Supplementary Results*: *Age Differences in Participants Matched on Performance

We selected 14 participants for each age group which exhibited comparable behavioral performance (p*s* $\geq$ .41; Hit rates (M ± SD) for 8-year-olds: .70 ± .11; 10-11-year-olds: .75 ± .08, 14-year-olds: .73 ± .09; and adults: .75 ± .08. False alarms (M ± SD) for 8-year-olds: .09 ± .07; 10-11-year-olds: .11 ± .07; 14-year-olds: .11 ± .09; adults: .13 ± .08. Color recollection rate (M ± SD for 8-year-olds: 73 ± .09; 10-11-year-olds: .74 ± .06; 14-year-olds: .76 ± .07; adults: .76 ± .08), and conducted the same analyses reported in the body of the manuscript on this sample. In general, the results observed with the full sample cannot be accounted by differences in behavioral performance, because the patterns of results are nearly identical in the full sample and in this reduced sample matched on performance, and most tests retain statistical significance despite reduced power.

Subsequent Memory Effects in the Hippocampus

Analyses were first conducted on the two hippocampal ROIs identified from Color Correct > Miss. When levels of activation in the left hippocampus were analyzed as a function of age and trial type, the results were highly similar to those reported with the full sample. The interaction between age and item trial approached significance, $F_{3, 52} = 2.48$, p =.07, and a main effect of trial type emerged when only Color Correct trials and Color Incorrect trials were included, $F_{3, 52} = 7.95$, p <.01. The simple-effects analyses within each group replicated those presented with the full sample (Supplementary Figure 1a). In 8-year-olds this region was recruited less strongly for Miss trials than Color Correct trials, p <.01, and Color incorrect trials, p < .05, and Color Correct and Color incorrect trials did not significantly differ, p =.99. In 10- to 11- year-olds, this region did not respond differently based on trial type, *p*s > 10. In 14-year –olds, Color Correct trials were associated with stronger activation than Color incorrect trials, p <.001, and Miss trials, p <.05; Color Correct trials and Miss trials did not statistically differ, p = .70. Finally, in adults, Color

Correct trials were associated with stronger activation than Color incorrect trials, p <.05, and Miss trials, *p* <.01; Color Correct trials and Miss trials did not statistically differ, p = .22.

In the right hippocampal region, the interaction between age and item type (with Color Incorrect and Miss trials) did not retain statistical significance, $F_{3, 52} = 2.03$, $p = .12$, but the simple-effect analyses revealed a patterns which was highly similar to that observed with the full sample (Supplementary Figure 1b). Specifically, in 8-year-olds this region was recruited less strongly for Miss trials than Color Correct trials, $p < .01$, and Color incorrect trials, $p < .01$, and Color Correct and Color incorrect trials did not significantly differ, $p = .99$. In 10- to 11- year-olds, this region showed stronger activation for Color Correct trials compared to miss trials, $p = .08$ (this difference was significant with the full sample), but no other significant difference emerged, *p*s> .19. In 14-year –olds, Color Correct trials were associated with stronger activation than Color incorrect trials, $p = .08$, and Miss trials, $p < .05$; in addition Color Incorrect trials and Miss trials did not statistically differ, $p = .65$. Finally, in adults, only Color Correct trials were associated with stronger activation than Miss trials, $p < .01$, but no other difference emerged, *p*s >.28.

We also analyzed the left posterior hippocampal region indentified from Color Correct > Color Incorrect (Supplementary Figure 1c). The interaction between age and item type retained statistical significance, $F_{6, 104} = 4.27$, $p < .01$. In 8-year-olds, Color Correct were associated with stronger activation than Color Incorrect, $p = .05$ (unlike in the full sample where these trials exhibited similar levels of performance), and than Miss trials, $p < .001$; Color Incorrect trials showed a trend for stronger activation than Miss trials, $p = .07$. In 10- to 11- year-olds, this region was recruited less strongly for Color Incorrect trials compared to Color Correct, $p = .07$, and Miss trials, $p < .05$. In 14-year-olds, none of the differences were significant, *p*s > .22. Finally, in adults, Color Correct trials were associated with stronger activation than Color incorrect trials, $p < .01$, and Miss trials, $p = .02$; Color Correct trials and Miss trials did not statistically differ, $p = .73$.

