

Can a daily multivitamin improve your memory?

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Credit: AI-generated image ([disclaimer](#))

Don't we all want to do what we can to reduce the impact of age-related decline on our memory?

A new study suggests a daily [multivitamin](#) and mineral supplement is a simple and inexpensive way to help [older adults](#) slow the decline in some

aspects of memory function.

The [new study](#), which comes from a [long-running clinical trial](#), shows there may be a small benefit of taking a daily multivitamin and mineral supplement for one type of cognitive task (immediate word recall) among well-functioning elderly white people. At least in the short term.

But that doesn't mean we should all rush out and buy multivitamins. The results of the study don't apply to the whole population, or to all types of memory function. Nor does the study show long-term benefits.

How was the study conducted?

The overarching COSMOS study is a well-designed double-blind randomized control trial. This means participants were randomly allocated to receive the intervention (a daily multivitamin and mineral supplement) or a placebo (dummy tablet), but neither the participants nor the researchers knew which one they were taking.

This type of study is considered the [gold standard](#) and allows researchers to compare various outcomes.

Participants (3,562) were older than 64 for women, and 59 for men, with no history of heart attack, invasive cancer, stroke or serious illness. They couldn't use multivitamins or minerals (or [cocoa extract](#) which they also tested) during the trial.

Participants completed a [battery of online cognitive tests](#) at the start of the study (known as baseline), then yearly for three years, of which only three were reported in this paper:

- ModRey, measuring immediate recall. Participants were shown "a list of 20 words, one at a time, for three seconds each," and

then had to type the list from memory

- ModBent, measuring object recognition. Participants were given 20 prompts with a shape and then had to select the correct match from a pair of similar prompts. After this, they were prompted with 40 shapes in turn, and had to indicate whether each was included in the original 20 or not
- Flanker, measuring "executive control". Participants had to select a colored block that corresponded to an arrow in a matrix of arrows, which could have the same (or different) color to the surrounding arrows, and the same (or different) direction as the prompt block.

What did the researchers find?

Of all the tests the researchers performed, only immediate recall (ModRey) at one year showed a significant effect, meaning the result is unlikely to just be a result of chance.

At two and three years, the effect was no longer significant (meaning it could be down to chance).

However they added an "overall estimate" by averaging the results from all three years to arrive at another significant effect.

All the effect sizes reported are very small. The largest effect is for the participants' immediate recall at one year, which was 0.07—a value that is [generally considered very small without justification](#).

Also of note is that both the multivitamin and placebo groups had higher immediate word recall scores at one year (compared to baseline),

although the multivitamin group's increase was significantly larger.

[In the researchers' prior study](#), the increase in word recall scores was described as a "typical learning (practice) effect". This means they attributed the higher scores at one year to familiarization with the test.

For some reason, this "learning effect" was not discussed in the current paper, where the treatment group showed a significantly larger increase compared to those who were given the placebo.

What are the limitations of the study?

The team used a suitable statistical analysis. However, it did not adjust for demographic characteristics such as age, gender, race, and level of education.

The authors detail their study's major limitation well: it is not very generalisable, as it used "mostly white participants" who had to be very computer literate, and, one could argue, would be quite well-functioning cognitively.

Another unmentioned limitation is the advanced age of their sample, meaning long-term results for younger people can't be assessed.

Additionally, the baseline diet score for their sample was abysmal. The researchers say participants' diet scores "were consistent with [averages from the US population](#)" but the cited study noted "the overall dietary quality... [was] poor."

And they didn't measure changes in diet over the three years, which could impact the results.

How should we interpret the results?

The poor dietary quality of the sample raises the question: can a better diet be the simple fix, rather than multivitamin and mineral supplements?

Even for the effect they observed, which micronutrient from the supplement was the contributing factor?

The researchers speculate about vitamins B12 and D. But you can find research on cognitive function for any arbitrarily chosen [ingredient](#), including [selenium](#), which can be [toxic at high levels](#).

So should I take a multivitamin?

[Health authorities advise](#) daily multivitamin use isn't necessary, as you can get all the nutrients you need by eating a wide variety of healthy foods. However, supplementation may be appropriate to meet any specific nutrient gaps an individual has.

Using a good quality multivitamin at the recommended dose shouldn't do any harm, but at best, this study shows well-functioning elderly white people might show some additional benefit in one type of cognitive task from using a multivitamin supplement.

The case for most of the rest of the population, and the long-term benefit for younger people, can't be made.

Blind peer review

Clare Collins writes:

I agree with the reviewer's assessment, which is a comprehensive critique of the study. The key result was a small effect size from taking a daily multivitamin and mineral (or "multinutrient") supplement on memory recall at one year (but not later time points) and is equivalent to a training effect where you get better at taking a test the more times you do it.

It's also worth noting the study authors received support and funding from commercial companies to undertake the study.

While the study authors state they don't believe background diet quality impacted the results, they didn't comprehensively assess this. They used a brief [diet quality assessment score](#) only at baseline. Participants may have changed their eating habits during the study, which could then impact the results.

Given all participants reported low diet quality scores, an important question is whether giving participants the knowledge, skills and resources to eat more healthily would have a bigger impact on cognition than taking supplements.

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