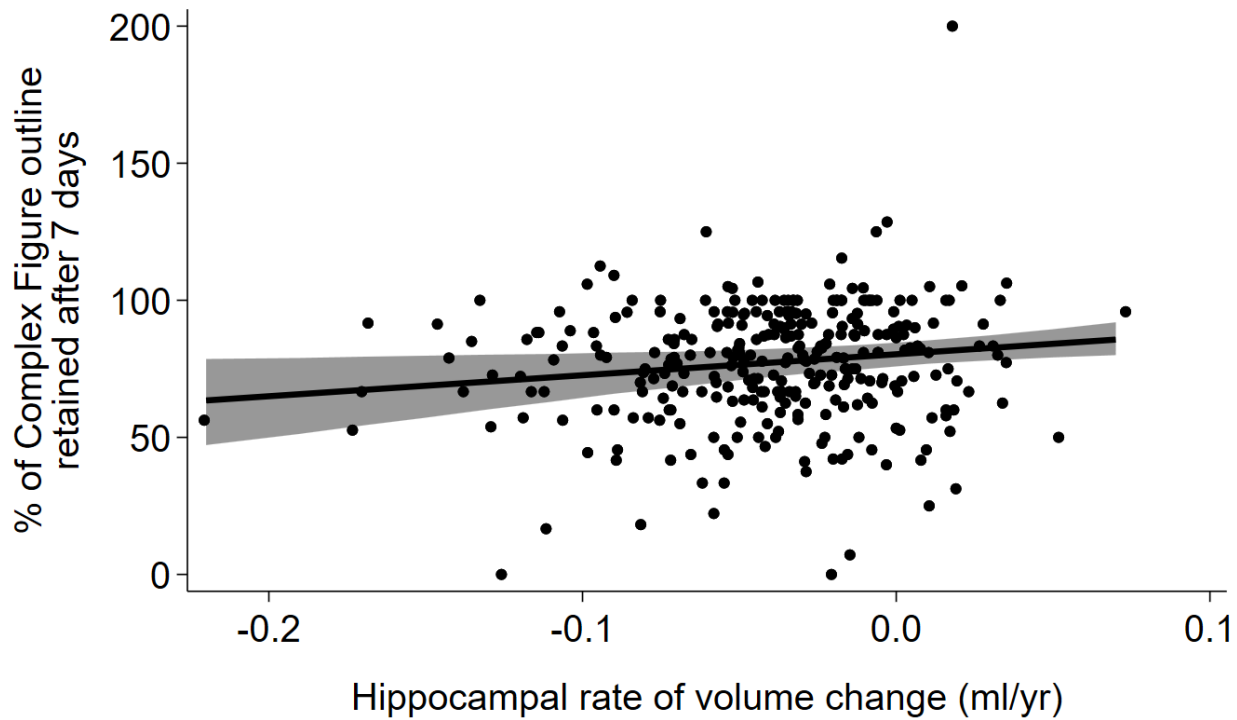**Supplementary Figure 1. Flowchart of participants included in analyses, with reasons for missing data**

ALF = Accelerated Long-term Forgetting.
*Note that for conditions with fewer than 5 participants, we have not stated the exact n due to sensitivity of disclosing disorders. Details of how the baseline sample was recruited from the wider National Survey of Health and Development (the British 1946 Birth Cohort) have been published previously.[28] Of the 420 participants with ALF scores for Complex Figure Drawing, 408 had a 7-day delay interval as per protocol, and 12 had a different delay interval due to logistical or scheduling issues (6 days: $n$=2; 8 days: $n$=7; 12 days: $n$=1; 13 days: $n$=1; 14 days: $n$=1).

**Supplementary Figure 2. Association between hippocampal atrophy and accelerated long-term forgetting on the Face-Name Associative Memory Exam (FNAME-12)**

Note that a score of >100% is possible if participants recalled more material after 7 days than after 30 minutes. The solid line represents the line of best fit from the multivariate regression model, adjusted for sex, age at assessment, childhood cognitive ability, education, socioeconomic position, *APOE* genotype (ε4 carrier / non-carrier), amyloid status, white matter hyperintensity volume and total intracranial volume. The shaded area represents its 95% confidence intervals. Markers show the unadjusted raw data. Note that the association is essentially unchanged if the outlier (who scored 200%) is excluded. Negative values for hippocampal volume change represent volume loss (atrophy).

