

What Factors Could Affect Memory in Later Life?

1. Abstract

Memory is often one of the first things to decline as we get older. What is less clear is how much of the difference between two people of the same age can be explained by factors they can actually change, which is what we set out to explore here. We used Wave 7 of the English Longitudinal Study of Ageing, covering 9,670 older adults in England and looked at age, sex, self-rated health, low mood, physical activity and social participation against a word recall score from 0 to 20. Since the scores were not normally distributed, we used five tests, each with its own null hypothesis. Females scored higher than males, memory declined with age and scores fell steadily as self-rated health worsened, from 11.98 to 8.41 (all $p < 0.001$). The least active people were also 4.66 times more likely to report low mood (95% CI 3.85 to 5.63). Together, the seven factors explained 21% of the variation in memory scores. Age had the strongest effect, which is not particularly surprising, but the changeable factors were not nearly as small in comparison: being physically active was associated with a difference like being around seven years younger, while each additional social group joined was worth roughly three years. With a sample this large, statistical significance is almost unavoidable, so the size of the effect tells us considerably more than the p value on its own.

2. Introduction

The English Longitudinal Study of Ageing (ELSA) has followed a representative sample of people aged 50 and over in England since 2002, returning every two years to collect economic, social, psychological, cognitive and health data (Stephens et al., 2013). It was developed as a sister study to the Health and Retirement Study in the USA, with new participants added at several waves, including Wave 7, helping the sample remain representative as the original group ages (Stephens et al., 2013). This gives us a working sample of 9,670 people in Wave 7.

ELSA gives us several measures to look at in relation to memory because it does not simply ask people how they think their memory is doing. Interviewers carry out an actual memory test face to face, while also collecting detailed information on health, activity, mood and social life (Stephens et al., 2013).

So, what we really want to know is which of these factors are linked to better memory when we look at them together, rather than one at a time. Age and sex cannot be changed, but they give us a baseline to judge the other factors against. Physical activity, mood and social contact can all change and if any of them remain linked to memory after accounting for age and health, then we have something worth acting on. That is what we use ELSA Wave 7 to test.

3. Literature Review

The idea of cognitive reserve says that a lifetime of mentally demanding work, study and hobbies builds a buffer, meaning some people continue to function well even after the brain has started to change underneath (Stern, 2012). The practical version of this idea is that staying mentally active later in life may matter too, which is why clubs and groups are worth measuring here. Exercise is the other main candidate. A review of long-term studies found that physically active people were less likely to experience cognitive decline and this held for moderate activity as well as harder exercise (Sofi et al., 2011).

There is a catch running through all of this work and it matters when reading the results below. Studies that measure everything at one moment cannot tell us which way the arrow points. Someone whose memory is already slipping may be exactly the person who stops going to the gym or turning up at the club. So, the link between activity and memory can run in either direction and this study cannot settle which one.

4. Research Aim and Objectives

Aim: To find out which personal, health, lifestyle and social factors are linked to better memory among older adults in England, using ELSA Wave 7.

The objectives were:

1. To describe how memory scores and the other variables are distributed across the sample
2. To test whether memory differs between males and females and across levels of self-rated health
3. To measure how strongly memory is linked to age
4. To test whether physical activity is linked to low mood
5. To determine how much of the variation in memory the factors explain together

5. Methodology

5.1. ELSA Wave 7

ELSA is a panel study following a representative group of females and males aged 50 and over living in England and was set up as a sister study to the Health and Retirement Study in the USA (Steptoe et al., 2013). Data are collected through computer-assisted personal interviews and self-completion questionnaires (Steptoe et al., 2013). Wave 7 was collected in 2014 and 2015. The cognitive tests are done directly by the interviewer, so the outcome we use here is an actual measured score rather than someone simply rating their own memory.

5.2. Variables used

We used 16 source variables: the number of words out of ten recalled straight away (cflisen), plus the number still remembered after a delay (cflisd). We then tested this against age (indager), sex (indsex), self-rated health (hehelf), physical activity based on how often people did vigorous and moderate activity (heacta, heactb), low mood from a single yes/no question (psceda) and social participation based on the eight organisation membership items (scorg01 to scorg08). And the outcome of it all was a memory score.

Variable	SPSS name(s)	Role	Type	Values
Memory Score	memory = cflisen + cflisd	Outcome	Continuous	0 to 20
Age	indager	Explanatory	Continuous	29 to 89
Sex	indsex (female for regression)	Explanatory	Categorical	Male, Female
Self-rated Health	hehelp (fairpoor for regression)	Explanatory	Ordered	Excellent to Poor
Physical activity	activity (from heacta, heactb; act_high, act_med)	Explanatory	Ordered	High, Medium, Low
Low mood	lowmood = psceda	Explanatory	Binary	Yes, No
Social Participation	members = SUM(scorg01 to scorg08)	Explanatory	Count	0 to 8 Groups

Table 1. The variables used and how they are measured.

5.3. Data Preparation and Tests

ELSA marks non-answers with negative numbers, so these were set to missing before we did anything else. We then created eight new variables from the raw items. Memory was made by adding immediate recall (cflisen) and delayed recall (cflisd), giving a score from 0 to 20. Activity came from the vigorous and moderate exercise questions (heacta, heactb): people doing vigorous activity at least weekly were coded 1 (High), those doing moderate but not vigorous activity at least weekly were coded 2 (Medium) and everyone else was 3 (Low). Members was made by summing the eight variables (scorg01 to scorg08), giving a count from 0 to 8. lowmood changed psceda from yes/no (1/2) into 1/0. For the regression, we needed four more 1/0 variables because it cannot use multi-category variables directly: female from indsex, fairpoor from hehelp (fair or poor = 1, everything else = 0) and act_high and act_med from activity, with Low activity left as the comparison group.

Age is slightly different. People aged 90 and over have a separate code because their exact age is withheld, so they cannot be identified. That means they have no usable age and drop out of every analysis involving age. This removes some of the oldest and lowest-scoring people, which could actually make the age effect look smaller than it really is. We used cases whenever the answers needed for that particular test were available, so the sample size changes between tests and is reported each time.

We checked the shape of the memory scores first, because that tells us which tests we can use. The scores were not normally distributed (see Results), so we stayed with nonparametric tests: Mann-Whitney U instead of an independent samples t-test, KruskalWallis instead of one-way ANOVA and Spearman's rho instead of Pearson's r. A chisquare test was used for the two categorical variables, with an odds ratio to show the size of the difference. Multiple linear regression came last, to see what each factor adds when the others are held constant. We checked its assumptions using residual plots and collinearity statistics. Every test has its own null and alternative hypothesis, with the full output in the Appendix.

6. Results

The sample was 55.5% females (5,368) and 44.5% males (4,302). Ages ranged from 29 to 89, with an average age of 66.8 (SD 9.7, $n = 9,477$). Memory scores averaged 10.5 out of 20 (SD 3.8, $n = 9,042$), with a median of 11 and people covered the full range from 0 to 20. The scores were slightly left-skewed (skewness = -0.42) and the Kolmogorov-Smirnov test was significant (statistic = 0.090, $df = 9,042$, $p < 0.001$), confirming that the scores were not normally distributed (Figure 1).

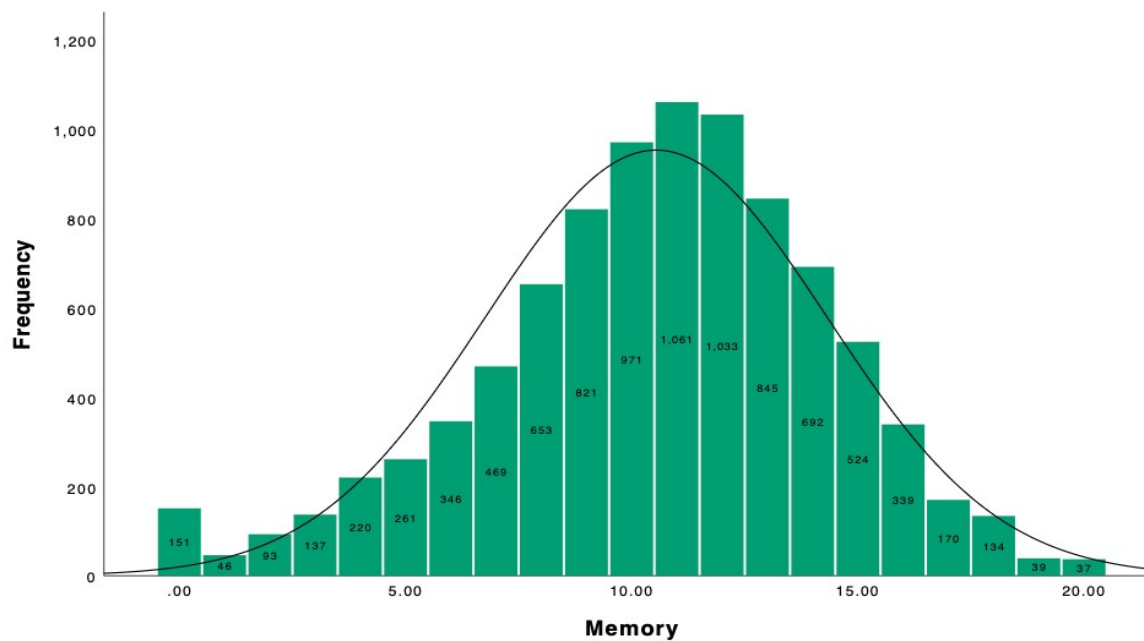


Figure 1. Memory scores with normal curve

Group	n	Valid %
Females	5,368	55.5
Males	4,302	44.5
Health: excellent	1,077	11.9
Health: very good	2,641	29.1
Health: good	2,989	33.0
Health: fair	1,682	18.5
Health: poor	679	7.5
Activity: high	2,851	29.5
Activity: medium	4,425	45.8
Activity: low	2,390	24.7
Reported low mood	1,043	11.6

Belongs to no groups	2,285	29.3
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Table 2. Variables, count and percentage of people who answered the items

Memory and sex, Mann-Whitney U. H0: males and females have the same spread of memory scores. H1: they differ. Females ranked higher (mean rank 4,773, $n = 5,073$) than males (mean rank 4,200, $n = 3,969$), $U = 8,789,994.5$, $Z = -10.41$, $p < 0.001$. So there is a real difference, but it is pretty small which is less than one word on a twenty-point test.

