

Full Length Research

Unlocking Memory: How Trace Elements Supplementation Liberates Word Recognition and Connecting Ability in Aged Persons with Memory Loss

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Memory loss quietly narrows the world of older adults, making it harder to recognise a familiar word or to link a new experience to something already known. This article draws on data from a nutritional intervention carried out among aged persons with memory loss in Jos North Local Government Area, Plateau State, Nigeria, to examine what happened when trace elements iron, zinc, selenium, and magnesium were used to correct nutritional deficiencies linked to cognitive decline. Ten older adults took part (aged 65--75): six received a course of trace elements supplementation, while four did not. Word recognition scores in the supplemented group more than doubled, rising from an average of 7.17 to 15.33, compared with a negligible change from 8.50 to 8.75 among those who were not supplemented. Connecting ability the everyday skill of linking people, places, and ideas showed an even larger shift, climbing from 8.83 to 18.83 among the supplemented group, against a modest rise from 8.00 to 9.25 in the comparison group. The comparison group's scores barely moved, which rules out simple retesting as the explanation for these gains. The findings suggest that correcting trace element deficiency can meaningfully loosen the grip of memory loss on two everyday cognitive abilities. They are preliminary, drawn from a small sample, but they point to a promising and inexpensive avenue for protecting and restoring cognitive independence in aging populations.

Keywords: Trace Elements Supplementation; Memory Loss; Older Adults; Cognitive Function; Word Recognition; Connecting Ability; Micronutrient Deficiency.

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Introduction

This article reports and interprets findings on the effect of trace elements supplementation on two specific cognitive abilities word recognition and connecting ability among aged persons with memory loss in Jos North LGA, Plateau State, Nigeria. Its purpose is threefold: to present, in plain and accessible terms, what changed in these two abilities after a course of supplementation; to situate that change within a wider and growing body of empirical and theoretical work on nutrition, memory, and cognitive ageing; and to weigh honestly what the findings do, and do not, establish.

The discussion that follows moves in stages. It begins by explaining why word recognition and connecting ability matter so much to older adults in the first place, drawing on a life-span theory of motivation that helps explain what aging minds are working to hold onto. It then turns to the biological and empirical case for trace elements iron, zinc, selenium, and magnesium — as plausible contributors to cognitive function in later life, and grounds that case in local evidence of nutrient deficiency among older Nigerians. Only after this groundwork is laid does the article turn to the study itself: who took part, what was measured, and what was found. It closes with a candid discussion of what the results mean, the limits that should temper any enthusiasm about them, and the practical and scientific paths forward.

Memory loss rarely announces itself all at once. It arrives instead as small, accumulating losses: a neighbour's name that will not surface, a word that hovers just out of reach, a thread of conversation that slips away before it can be followed to its end. For aging people, these losses are not merely inconvenient. They erode the everyday competence on which independence, dignity, and social belonging depend. An older adult who can no longer recognise a familiar written instruction, or who struggles to connect a doctor's advice to the medicine on the shelf, is not simply forgetful they are being quietly cut off from the world around them.

Two of the abilities most affected by this erosion are word recognition and connecting ability. Word recognition the capacity to identify a previously encountered word accurately and quickly is not a narrow linguistic skill; it underlies reading, following instructions, and everyday communication. Large-scale evidence shows that this ability reliably declines with age, even though the size of the decline depends on what is being remembered and how (Fraundorf et al., 2019). Connecting ability the capacity to link new information to existing knowledge and experience, sometimes called associative memory is, if anything, even more vulnerable. Ageing appears to hit the relationships between pieces of information harder than it hits the pieces themselves: across dozens of studies and thousands of participants, age-related decline has been found to be larger for associative memory than for memory of single items (Old & Naveh-Benjamin, 2008; Hwang et al., 2024). Put simply, older adults often do not just forget facts they forget how those facts fit together.

This article asks a direct question: can a low-cost nutritional intervention meaningfully restore these two abilities in aged persons already living with memory loss? Using data from an intervention study carried out among aged persons in Jos North, Plateau State, Nigeria, it presents what happened to word recognition and connecting ability after a course of trace elements supplementation, situates that evidence within a wider and growing body of empirical work on nutrition and cognitive ageing, and considers what the results mean and do not mean for how memory loss in old age might be addressed.