Subsequent Memory Effects in the Posterior Parahippocampal Gyrus: Analysis of Simple Effects on Age Groups Matched on Performance

When levels of activation in the posterior parahippocmapal gyrus were examined, the results were similar to those reported with the full sample. In the left posterior parahippocampal ROI identified from Color Correct > Miss (Supplementary Figure 2a), the interaction between age and item trial was still significant, $F_{6, 104} = 2.59$, $p < .01$. In 8-year-olds, there was a pattern consistent with this region responding to item recognition (Color Correct > Miss, $p < .001$ and Color Incorrect > Miss, $p < .01$; Color Correct ≈ Color Incorrect, $p = .97$). In 10-year-olds, no reliable effect of item type was found, *p*s >.23. In 14-year-olds and adults, the pattern of activation was consistent with selectivity for color recollection, but less reliable than with the full sample (14-year-olds: Color Correct > Color Incorrect, $p < .05$ and Color Correct > Miss, $p < .10$; Color incorrect ≈ Miss, $p = .65$; adults: Color Correct > Color Incorrect, $p < .10$, and Color Correct > Miss, $p < .05$; Color incorrect ≈ Miss, $p = .74$).

In the right posterior parahippocampal gyrus, the interaction between age and item trial was statistically significant, $F_{6, 104} = 2.75$, $p < 0.05$. Simple effect analyses revealed a pattern of activation that was nearly identical to that observed with the full sample (Supplementary Figure 2b). In 8-year-olds, as in other regions, a pattern consistent with item recognition was found (Color Correct > Miss and Color Incorrect > Miss, *p*s < .001; Color Correct ≈ Color Incorrect, $p = .36$). In 10-year-olds, no reliable effect of item type was found, *p*s >.13.

Similarly to the left posterior parahippocampal gyrus, in 14-year-olds and adults, the pattern of activation was consistent with selectivity for color recollection, but less reliable than with the full sample (14-year-olds: Color Correct > Color Incorrect, $p<.05$ and Color Correct > Miss, $p < .10$; Color incorrect ≈ Miss, $p = .86$; adults: Color Correct > Color Incorrect, $p<. 001$, and Color Correct > Miss, $p <.05$; Color incorrect ≈ Miss, $p = .74$).

Supplementary Table 1.

Whole-brain contrasts excluding regions in the medial temporal areas for the contrasts Color Correct > Miss (a)and Color Correct > Color Incorrect (b) (all participants at p <.001 uncorrected).