Memory and self-rated health, Kruskal-Wallis. H0: all five health groups have the same spread of memory scores. H1: at least one is different. The mean ranks fell steadily from excellent health (5,540) to poor health (3,101), $H(4) = 668.03$, $p < 0.001$, while the average memory score followed the same pattern, dropping from 12.0 to 8.4 (Figure 2). The followup comparisons found that all ten pairs of health groups were significantly different after Bonferroni adjustment. The pattern is a pretty steady drop as reported health gets worse.

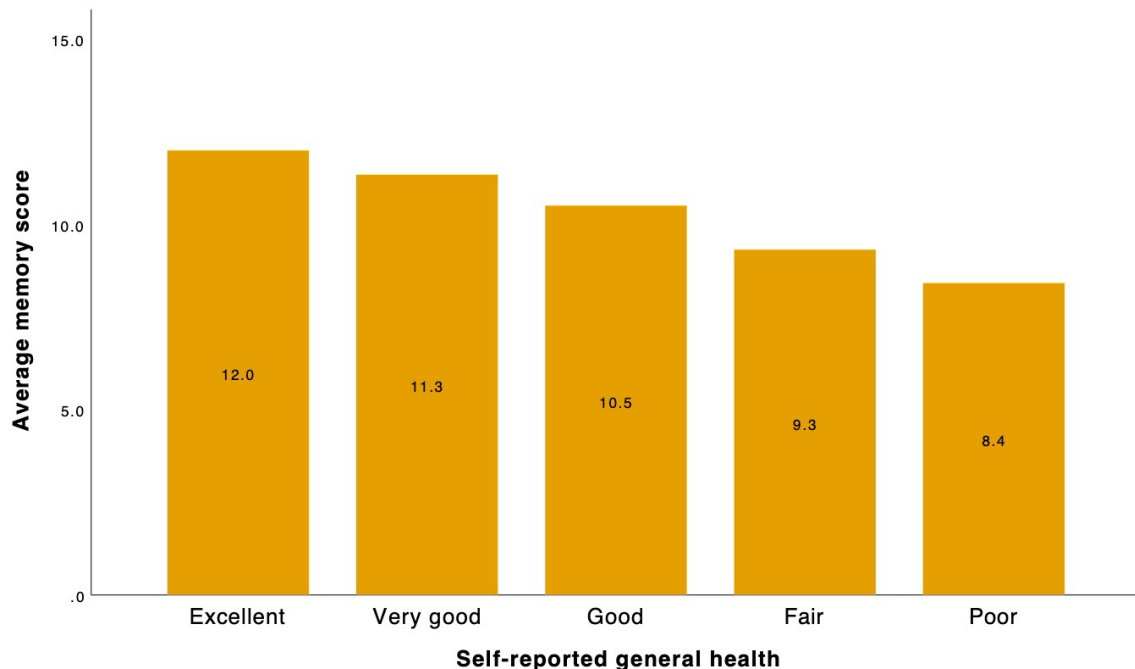


Figure 2. Average memory score of self-reported health group

Memory and age, Spearman's rho. H0: there is no link between age and memory ($\rho = 0$). H1: there is a link. There was a moderate negative relationship, $\rho = -.351$, $p < 0.001$, $n = 8,898$.

Physical activity and low mood, chi-square. H0: activity and low mood are unrelated. H1: they are related. They were clearly related, $\chi^2(2) = 347.00$, $p < 0.001$, $n = 9,001$. No cell had an expected count below 5, with the smallest being 247.6, so the test was valid. Low mood was reported by 5.9% of the most active group, 9.7% of the middle group and 22.5% of the least active group (Figure 3). The linear-by-linear result was also significant, 303.83 ($df = 1$, $p < 0.001$), showing that this is a pretty steady trend rather than one group

simply standing out. Comparing the most and least active groups gives an odds ratio of 4.66 (95% CI 3.85 to 5.63).

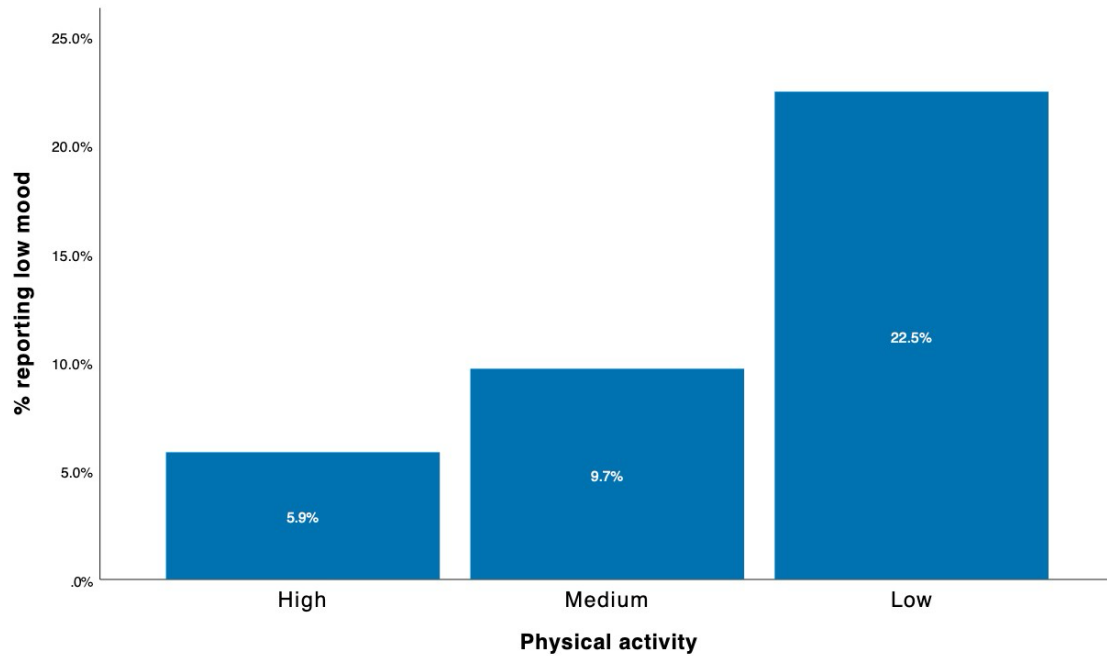


Figure 3. Percentage of people reporting low mood at each activity level

Multiple linear regression. H0: none of the factors are linked to memory once the others are taken into account. H1: at least one is. The model was significant, $F(7, 7668) = 288.76$, $p < 0.001$ and explained 21% of the differences in memory scores ($R^2 = .209$, $n = 7,676$). All seven factors were still significant in the model (Table 3), so none of them disappeared once the others were accounted for. Collinearity was not an issue either, with the highest VIF at 2.25, well below the usual threshold of 10.

Factor	Unstandardised B	Std. Error	Beta	p
Age (per year)	-0.126	0.004	-0.332	<0.001
Female	0.814	0.073	0.114	<0.001
Fair or poor health	-0.804	0.095	-0.096	<0.001
Low mood	-0.806	0.124	-0.069	<0.001
High Activity	0.930	0.116	0.122	<0.001
Medium Activity	0.714	0.102	0.100	<0.001
Social Groups	0.372	0.027	0.147	<0.001

Table 3. Regression predicting memory score ($n=7,676$ and $R^2 = 0.209$)

With a sample this big, almost everything comes out significant, so the p value is not that useful on its own. Every factor in Table 3 had $p < 0.001$, even sex, where the actual effect is very small. What matters more is how big the effects are. The easiest way to show this is to compare them with age. One extra year of age costs 0.126 points on the memory test, so we can divide each other B value by 0.126 to see how many “years of ageing” it is worth.

On this scale, high activity is worth about 7 years, medium activity about 6 years and each extra group joined about 3 years. Low mood and fair or poor health each cost about 6 years.

The total memory score also hides something interesting. When we split it into its two parts (Figure 4), words recalled straight away fall from 6.5 in the youngest group to 4.6 in the oldest, a drop of about 30%. Words remembered after the delay fall even more, from 5.3 to 3.0, or about 44%. So, the share of words people still remembered after the delay falls from around 81% to 65%. In other words, ageing seems to affect holding on to information more than simply taking it in and the single 20-point memory score hides this difference.

Graph

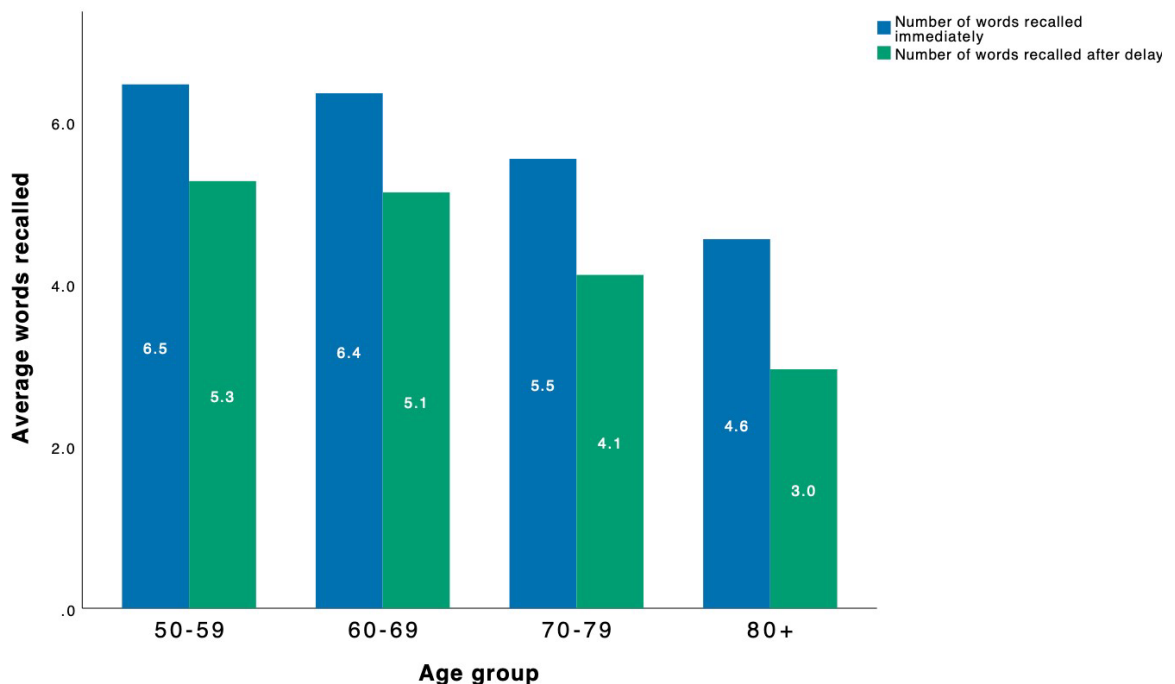


Figure 4. Recollection of words immediately and after a delay

The obvious question about the activity finding is whether active people are simply younger. Figure 5 helps answer this by looking at age and activity together. In every age group, the most active people scored about two points higher than the least active. This was roughly 12.4 against 10.2 for the 50–59 group and 8.9 against 6.7 for people aged 80 and over. If activity was only a sign of being younger, we would expect this gap to almost disappear once we look within the same age group. It does not. The gap is just as clear among the oldest people as it is among the youngest. This still does not prove that activity

causes better memory, but it does rule out the simplest explanation that the result is only because active people are younger.

