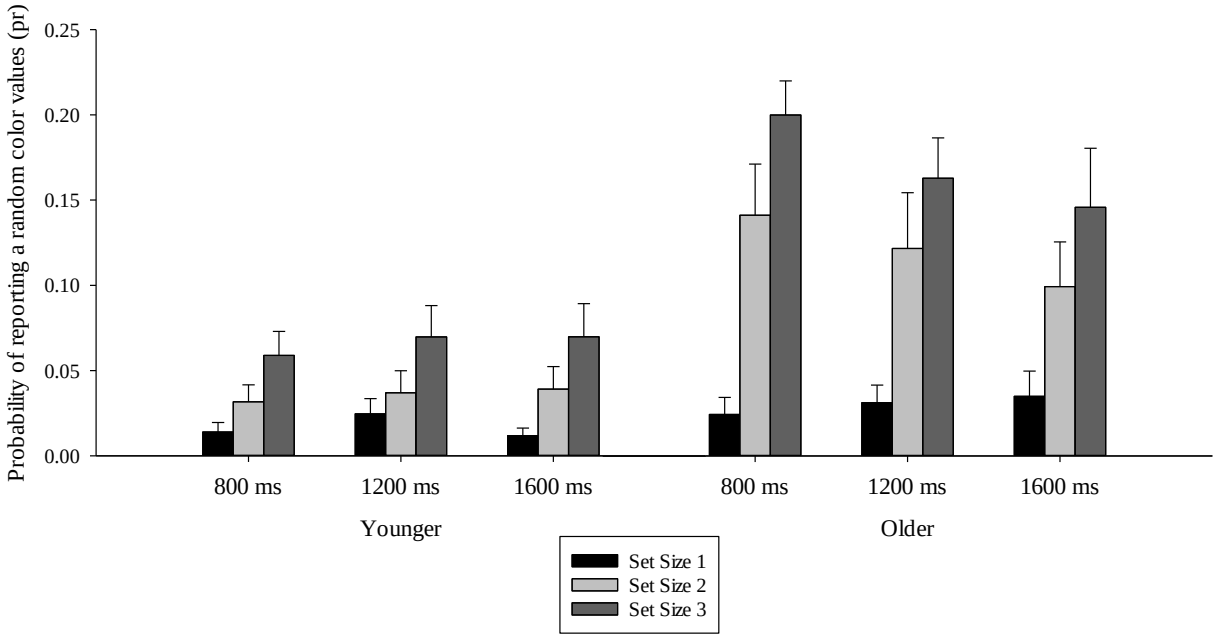

Figure S3: The probability of reporting a random color value (p_r) across set-sizes, delays, and ages in Experiment 1.

Standard deviations of the target distributions (precision of correct reports): To test whether aging affects the precision of the color reports, a 3 (set size: 1, 2, 3) x 3 (delay: 800ms, 1200ms, 1600ms) x 2 (age: older, younger) ANOVA was run on the standard deviation of the color report distribution (Figure S4). We found a significant main effect of set size, $F(2, 116) = 65.9$, $p < .001$, $\eta_p^2 = .532$, a significant main effect of age, $F(1, 58) = 28.4$, $p < .001$, $\eta_p^2 = .328$, and a significant Set Size x Age interaction, $F(2, 116) = 7.88$, $p = .001$, $\eta_p^2 = .120$. The main effect of delay, $F(2, 116) = 2.14$, $p = .123$, $\eta_p^2 = .035$, Set Size x Delay interaction, $F < 1$, Delay x Age interaction, $F < 1$, and Set Size x Delay x Age interaction, $F(4, 232) = 1.98$, $p = .099$, $\eta_p^2 = .033$, were not significant.