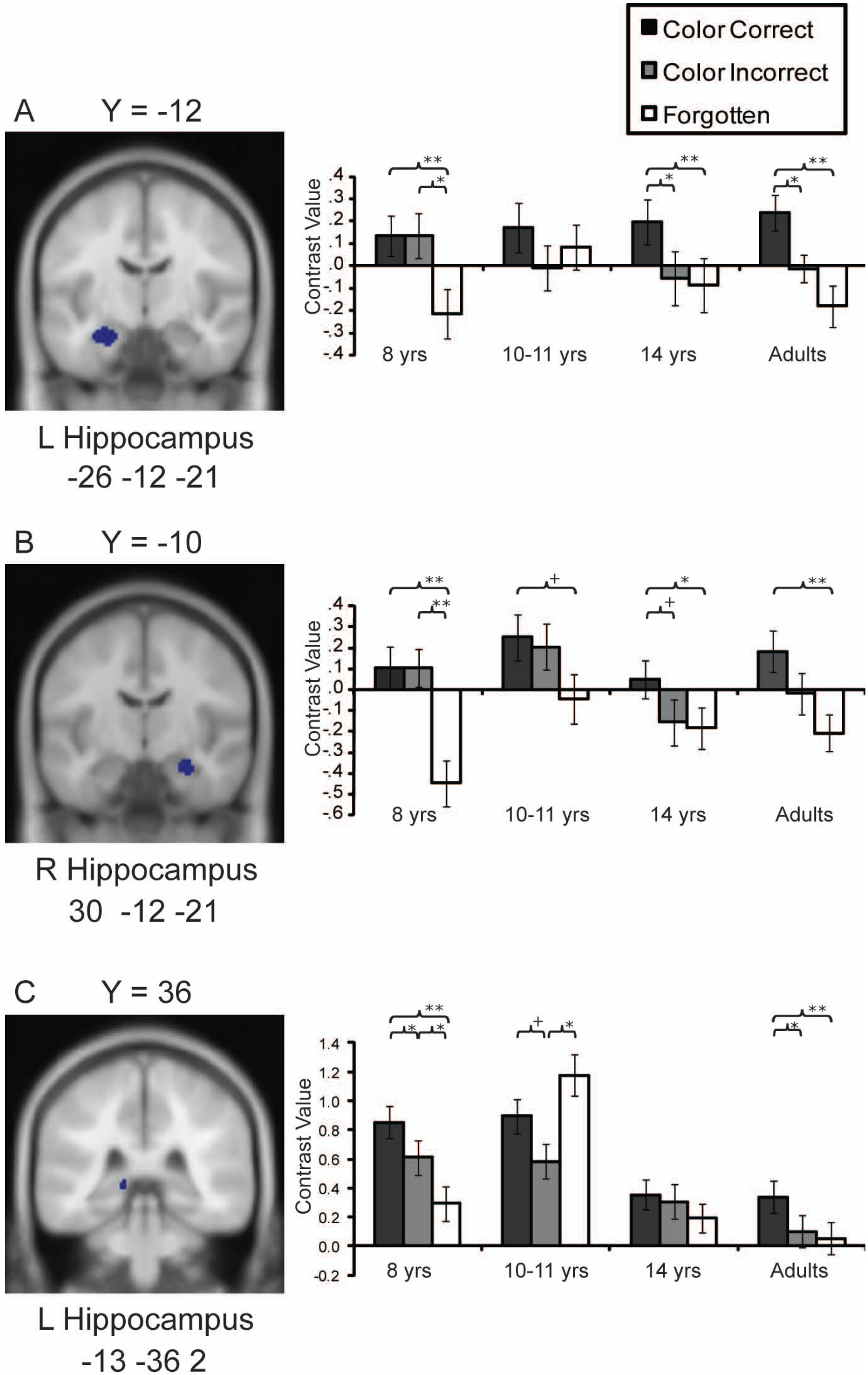
		BA	MNI Coordinates X	Y	Z	No. Voxels	Peak T value
Color Correct > Miss							
Frontal Regions							
L	Inferior/Superior frontal gyrus	47/45/6/8	-36	32	-12	6916	7.32
L	Middle frontal gyrus	11	-4	38	-14	309	6.05
R	Middle frontal gyrus	46	50	32	18	152	4.21
R	Middle frontal gyrus	11	34	34	-8	99	3.87
Other Regions							
L	Fusiform gyrus	37/20	-28	-36	-24	3072	8.34
R	Fusiform gyrus	37/20	32	-40	-20	3453	7.25
L	Posterior cingulate	19/39	-38	-70	30	552	4.39
L	Inferior Temporal gyrus	21	-56	-12	-22	72	4.05
Color Correct > Color Incorrect							
Frontal Regions							
L	Inferior frontal gyrus	47	-32	30	-14	95	4.16
Other Regions							
L	Fusiform gyrus	20	-32	-34	-22	433	4.37
R	Fusiform gyrus	20	32	-40	-16	190	4.25
Color Incorrect> Miss							
Frontal Regions							
L	Inferior frontal gyrus	47	-46	30	-12	192	3.90
Other Regions							
R	Fusiform gyrus	37	48	-50	-16	731	5.12
R	Middle occipital gyrus	19	38	-86	6	47	3.92