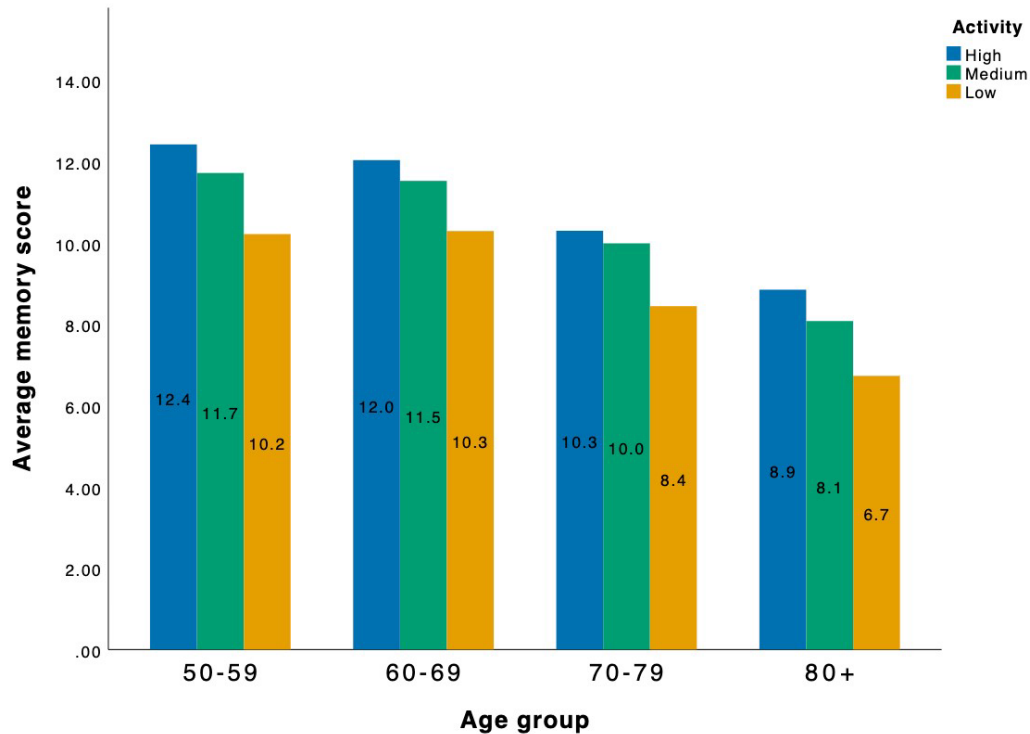


Figure 5. Average memory score by activity level for each age group

7. Discussion

Physical activity was linked to better memory, which fits with earlier research showing that people who are more active are less likely to experience cognitive decline (Sofi et al., 2011). Social participation was also one of the stronger factors, which fits the cognitive reserve idea that staying mentally and socially active later in life may help people cope better with age-related changes in the brain (Stern, 2012).

Figure 5 also shows that the activity link is not simply age in disguise and Figure 4 reminds us that a single summed score can hide what is actually changing underneath it. But there is still a big catch: none of this proves that changing these things would improve memory. Social participation is especially tricky because the arrow could easily point the other way. Overall, though, the results are in line with the existing literature.

The biggest limitation is that everything was measured at one point in time, so we cannot make a causal claim. Some of the measures are also quite basic. Low mood comes from one question rather than a full scale, while physical activity is based on how often people exercise, not how hard or how long they exercise for. That can make the relationship look weaker than it really is. The 90 and over group is another issue, because removing the oldest

people probably makes the age effect look smaller. Sample sizes also change between tests, from 9,042 to 7,676 and only 7,803 people answered the group membership questions. That means people who skipped the self-completion questionnaire are missing from one of the stronger factors in the model. And finally, 21% explained still means 79% unexplained.

The obvious next step is to follow the same people across several ELSA waves. That would give us a much better shot at answering the question this study cannot: does activity drop first, or does memory? The measures could also be improved. A proper mood scale would be better than one question, activity could be measured with a tracker rather than self-report and education could be included as another important part of the picture.

8. Conclusion

Across 9,670 older adults in England, memory scores were linked to age, sex, health, mood, physical activity and social participation, which together explained about a fifth of the differences between people. Age had the biggest effect, which is hardly surprising. What is more interesting is how being highly active was roughly like being seven years younger, while each group someone belonged to was worth about three years. The activity gap also showed up across every age group, so it did not simply disappear once we accounted for age. There is still a big catch here. This is only a snapshot, so we cannot say that changing these things would actually improve memory. It could just as easily be that people whose memory is getting worse are the ones who stop exercising and going out. What we can say is that these are the areas a study following people over time should look at first.

9. References

- Sofi, F., Valecchi, D., Bacci, D., Abbate, R., Gensini, G. F., Casini, A., & Macchi, C. (2011). Physical activity and risk of cognitive decline: A meta-analysis of prospective studies. *Journal of Internal Medicine*, 269(1), 107-117. <https://doi.org/10.1111/j.13652796.2010.02281.x>
- Stephens, A., Breeze, E., Banks, J., & Nazroo, J. (2013). Cohort profile: The English Longitudinal Study of Ageing. *International Journal of Epidemiology*, 42(6), 1640-1648. <https://doi.org/10.1093/ije/dys168>
- Stern, Y. (2012). Cognitive reserve in ageing and Alzheimer's disease. *The Lancet Neurology*, 11(11), 1006-1012. [https://doi.org/10.1016/S1474-4422\(12\)70191-6](https://doi.org/10.1016/S1474-4422(12)70191-6)

10. Appendix

Descriptives

Notes		
Output Created		21-JUL-2026 02:34:50
Comments		
Input	Data	/Users/srujan/Downloads/elsa_wave7.sav
	Active Dataset	DataSet2
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	9670
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	All non-missing data are used.
Syntax		DESCRIPTIVES VARIABLES=memory indager /STATISTICS=MEAN STDDEV MIN MAX KURTOSIS SKEWNESS.
Resources	Processor Time	00:00:00.01
	Elapsed Time	00:00:00.00

[DataSet2] /Users/srujan/Downloads/elsa_wave7.sav

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
memory	9042	.00	20.00	10.5416	3.78338
(D) Definitive age variable collapsed at 90+: priority diag, dhage	9477	29.00	89.00	66.8321	9.71315
Valid N (listwise)	8898				

Descriptive Statistics

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
memory	-.417	.026	.205	.052
(D) Definitive age variable collapsed at 90+: priority diag, dhage	.090	.025	-.478	.050
Valid N (listwise)				

Frequencies

Statistics						
		(D) Definitive sex variable: priority disex, dhsex	Self-reported general health	activity	lowmood	members
N	Valid	9670	9068	9666	9003	7803
	Missing	0	602	4	667	1867

Frequency Table

(D) Definitive sex variable: priority disex, dhsex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	4302	44.5	44.5	44.5
	Female	5368	55.5	55.5	100.0
	Total	9670	100.0	100.0	

Self-reported general health

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	...excellent,	1077	11.1	11.9	11.9
	very good,	2641	27.3	29.1	41.0
	good,	2989	30.9	33.0	74.0
	fair,	1682	17.4	18.5	92.5
	or, poor?	679	7.0	7.5	100.0
	Total	9068	93.8	100.0	
Missing	Don't know	3	.0		
	Not applicable	599	6.2		
	Total	602	6.2		
Total		9670	100.0		

		activity			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High	2851	29.5	29.5	29.5
	Medium	4425	45.8	45.8	75.3
	Low	2390	24.7	24.7	100.0
	Total	9666	100.0	100.0	
Missing	System	4	.0		
Total		9670	100.0		

		lowmood			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	7960	82.3	88.4	88.4
	1.00	1043	10.8	11.6	100.0
	Total	9003	93.1	100.0	
Missing	System	667	6.9		
Total		9670	100.0		

		members			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	2285	23.6	29.3	29.3
	1.00	2366	24.5	30.3	59.6
	2.00	1579	16.3	20.2	79.8
	3.00	913	9.4	11.7	91.5
	4.00	405	4.2	5.2	96.7
	5.00	164	1.7	2.1	98.8
	6.00	46	.5	.6	99.4
	7.00	13	.1	.2	99.6
	8.00	32	.3	.4	100.0
	Total	7803	80.7	100.0	
Missing	System	1867	19.3		
Total		9670	100.0		

Explore

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
memory	9042	93.5%	628	6.5%	9670	100.0%