**Supplementary Table 1. Participant characteristics and accelerated long-term forgetting scores in the full sample (n=429)**

| | |
|---|---|
| % female | 47.1 |
| Age at ALF assessment (years): mean, *SD*, (range) | 73.0, *0.71,* (71.9, 74.8) |
| Childhood cognitive ability (z-score): mean, *SD*, (range) | 0.38, *0.73,* (-1.60, 2.50) |
| Highest educational qualification: % | |
|   None | 15.4 |
|   Below O-levels (vocational) | 4.9 |
|   O-levels or equivalent | 27.0 |
|   A-levels or equivalent | 33.3 |
|   Degree or equivalent | 19.4 |
| Socioeconomic position: % | |
|   Unskilled | 0.9 |
|   Partly skilled | 4.9 |
|   Skilled manual | 9.1 |
|   Skilled non-manual | 21.2 |
|   Intermediate | 52.9 |
|   Professional | 11.0 |
| % *APOE*-ε4 carriers | 29.1 |
| Neuroimaging follow-up interval (years): mean, *SD*, (range) | 2.4, *0.2,* (2.0, 3.5)[b] |
| White Matter Hyperintensity volume (ml): median, *IQR*, (range) | 4.1, *2.0-9.1,* (0.1, 44.0)[c] |
| Whole-brain atrophy rate[a] (ml / year): mean, *SD*, (range) | -6.0, *3.5,* (-32.9, 3.6)[d] |
| Hippocampal atrophy rate[a] (ml / year): mean, *SD*, (range) | -0.04, *0.05,* (-0.46, 0.07)[d] |
| MyCog Subjective Cognitive decline score (out of 24): mean, *SD*, (range) | 4.8, *4.0,* (0, 21) |
| Change in MyCog score): mean, *SD*, range) | 0.39, 3.0, (-10, 11) |
| Preclinical Alzheimer's Cognitive Composite: mean, *SD*, (range) | -0.02, *0.78,* (-6.1, 1.8) |
|   Complex Figure Drawing$_{total}$ | 79, *17,* [80], (0-122)[e] |
|   Complex Figure Drawing$_{outline}$ | 94, *17,* [100], (0-200)[e] |
|   Complex Figure Drawing$_{detail}$ | 72, *22,* [72], (0-157)[e] |
|   Face-Name | 76, *22,* [78], (0-200)[f] |

[a] Atrophy is represented as change in volume, with negative numbers indicating volume loss.

[b] *n*=364 due to missing data.

[c] *n*=351 due to missing data.

[d] *n*=354 due to missing data.

[e] *n*=420 due to missing data.

[f] *n*=428 due to missing data.

**Supplementary Table 2. Complex Figure Drawing and Face-Name (FNAME-12) scores (% correct), for each recall and recognition trial within these tasks: median, *IQR*, (range)**