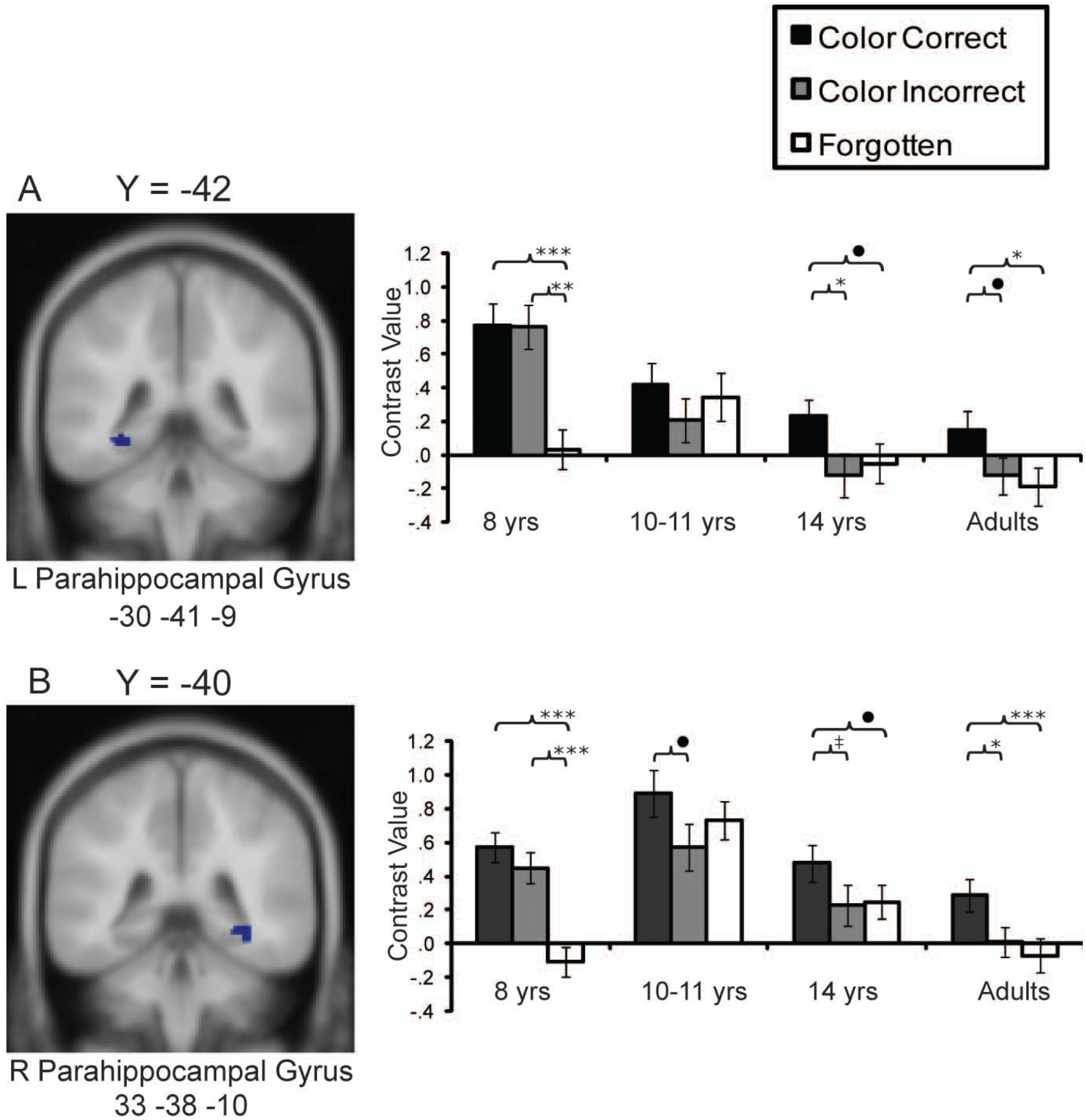
Supplementary Figure 1. Average contrast values for age groups matched on performance for ROIs in the (a) left hippocampus from Color Correct > Miss (b) right hippocampus, Color Correct > Miss, all participants, and (c) left hippocampus, Color Correct > Color Incorrect (all participants, p <.001 uncorrected). Standard errors are included. Significance levels are indicated as follows: **p<.01, *p<.05, + p =.08