Descriptives

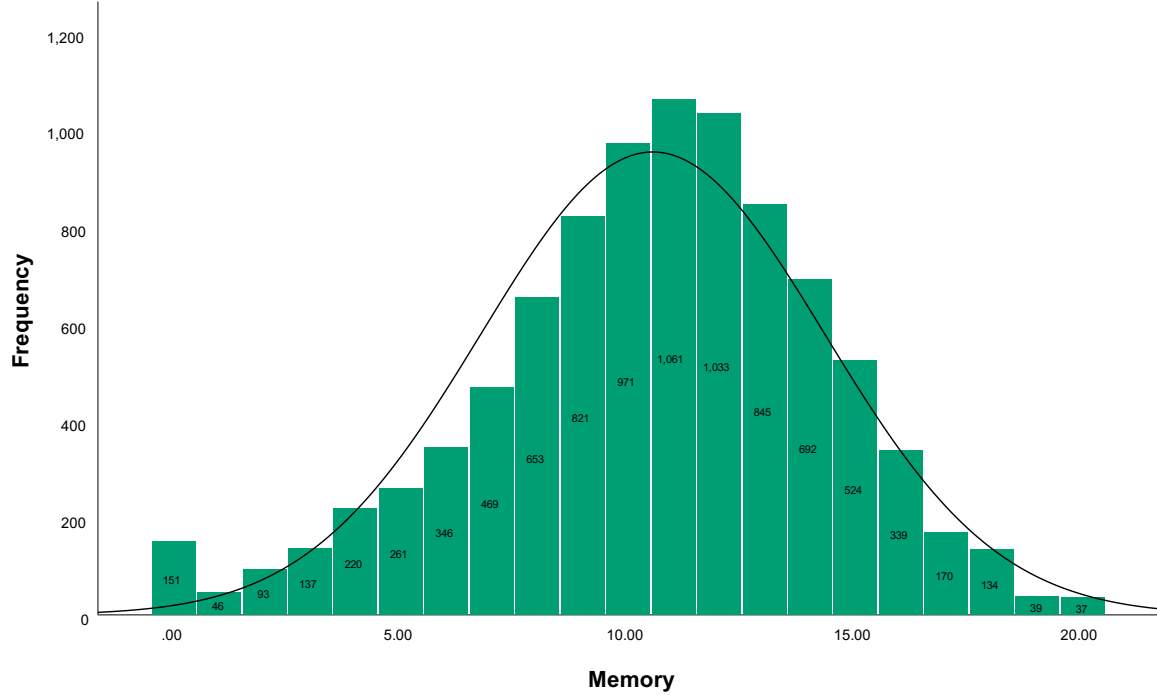
		Statistic	Std. Error
memory	Mean	10.5416	.03979
	95% Confidence Interval for Mean	Lower Bound	10.4636
		Upper Bound	10.6196
	5% Trimmed Mean	10.6462	
	Median	11.0000	
	Variance	14.314	
	Std. Deviation	3.78338	
	Minimum	.00	
	Maximum	20.00	
	Range	20.00	
	Interquartile Range	5.00	
	Skewness	-.417	.026
	Kurtosis	.205	.052

Tests of Normality

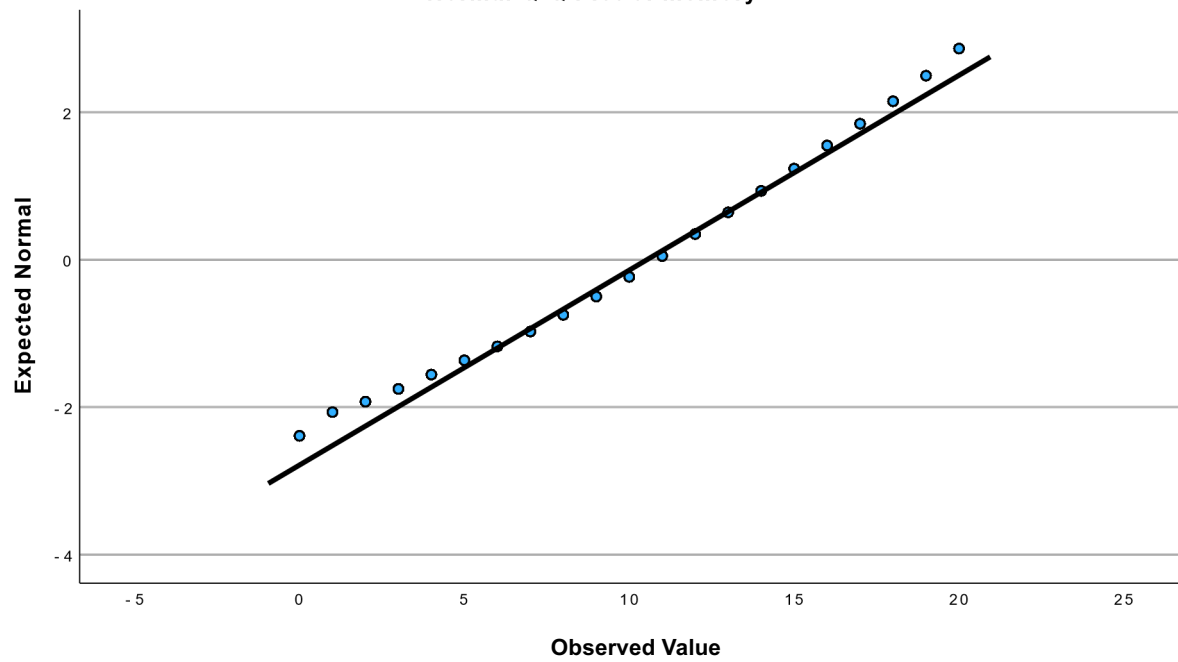
	Kolmogorov-Smirnov ^a		
	Statistic	df	Sig.
memory	.090	9042	<.001

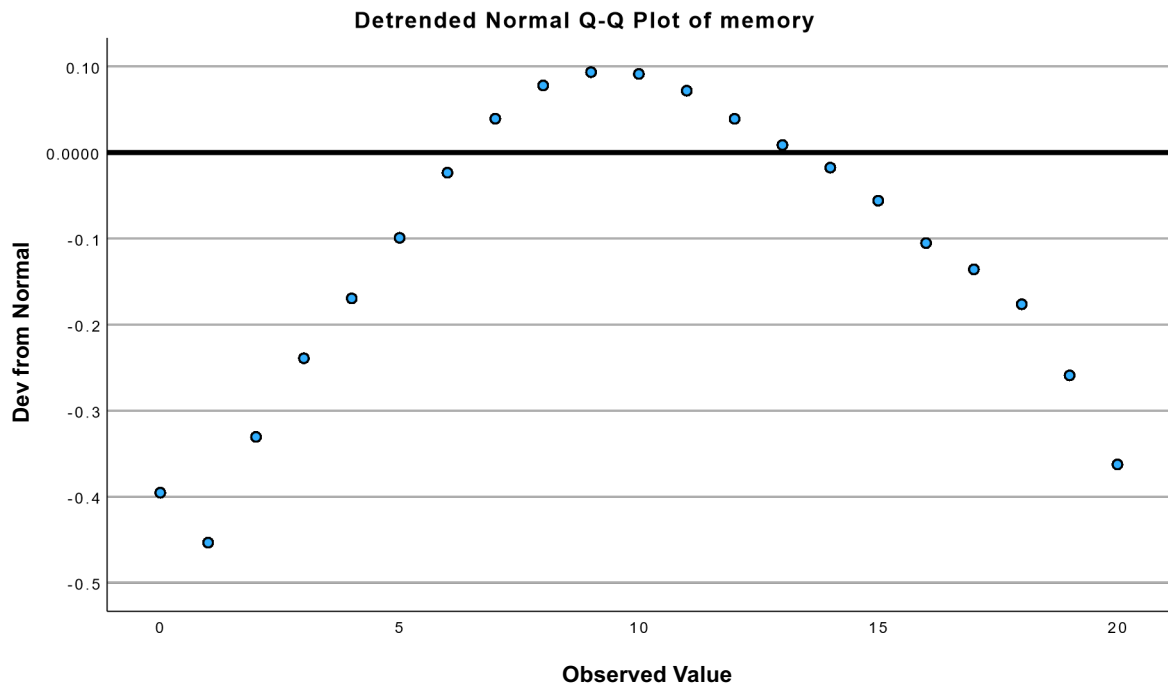
a. Lilliefors Significance Correction

memory



Normal Q-Q Plot of memory





NPar Tests

Mann-Whitney Test

Ranks				
(D) Definitive sex variable: priority disex, dhsex		N	Mean Rank	Sum of Ranks
memory	Male	3969	4199.66	16668459.50
	Female	5073	4773.30	24214943.50
	Total	9042		

Test Statistics ^a memory	
Mann-Whitney U	8789994.500
Wilcoxon W	16668459.5
Z	-10.408
Asymp. Sig. (2-tailed)	<.001

a. Grouping Variable: (D) Definitive sex variable: priority disex, dhsex

NPar Tests

Descriptive Statistics				
N	Mean	Std. Deviation	Minimum	Maximum

memory	9042	10.5416	3.78338	.00	20.00
Self-reported general health	9068	2.8065	1.10182	1.00	5.00

Kruskal-Wallis Test

Ranks		Self-reported general health	
		N	Mean Rank
memory	...excellent,	1075	5539.76
	very good,	2632	5061.73
	good,	2986	4482.59
	fair,	1672	3650.38
	or, poor?	674	3101.08
	Total	9039	

Test Statistics^{a,b} memory

Kruskal-Wallis H	668.025
df	4
Asymp. Sig.	<.001

a. Kruskal Wallis Test

b. Grouping Variable: Self-reported general health

Nonparametric Tests

Hypothesis Test Summary

	Null Hypothesis	Test	Sig. ^{a,b}
1	The distribution of memory is the same across categories of Self-reported general health.	Independent-Samples KruskalWallis Test	<.001

Hypothesis Test Summary

	Decision
1	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

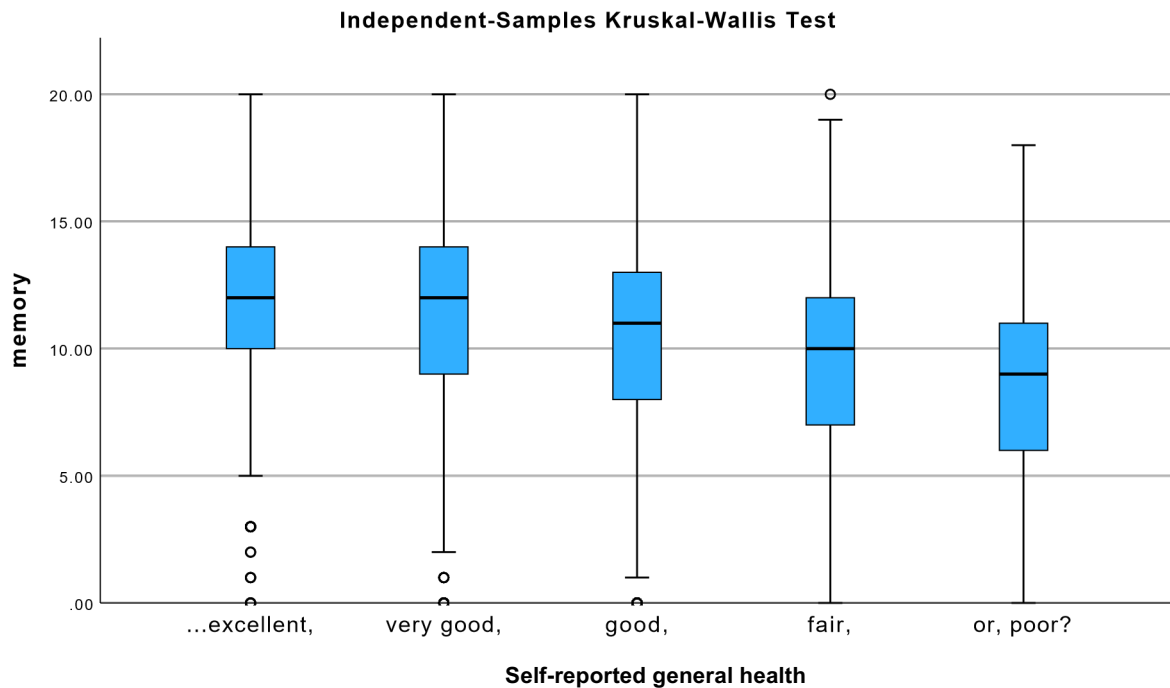
Independent-Samples Kruskal-Wallis Test memory across Self-reported general health