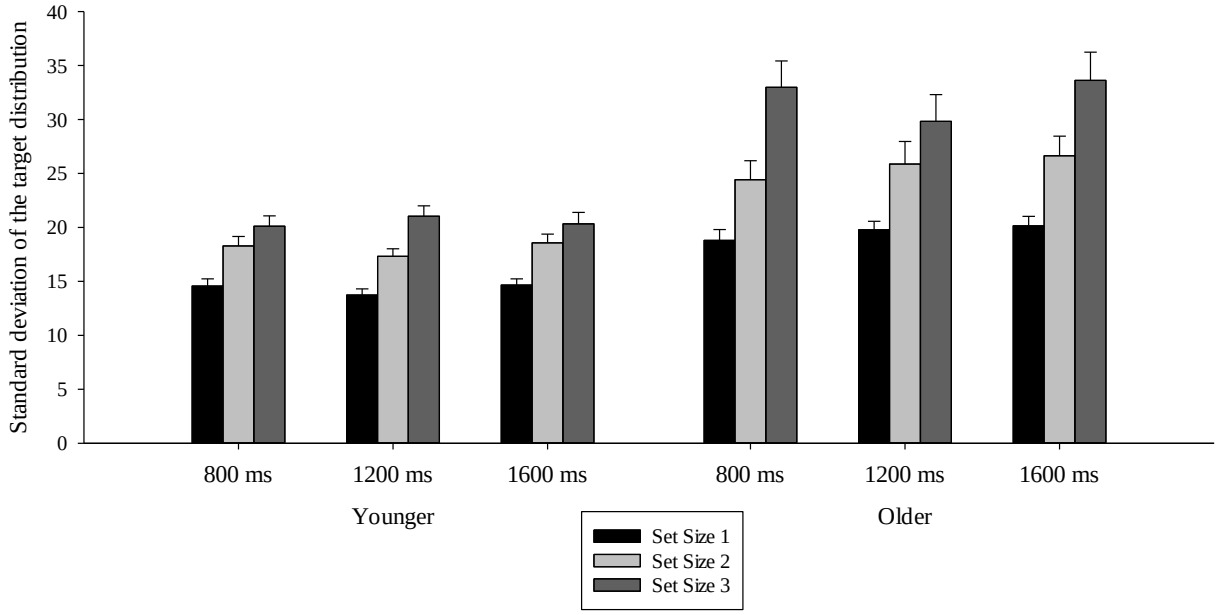

Figure S4: Standard deviations of the target distributions across set-sizes, delays, and ages in Experiment 1.

Experiment 2.

Probability of reporting the correct target value (p_t): To test the effects of set size, delay, and age on reporting the correct target color, we ran a 3 (set size: 1, 2, 3) x 3 (delay: 800ms, 1200ms, 1600ms) x 2 (age: older, younger) ANOVA on the p_t data (Figure S5). The results showed a significant main effect of set size, $F(2, 114) = 80.5$, $p < .001$, $\eta_p^2 = .584$, and a significant Set Size x Age interaction, $F(2, 114) = 11.56$, $p < .001$, $\eta_p^2 = .169$. The main effect of delay, $F < 1$, the main effect of age, $F(1, 57) = 2.04$, $p = .159$, $\eta_p^2 = .035$, Set Size x Delay interaction, $F < 1$, Delay x Age interaction, $F(2, 114) = 1.02$, $p = .364$, $\eta_p^2 = .018$, and the three-way interaction, $F < 1$, were not significant.