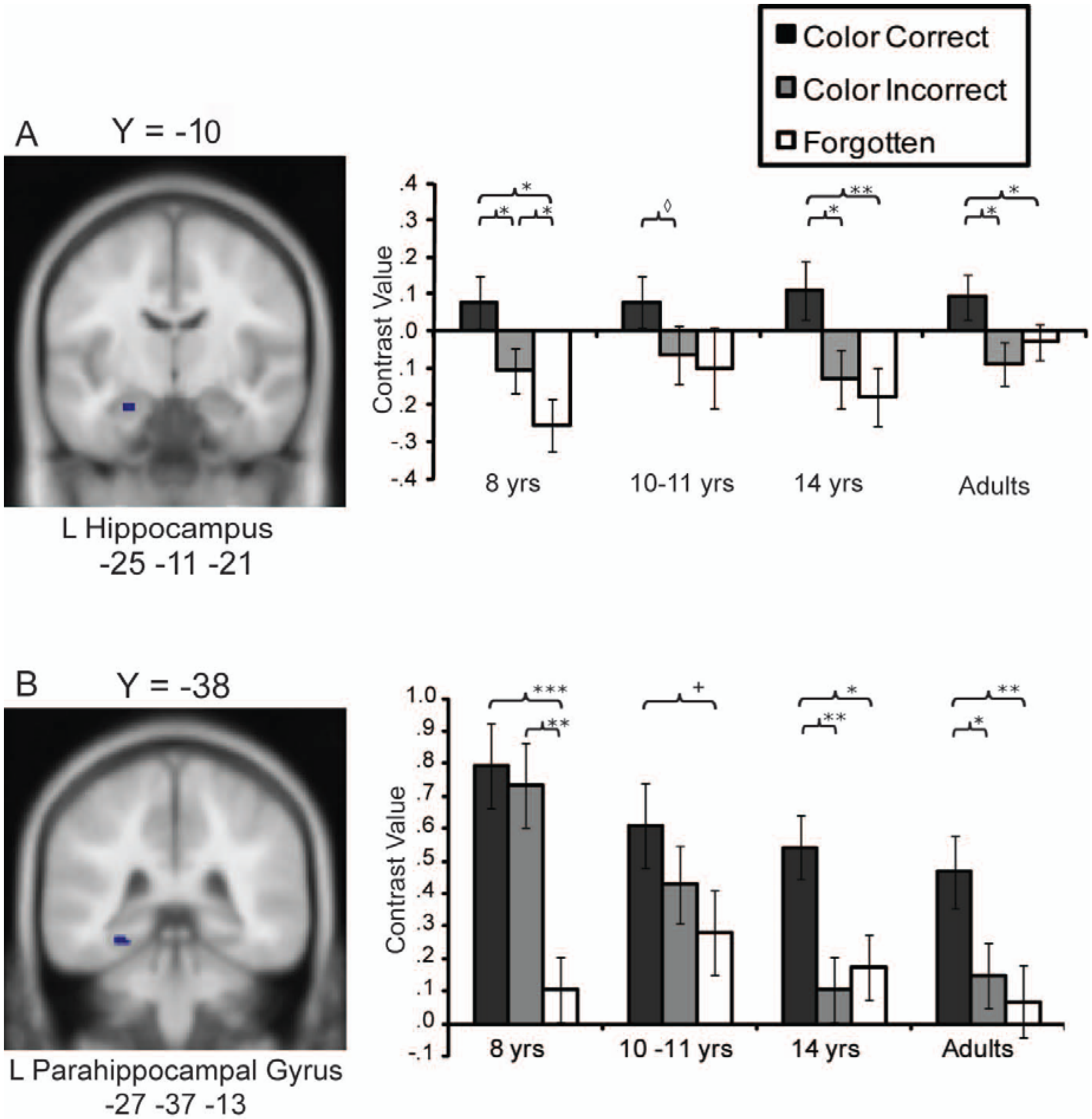
Supplementary Figure 2. Average contrast values for age groups matched on performance for ROIs in the left (a) and right (b) posterior parahippocampal gyrus from Color Correct > Miss (all participants, p <.001 uncorrected). Significance levels are indicated as follows: *** p<.001, **p<01, *p<.05, ‡ p =.05, • p <.10