Independent-Samples Kruskal-Wallis Test Summary

Total N	9039
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Test Statistic	668.025 ^a
Degree Of Freedom	4
Asymptotic Sig.(2-sided test)	<.001

a. The test statistic is adjusted for ties.



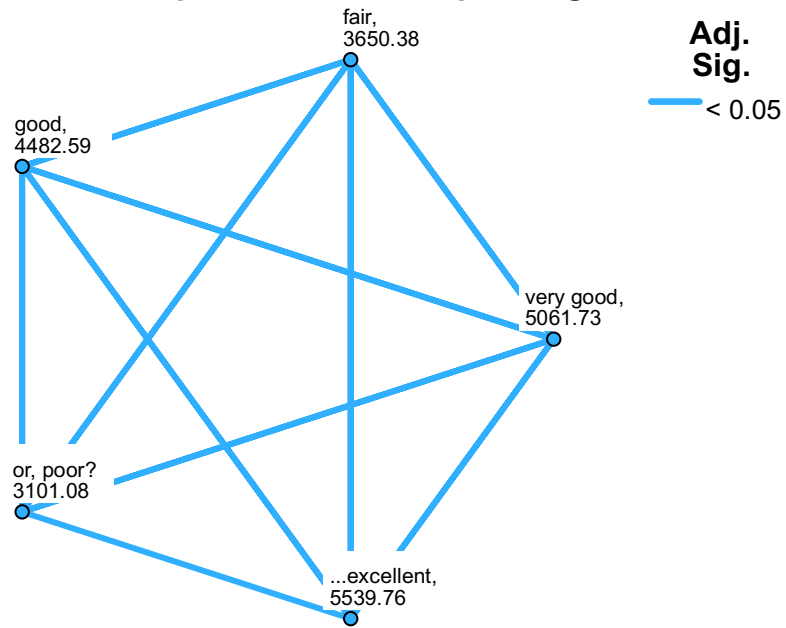
Pairwise Comparisons of Self-reported general health

Sample 1-Sample 2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. ^a
or, poor?-fair,	549.298	118.629	4.630	<.001	.000
or, poor?-good,	1381.503	110.877	12.460	<.001	.000
or, poor?-very good,	1960.647	112.242	17.468	<.001	.000
or, poor?-...excellent,	2438.675	127.743	19.090	<.001	.000
fair,-good,	832.205	79.417	10.479	<.001	.000
fair,-very good,	1411.349	81.311	17.357	<.001	.000
fair,-...excellent,	1889.377	101.644	18.588	<.001	.000
good,-very good,	579.144	69.515	8.331	<.001	.000
good,-...excellent,	1057.172	92.479	11.431	<.001	.000
very good,-...excellent,	478.028	94.111	5.079	<.001	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .050.

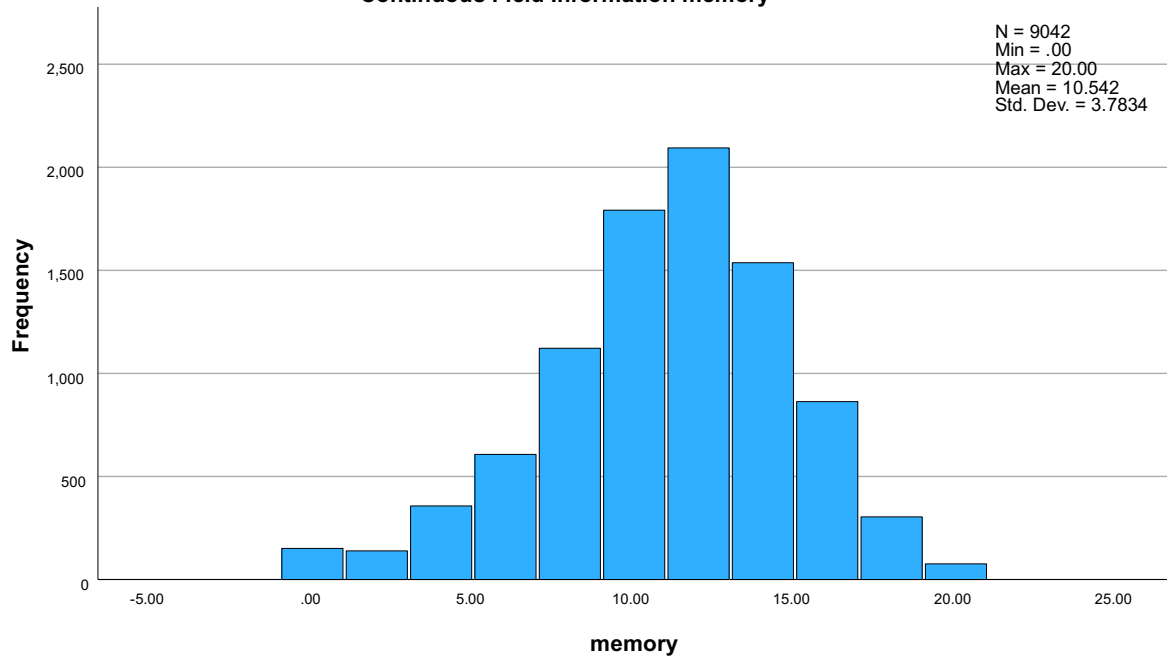
a. Significance values have been adjusted by the Bonferroni correction for multiple tests.

Pairwise Comparisons of Self-reported general ...

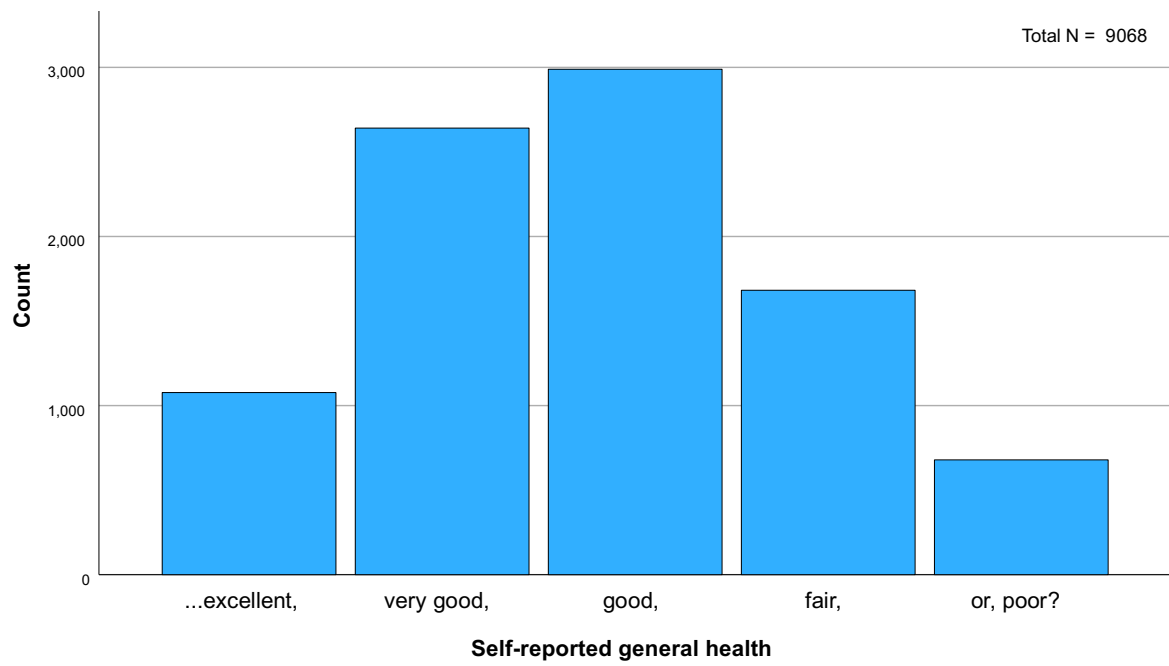


Each node shows the sample average rank of Self-reported general health.

Continuous Field Information memory



Categorical Field Information Self-reported general health



Nonparametric Correlations

Correlations

		memory		(D) Definitive age variable collapsed at 90+: priority diag, dhage
Spearman's rho	memory	Correlation Coefficient	1.000	-.351**
		Sig. (2-tailed)	.	<.001
		N	9042	8898
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	Correlation Coefficient	-.351**	1.000
		Sig. (2-tailed)	<.001	.
		N	8898	9477

** . Correlation is significant at the 0.01 level (2-tailed).

Spearman's rho Correlations

Highly Positive: (None)

Positive: (None)

No Linear Correlation: (None)

Negative: (memory <---> (D) Definitive age variable collapsed at 90+: priority diag, dhage)

Highly Negative: (None)

Note: Curated Help is calculated based on actual cell values, not the formatted values.