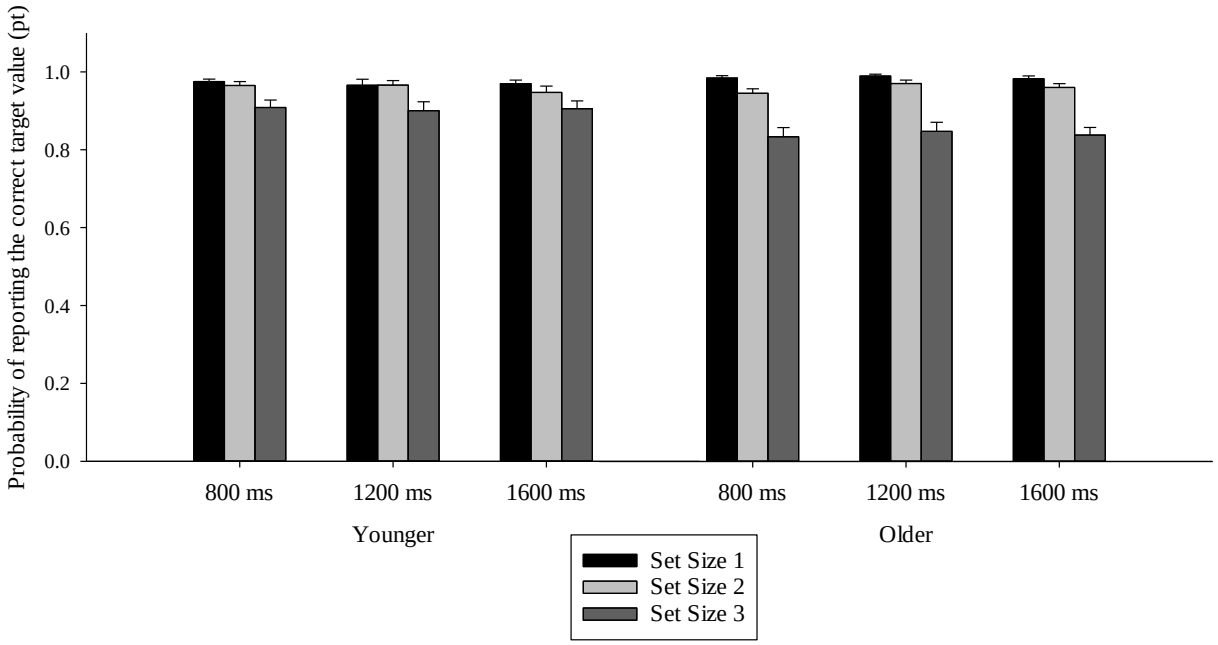

Figure S5: The probability of reporting the target color value (p_t) across set-sizes, delays, and ages in Experiment 2.

Standard deviations of the target distributions (precision of correct reports): To test these effects on the precision of the color reports, we ran a 3 (set size: 1, 2, 3) x 3 (delay: 800ms, 1200ms, 1600ms) x 2 (age: older, younger) ANOVA on the standard deviation of the color report distribution (Figure S6). There was a significant main effect of set size, $F(2, 114) = 71.5$, $p < .001$, $\eta_p^2 = .556$, and a significant main effect of age, $F(1, 57) = 18.7$, $p < .001$, $\eta_p^2 = .247$. All other effects were not significant (all Fs < 1).

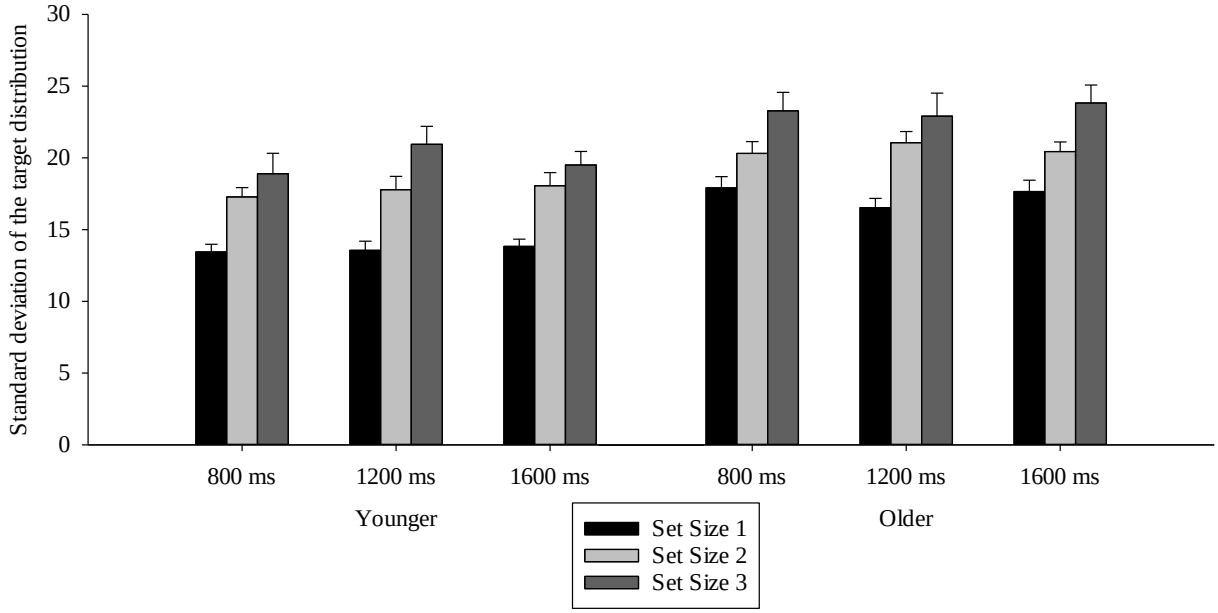

Figure S6: The standard deviations of the target distribution across set-sizes, delays and ages in Experiment 2.