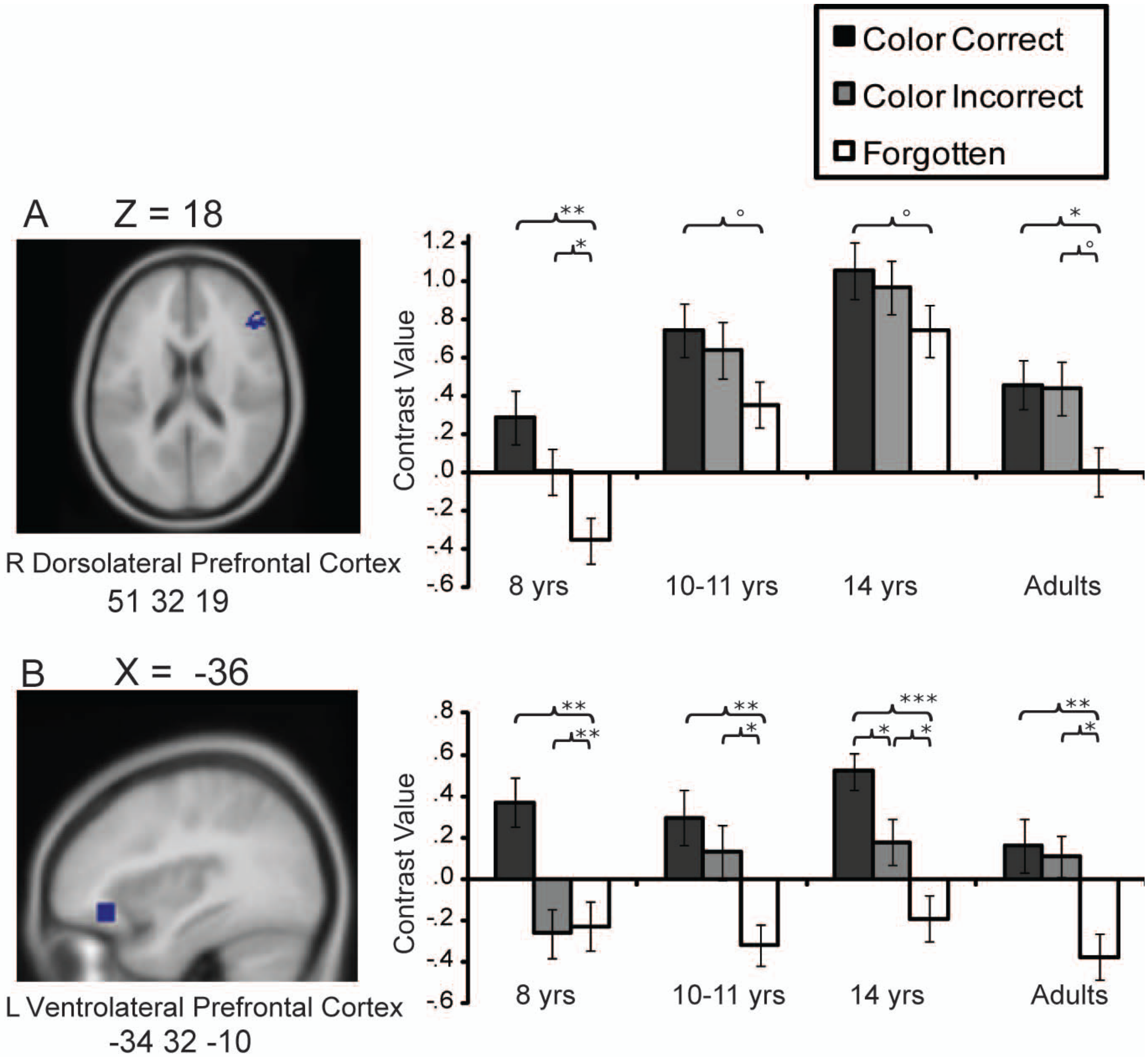
Supplementary Figure 3. Average contrast values in each age group with the full sample for ROIs in the (a) left hippocampus from Color Correct > Miss (b) left posterior PHG from Color Correct > Color Incorrect. These regions are fully contained in those reported in Figure 2a and 3a respectively and confirm the same pattern of results (all participants, p <.001 uncorrected). Standard errors are included. Significance levels are indicated as follows: *** p<.001, **p<.01, *p<.05, ‡ p =.05, ◊=.06, + = p =.08.