Crosstabs

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
activity * lowmood	9001	93.1%	669	6.9%	9670	100.0%

activity * lowmood Crosstabulation

	lowmood		Total
	.00	1.00	

activity	High	Count	2523	157	2680
		% within activity	94.1%	5.9%	100.0%
	Medium	Count	3778	406	4184
		% within activity	90.3%	9.7%	100.0%
	Low	Count	1657	480	2137
		% within activity	77.5%	22.5%	100.0%
Total	Count		7958	1043	9001
	% within activity		88.4%	11.6%	100.0%

Chi-Square Tests

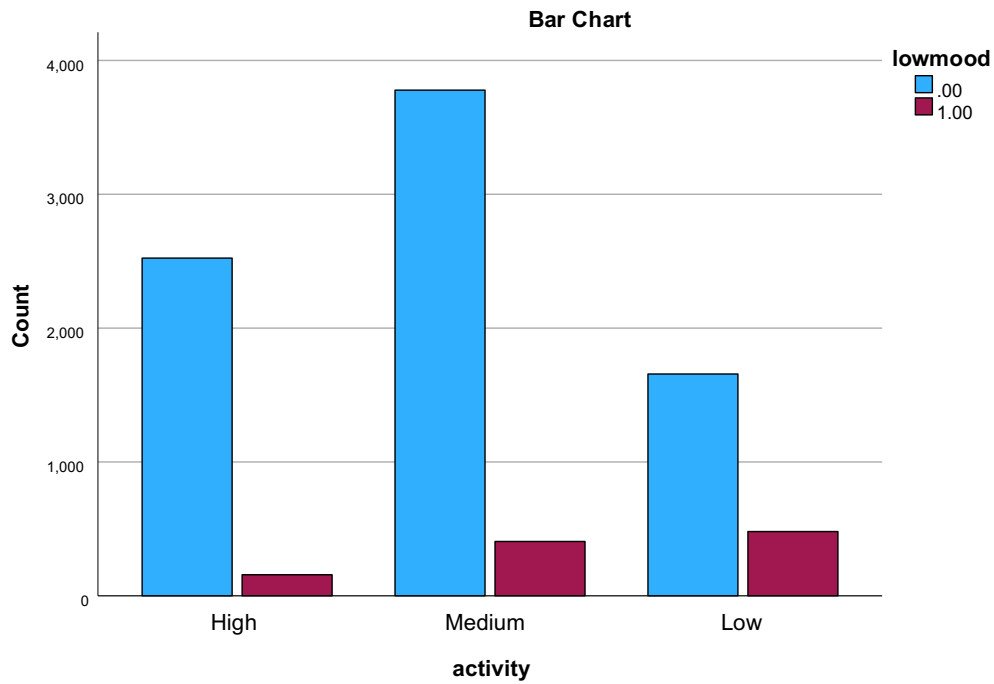
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	347.004 ^a	2	<.001
Likelihood Ratio	318.372	2	<.001
Linear-by-Linear Association	303.828	1	<.001
N of Valid Cases	9001		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 247.63.

Risk Estimate

	Value
Odds Ratio for activity (High / Medium)	a

a. Risk Estimate statistics cannot be computed. They are only computed for a 2*2 table without empty cells.



Crosstabs

Case Processing Summary

	Valid		Cases Missing		Total	
	N	Percent	N	Percent	N	Percent
activity * lowmood	4817	91.9%	424	8.1%	5241	100.0%

activity * lowmood Crosstabulation

			lowmood		
			.00	1.00	Total
activity	High	Count	2523	157	2680
		% within activity	94.1%	5.9%	100.0%
	Low	Count	1657	480	2137
		% within activity	77.5%	22.5%	100.0%
Total		Count	4180	637	4817
		% within activity	86.8%	13.2%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2sided)
Pearson Chi-Square	285.616 ^a	1	<.001	
Continuity Correction ^b	284.171	1	<.001	

Likelihood Ratio	291.022	1	<.001	
Fisher's Exact Test				<.001
Linear-by-Linear Association	285.557	1	<.001	
N of Valid Cases	4817			

Chi-Square Tests

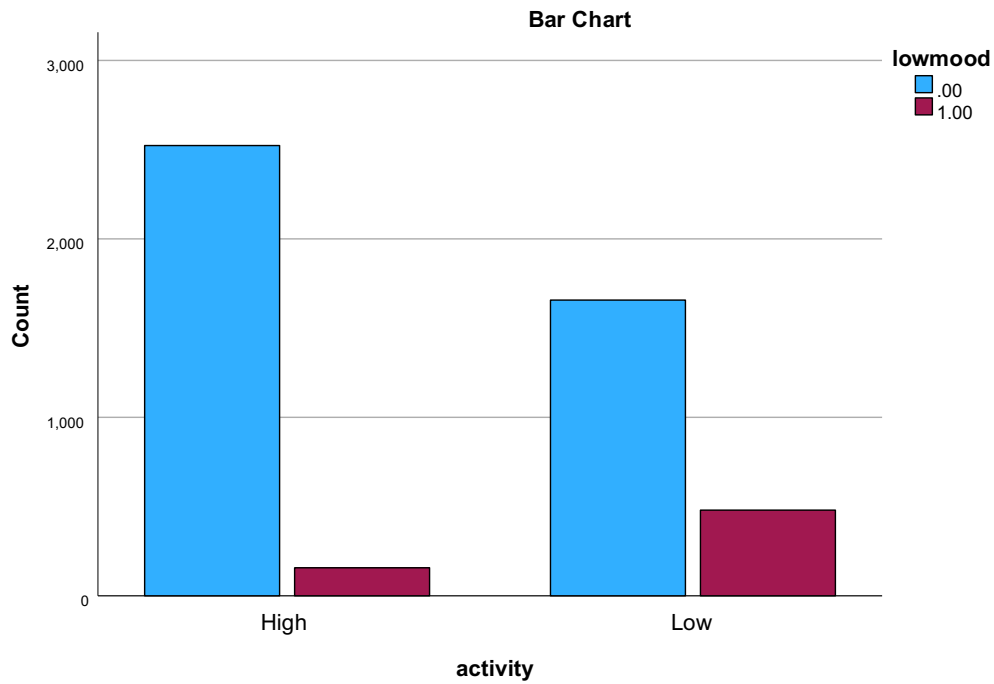
	Exact Sig. (1-sided)
Pearson Chi-Square	
Continuity Correction ^b	
Likelihood Ratio	
Fisher's Exact Test	<.001
Linear-by-Linear Association	
N of Valid Cases	

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 282.60.

b. Computed only for a 2x2 table

Risk Estimate

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for activity (High / Low)	4.655	3.848	5.632
For cohort lowmood = .00	1.214	1.185	1.244
For cohort lowmood = 1.00	.261	.220	.309
N of Valid Cases	4817		



Regression

Descriptive Statistics

	Mean	Std. Deviation	N
memory	10.8964	3.55115	7676
(D) Definitive age variable collapsed at 90+: priority diag, dhage	66.7536	9.38412	7676
female	.5561	.49687	7676
fairpoor	.2370	.42525	7676
lowmood	.1025	.30336	7676
act_high	.3150	.46455	7676
act_med	.4795	.49961	7676
members	1.4556	1.40571	7676

Correlations

		memory	(D) Definitive age variable collapsed at 90+: priority diag, dhage	female	fairpoor
Pearson Correlation	memory	1.000	-.359	.118	-.216
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	-.359	1.000	-.037	.130
	female	.118	-.037	1.000	.002
	fairpoor	-.216	.130	.002	1.000

	lowmood	-.131	.044	.067	.249
	act_high	.168	-.185	-.081	-.243
	act_med	.022	.018	.032	-.077
	members	.160	.093	.021	-.150
Sig. (1-tailed)	memory	.	<.001	<.001	<.001
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	.000	.	.001	.000
	female	.000	.001	.	.428
	fairpoor	.000	.000	.428	.
	lowmood	.000	.000	.000	.000
	act_high	.000	.000	.000	.000
	act_med	.028	.056	.002	.000
	members	.000	.000	.032	.000
N	memory	7676	7676	7676	7676
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	7676	7676	7676	7676
	female	7676	7676	7676	7676
	fairpoor	7676	7676	7676	7676
	lowmood	7676	7676	7676	7676
	act_high	7676	7676	7676	7676
	act_med	7676	7676	7676	7676
	members	7676	7676	7676	7676

Correlations

		lowmood	act_high	act_med	members
Pearson Correlation	memory	-.131	.168	.022	.160
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	.044	-.185	.018	.093
	female	.067	-.081	.032	.021
	fairpoor	.249	-.243	-.077	-.150
	lowmood	1.000	-.104	-.036	-.101
	act_high	-.104	1.000	-.651	.199
	act_med	-.036	-.651	1.000	-.049
	members	-.101	.199	-.049	1.000
Sig. (1-tailed)	memory	<.001	<.001	.028	<.001
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	.000	.000	.056	.000
	female	.000	.000	.002	.032
	fairpoor	.000	.000	.000	.000
	lowmood	.	.000	.001	.000
	act_high	.000	.	.000	.000
	act_med	.001	.000	.	.000
	members	.000	.000	.000	.
N	memory	7676	7676	7676	7676
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	7676	7676	7676	7676
	female	7676	7676	7676	7676
	fairpoor	7676	7676	7676	7676
	lowmood	7676	7676	7676	7676
	act_high	7676	7676	7676	7676
	act_med	7676	7676	7676	7676
	members	7676	7676	7676	7676

Pearson Correlation

Highly Positive: (None)

Positive: (memory <---> female), (memory <---> act_high), (memory <---> act_med), (memory <---> members), ((D) Definitive age variable collapsed at 90+: priority diag, dhage <---> fairpoor), ((D) Definitive age variable collapsed at 90+: priority diag, dhage <---> lowmood), ((D) Definitive age variable collapsed at 90+: priority diag, dhage <---> act_med), ((D) Definitive age variable collapsed at 90+: priority diag, dhage <---> members), (female <---> fairpoor), (female <---> lowmood), (female <---> act_med), (female <---> members), (fairpoor <---> lowmood), (act_high <---> members)

No Linear Correlation: (None)

Negative: (memory <---> (D) Definitive age variable collapsed at 90+: priority diag, dhage), (memory <---> fairpoor), (memory <---> lowmood), ((D) Definitive age variable collapsed at 90+: priority diag, dhage <---> female), ((D) Definitive age variable collapsed at 90+: priority diag, dhage <---> act_high), (female <---> act_high), (fairpoor <---> act_high), (fairpoor <---> act_med), (fairpoor <---> members), (lowmood <---> act_high), (lowmood <---> act_med), (lowmood <---> members), (act_high <---> act_med), (act_med <---> members)

Highly Negative: (None)

Note: Curated Help is calculated based on actual cell values, not the formatted values.