| | All | Cognitively-normal with complete biomarker data (n = 306) | |
|---|---|---|---|
| | | β-amyloid negative | β-amyloid positive |
| **N** | 429 | 211 | 95 |
| **Complex Figure Drawing – total** | | | |
| Copy | 98, *95-100,* (74-100) [a] | 98, *95-100,* (75-100) | 98, *95-100,* (80-100) |
| Immediate Recall | 78, *63-89,* (20-100) [b] | 81, *68-92,* (20-100) [d] | 76, *61-88,* (30-100) |
| 30-minute recall | 76, *60-88,* (15-100) [a] | 79, *66-90,* (15-100) | 76, *61-88,* (30-100) |
| 7-day recall | 58, *45-73,* (0-100) [c] | 62, *48-74,* (8-100) [e] | 56, *43-73,* (0-98) |
| **Complex Figure Drawing - outline** | | | |
| Copy | 100, *100-100,* (77-100) [a] | 100, *100-100,* (77-100) | 100, *100-100,* (82-100) |
| Immediate Recall | 100, *91-100,* (36-100) [b] | 100, *91-100,* (36-100) [d] | 100, *91-100,* (59-100) |
| 30-minute recall | 100, *91-100,* (18-100) [a] | 100, *91-100,* (18-100) | 100, *91-100,* (68-100) |
| 7-day recall | 93, *82-100,* (0-100) [c] | 95, *86-100,* (14-100) [e] | 91, *77-100,* (0-100) |
| **Complex Figure Drawing – detail** | | | |
| Copy | 97, *93-100,* (64-100) [a] | 97, *93-100,* (69-100) | 97, *93-100,* (72-100) |
| Immediate Recall | 71, *52-86,* (14-100) [b] | 76, *57-88,* (14-100) [d] | 71, *50-84,* (19-100) |
| 30-minute recall | 69, *48-83,* (9-100) [a] | 72, *53-88,* (14-100) | 67, *50-83,* (16-100) |
| 7-day recall | 47, *29-63,* (0-100) [c] | 49, *31-66,* (5-100) [e] | 45, *29-62,* (0-97) |
| **Complex Figure Drawing - recognition** | | | |
| 7-day recognition | 100, *75-100,* (0-100) [a] | 100, *75-100,* (25-100) | 100, *75-100,* (0-100) |
| **FNAME-12 Recall** | | | |
| Learning and immediate recall 1 | 50, *38-67,* (0-100) | 50, *38-67,* (0-100) | 50, *38-63,* (0-96) |
| Learning and immediate recall 2 | 83, *67-96,* (4-100) | 83, *67-96,* (21-100) | 79, *67-92,* (4-100) |
| 10-minute recall | 79, *63-92,* (4-100) | 81, *63-96,* (17-100) | 75, *58-92,* (4-100) |
| 30-minute recall | 79, *58-92,* (0-100) [a] | 79, *63-96,* (0-100) | 79, *58-92,* (4-100) |
| 7-day recall | 58, *42-79,* (0-100) | 58, *42-79,* (0-100) | 58, *42-75,* (0-100) |
| **FNAME-12 Recognition** | | | |
| 30-minute facial recognition | 100, *100-100,* (50-100) | 100, *100-100,* (83-100) | 100, *100-100,* (92-100) |
| 30-minute names and occupations recognition | 96, *88-100,* (46-100) | 96, *88-100,* (63-100) | 96, *88-100,* (63-100) |
| 7-day facial recognition | 100, *100-100,* (42-100) | 100, *100-100,* (92-100) | 100, *100-100,* (92-100) |
| 7-day names and occupations recognition | 92, *83-100,* (38-100) | 92, *83-100,* (46-100) | 88, *83-96,* (54-100) |

[a] *n*=428 due to missing data. [b] *n*=427 due to missing data. [c] *n*=420 due to missing data. [d] *n*=210 due to missing data. [e] *n*=208 due to missing data.

**Supplementary Table 3. Predictors of accelerated long-term forgetting scores in cognitively-normal participants (_n_=306), with amyloid burden as a continuous variable (Standard Uptake Value Ratio)**

| | | Coefficient (95% confidence intervals) (% retained after 7 days, relative to after 30 minutes) | | | |
| --- | --- | --- | --- | --- | --- |
| | | Complex Figure Drawing: total | Complex Figure Drawing: outline | Complex Figure Drawing: detail | Face-Name |
| **Model 5 [a]** | | | | | |
| | **Amyloid burden: SUVR** | -0.3 (-8.8, 8.5) | -7.5 (-17.4, 0.6) | 2.2 (-7.9, 13.8) | -1.0 (-12.6, 10.2) |
| **Model 7** | **Interaction between SUVR and whole-brain atrophy rate** | 3.5 (-0.0, 8.6) | **4.2 (0.9, 9.9)\*\*** | 3.0 (-1.1, 8.4) | 3.3 (-1.2, 8.6) |
| **Model 8** | **Interaction between SUVR and hippocampal atrophy rate** | 72 (-171, 419) | 239 (-10, 608) | -33 (-343. 342) | 17 (-282, 411) |

**\*** significant at $p < 0.05$; **\*\*** significant at $p < 0.01$. See Methods for details of Models. Negative associations indicate that the predictor is associated with a lower percentage of material retained after 7 days relative to 30 minutes (i.e. greater forgetting). Multivariable regression models were used so each association is independent of all others. All models also included adjustment for sex, age at assessment, education, childhood cognitive ability, socioeconomic position, _APOE-ε4_ genotype, white matter hyperintensity volume and head size (total intracranial volume). $p<0·05$ or $p>0·05$ and $p<0·01$ or $p>0·01$ was inferred from bootstrapped 95% and 99% CIs. [a] The coefficients for SUVR are essentially the same in Model 5 (shown here) and Model 6 (not shown).