Supplementary Figure 4. Average contrast values in the full sample for ROIs in the regions in the left ventrolateral PFC (a) and left dorsolateral PFC (b) which do not show age-related increases in activation (all participants, p <.001 uncorrected). Standard errors are included. Significance levels are indicated as follows: *** p<.001, **p<.01, *p<.05, $^{\circ}$=.07


Color Correct
Color Incorrect
Forgotten
A Y = -12
L Hippocampus
-26 -12 -21
Contrast Value
8 yrs
10-11 yrs
14 yrs
Adults
B Y = -10
R Hippocampus
30 -12 -21
Contrast Value
8 yrs
10-11 yrs
14 yrs
Adults
C Y = 36
L Hippocampus
-13 -36 2
Contrast Value
8 yrs
10-11 yrs
14 yrs
Adults


Color Correct
Color Incorrect
Forgotten
A
Y = -42
Contrast Value
1.2
1.0
.8
.6
.4
.2
.0
-.2
-.4
***
**
*
*
8 yrs
10-11 yrs
14 yrs
Adults
L Parahippocampal Gyrus
-30 -41 -9
B
Y = -40
Contrast Value
1.2
1.0
.8
.6
.4
.2
.0
-.2
-.4
***
***
‡
***
*
8 yrs
10-11 yrs
14 yrs
Adults
R Parahippocampal Gyrus
33 -38 -10


Color Correct
Color Incorrect
Forgotten
A
Y = -10
L Hippocampus
-25 -11 -21
Contrast Value
.4
.3
.2
.1
.0
-.1
-.2
-.3
-.4
8 yrs
10-11 yrs
14 yrs
Adults
B
Y = -38
L Parahippocampal Gyrus
-27 -37 -13
Contrast Value
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
.0
-.1
8 yrs
10 -11 yrs
14 yrs
Adults



Color Correct
Color Incorrect
Forgotten
A
Z = 18
R Dorsolateral Prefrontal Cortex
51 32 19
Contrast Value
1.2
1.0
.8
.6
.4
.2
.0
-.2
-.4
-.6
8 yrs
10-11 yrs
14 yrs
Adults
B
X = -36
L Ventrolateral Prefrontal Cortex
-34 32 -10
Contrast Value
.8
.6
.4
.2
.0
-.2
-.4
-.6
8 yrs
10-11 yrs
14 yrs
Adults