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	members, female, act_med, (D) Definitive age variable collapsed at 90+: priority diag, dhage, lowmood, fairpoor, act_high ^b	.	Enter

a. Dependent Variable: memory

b. All requested variables entered.

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.457 ^a	.209	.208	3.16054

a. Predictors: (Constant), members, female, act_med, (D) Definitive age variable collapsed at 90+: priority diag, dhage, lowmood, fairpoor, act_high

b. Dependent Variable: memory

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20191.043	7	2884.435	288.761	<.001 ^b
	Residual	76595.619	7668	9.989		

Total	96786.662	7675			
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a. Dependent Variable: memory

b. Predictors: (Constant), members, female, act_med, (D) Definitive age variable collapsed at 90+: priority diag, dhage, lowmood, fairpoor, act_high

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	
1	(Constant)	17.929	.298		60.141
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	-.126	.004	-.332	-31.328
	female	.814	.073	.114	11.114
	fairpoor	-.804	.095	-.096	-8.493
	lowmood	-.806	.124	-.069	-6.522
	act_high	.930	.116	.122	7.987
	act_med	.714	.102	.100	7.014
	members	.372	.027	.147	13.862

Coefficients^a

Model		Sig.	95.0% Confidence Interval for B		Collinearity Statistics Tolerance
			Lower Bound	Upper Bound	
1	(Constant)	<.001	17.345	18.513	
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	<.001	-.134	-.118	.918
	female	<.001	.671	.958	.982
	fairpoor	<.001	-.989	-.618	.804
	lowmood	<.001	-1.049	-.564	.925
	act_high	<.001	.701	1.158	.445
	act_med	<.001	.515	.914	.503
	members	<.001	.319	.425	.915

Coefficients^a

Model		Collinearity Statistics VIF
1	(Constant)	
	(D) Definitive age variable collapsed at 90+: priority diag, dhage	1.089
	female	1.018
	fairpoor	1.244
	lowmood	1.081
	act_high	2.246
	act_med	1.989
	members	1.093

a. Dependent Variable: memory

Collinearity Diagnostics^a

Model		Dimension	Eigenvalue	Condition Index	Variance Proportions (D) Definitive age variable collapsed at 90+: priority diag, dhage		
					(Constant)		female
1	1		4.403	1.000	.00	.00	.01
	2		1.169	1.940	.00	.00	.00
	3		.925	2.181	.00	.00	.00
	4		.624	2.655	.00	.00	.01
	5		.425	3.217	.00	.00	.65
	6		.331	3.646	.00	.00	.24
	7		.113	6.243	.02	.04	.06
	8		.008	23.081	.98	.95	.02

Collinearity Diagnostics^a

Model		Dimension	Variance Proportions				
			fairpoor	lowmood	act_high	act_med	members
1	1		.01	.01	.00	.01	.01
	2		.12	.19	.09	.01	.03
	3		.05	.28	.08	.10	.00
	4		.57	.49	.00	.02	.00
	5		.01	.03	.00	.02	.33
	6		.01	.00	.11	.08	.61
	7		.23	.01	.57	.68	.01
	8		.00	.00	.14	.08	.01

a. Dependent Variable: memory

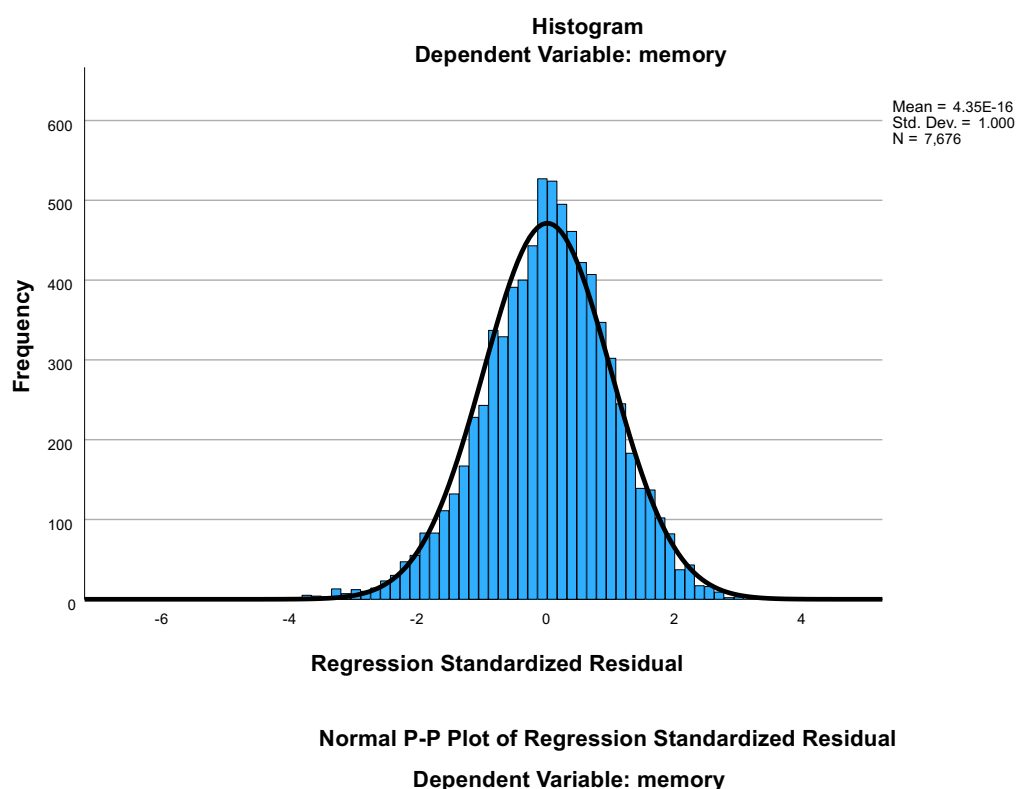
Residuals Statistics^a

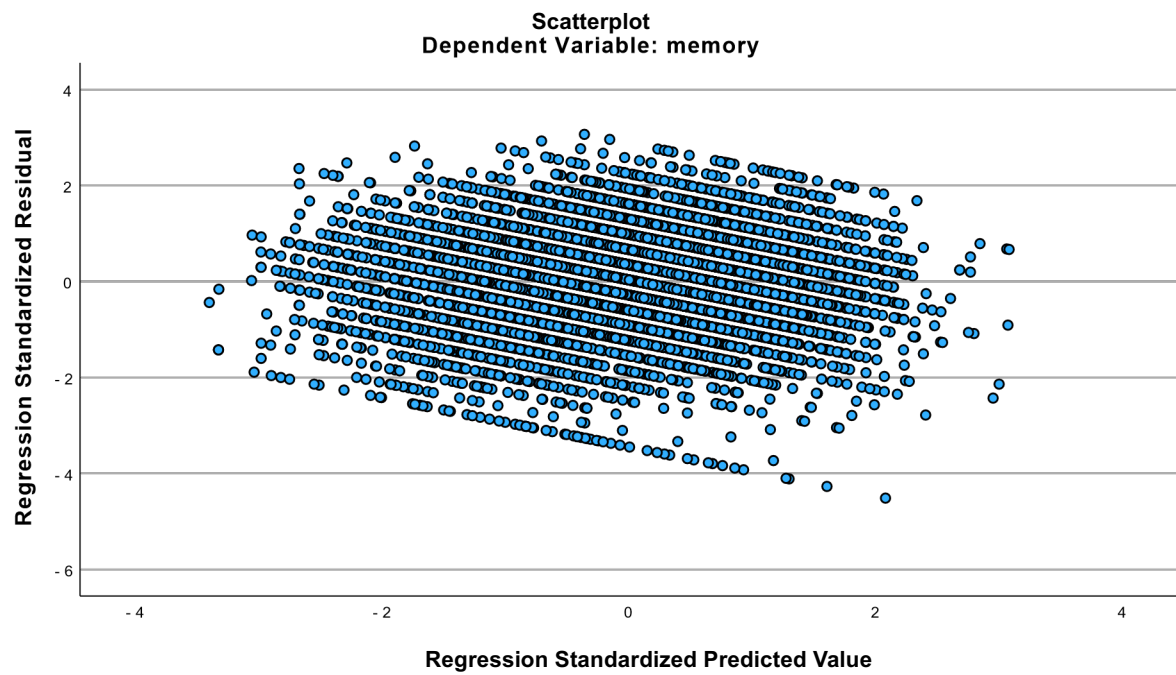
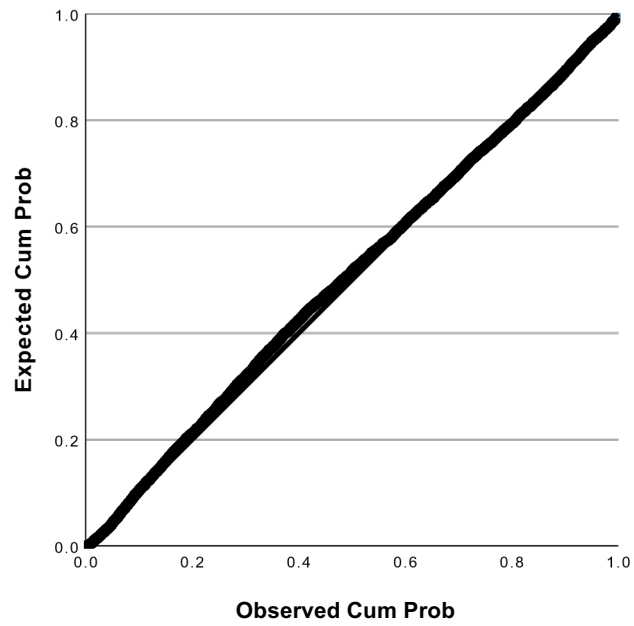
Minimum	Maximum	Mean	Std. Deviation	N
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Predicted Value	5.3855	15.8925	10.8964	1.62196	7676
Std. Predicted Value	-3.398	3.080	.000	1.000	7676
Standard Error of Predicted Value	.065	.237	.099	.024	7676
Adjusted Predicted Value	5.3887	15.8887	10.8965	1.62199	7676
Residual	-14.26891	9.68692	.00000	3.15910	7676
Std. Residual	-4.515	3.065	.000	1.000	7676
Stud. Residual	-4.518	3.067	.000	1.000	7676
Deleted Residual	-14.28862	9.69709	-.00011	3.16256	7676
Stud. Deleted Residual	-4.524	3.068	.000	1.000	7676
Mahal. Distance	2.274	42.105	6.999	4.188	7676
Cook's Distance	.000	.004	.000	.000	7676
Centered Leverage Value	.000	.005	.001	.001	7676

a. Dependent Variable: memory

Charts





Means

Case Processing Summary

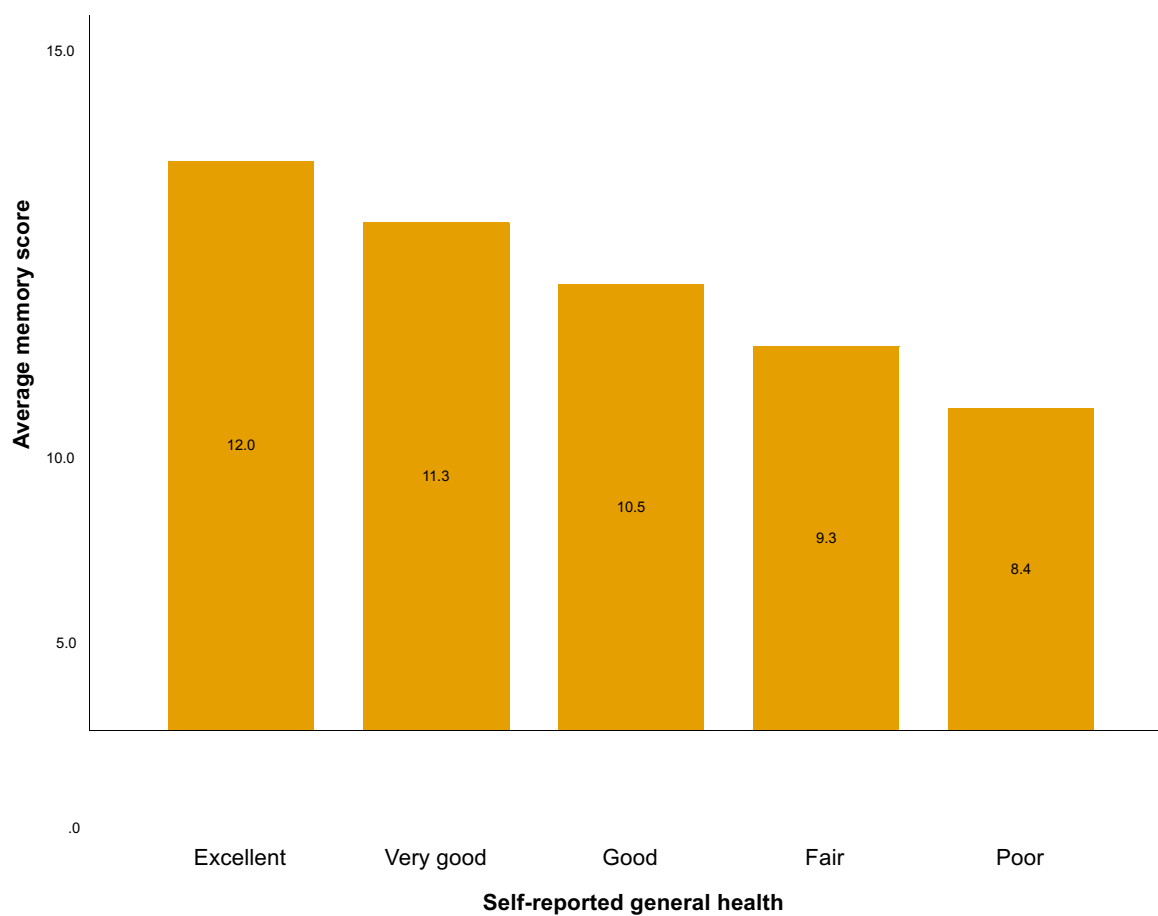
	Included		Cases Excluded		Total	
	N	Percent	N	Percent	N	Percent
memory * Self-reported general health	9039	93.5%	631	6.5%	9670	100.0%

Report

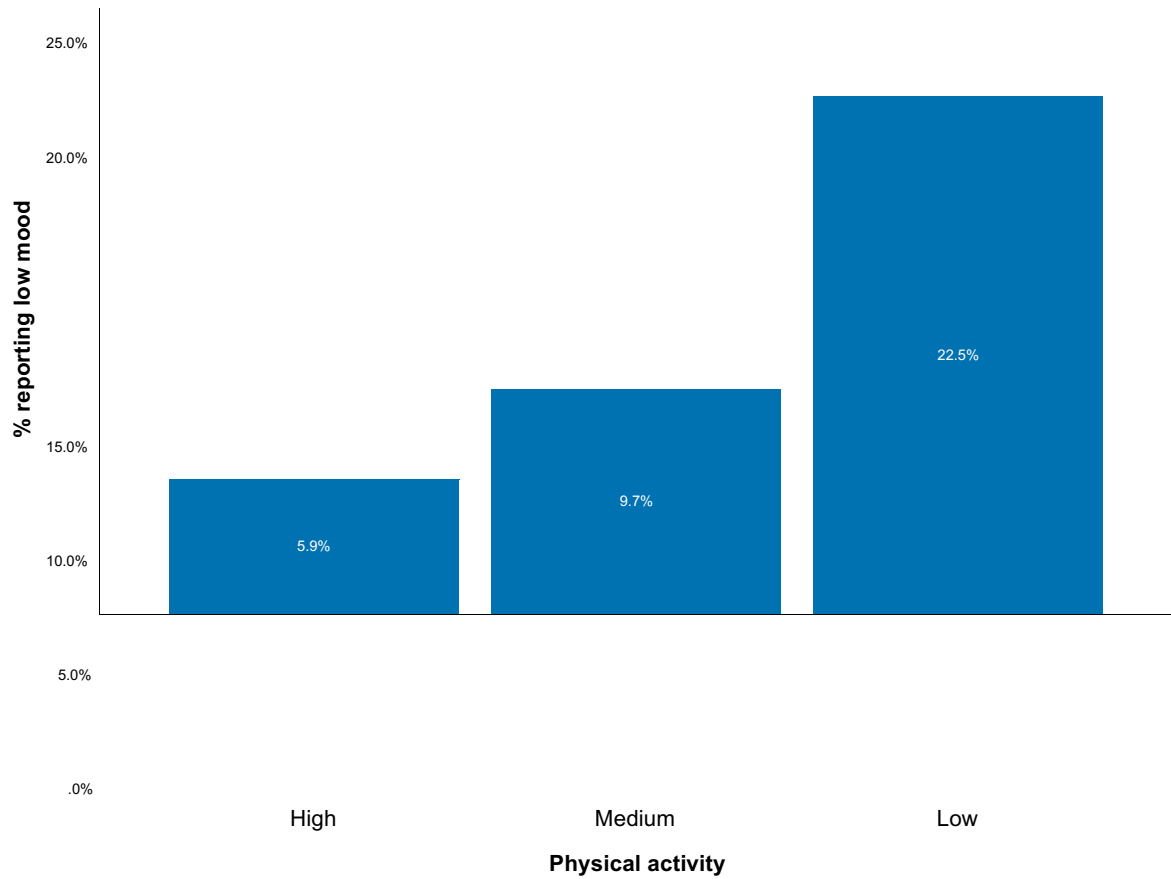
memory

Self-reported general health			
	Mean	N	Std. Deviation
...excellent,	11.9842	1075	3.38013
very good,	11.3305	2632	3.57110
good,	10.4983	2986	3.67173
fair,	9.3098	1672	3.74641
or, poor?	8.4080	674	3.92250
Total	10.5417	9039	3.78324

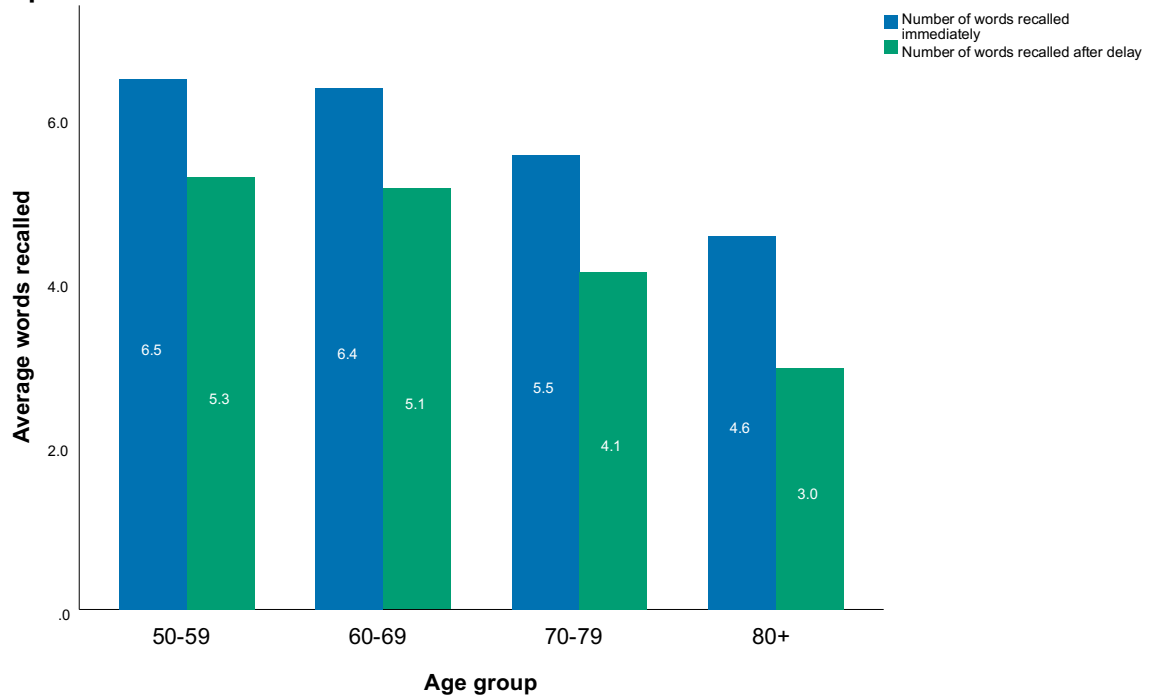
Graph



Graph



Graph



Graph