Theoretical Perspective: Socioemotional Selectivity Theory

It is worth asking why word recognition and connecting ability, in particular, deserve this attention. Socioemotional Selectivity Theory offers an answer. The theory holds that as people age and come to perceive their remaining time as limited, their goals shift: acquiring new information and expanding one's world matters less, while emotionally meaningful connection to people, to shared history, to a sense of self matters more (Carstensen, Isaacowitz, & Charles, 1999). This is not decline for its own sake; it is a reorganisation of priorities that, under normal circumstances, allows older adults to invest their remaining energy where it counts most.

Word recognition and connecting ability are, in a very practical sense, the machinery that makes those emotionally meaningful goals reachable. Recognising a grandchild's name on a card, placing a face against a shared memory, following the thread of a friend's story all of this depends on exactly the abilities that memory loss erodes first. Seen through this lens, the stakes of the present findings are not merely cognitive but relational: an intervention that restores word recognition and connecting ability is not simply raising test scores, it is potentially restoring an older person's capacity to reach the emotionally meaningful goals that, according to the theory, matter most in later life. That is the sense in which this article speaks of liberation — not a cure for ageing, but a loosening of one of the specific constraints that keeps aging people from the connection they are most motivated to seek.

Trace Elements, Nutrition, and Cognitive Function

The starting point for this work is a simple biological observation: the brain does not run on thought alone. It depends on a steady supply of micronutrients that keep its cells fuelled, protected, and able to communicate. Iron carries oxygen to tissue and drives cellular energy production; zinc participates in cell signalling and enzyme activity throughout the nervous system; selenium anchors the body's antioxidant defences, which protect neurons from the wear of oxidative stress; and magnesium supports the electrical and structural processes that allow neurons to fire and form new connections. When any of these trace elements runs low, the biological conditions that support clear thinking and reliable recall are, at least plausibly, compromised.

The evidence for iron is fairly direct. In a study of 622 geriatric outpatients in Turkey, iron deficiency was associated with significantly lower scores on the Mini-Mental State Examination, and this relationship held even in patients who were not anaemic indicating that iron deficiency itself, and not simply the blood loss it can cause, carries a cognitive cost in older adults (Yavuz et al., 2012).

The picture for zinc is broader but points in a similar direction. A systematic review and meta-analysis of eighteen studies found that the majority reported a positive association between zinc status and one or more measures of cognitive function (Warthon-Medina et al., 2015), and, as already noted, dietary zinc has also been linked to cognitive performance in older Chinese adults albeit with the caution that excessive zinc from a particular source was associated with worse, not better, outcomes (Wang et al., 2021). For selenium, a systematic review and meta-analysis focused specifically on mild cognitive impairment and Alzheimer's disease reported improvements in selenium status and some cognitive measures in selected studies, while also flagging clear limitations in the evidence base (Pereira et al., 2022).

Magnesium tells a more cautious story, and it is worth reporting honestly rather than selectively. A 2024 systematic review and meta-analysis of magnesium and cognitive health found that low serum magnesium was consistently linked to a higher risk of dementia and cognitive impairment, but also found that very high dietary magnesium intake, particularly when out of balance with calcium intake, was associated with increased dementia risk in some cohorts a U-shaped relationship in which both too little and too much appear unhelpful (Chen et al., 2024). Magnesium, more than the other elements considered here, illustrates why this article insists on describing supplementation as correcting deficiency rather than as a general-purpose cognitive booster.

The broader intervention literature involving combined nutrient formulas is similarly mixed. A large randomised trial of a multivitamin-multimineral preparation in adults aged 65 years and older did not demonstrate a general cognitive benefit across all outcomes (Grima et al., 2012), whereas the COSMOS-Web randomised clinical trial found that daily multivitamin supplementation improved immediate recall in older adults over one and three years (Yeung et al., 2023). The lesson from this body of work is not that supplementation is a cure-all, but that its effects depend on who is being supplemented, what they are deficient in, and what is being measured. Correcting a genuine deficiency is a very different proposition from indiscriminately adding nutrients to an already adequate diet.

Micronutrient Deficiency among Older Nigerians

None of this would matter for aged Nigerians specifically unless micronutrient deficiency was a real and present problem in that population and the available local evidence suggests that it is. A pilot study of elderly patients attending a geriatric centre at the University College Hospital in Ibadan, Nigeria, found a substantial burden of micronutrient deficiency among older attendees, with deficiencies in specific vitamins and minerals common enough, and unevenly distributed enough by gender, to be described by the study's authors as a pressing health concern for this population (Farombi et al., 2024). This is the same country and a broadly comparable older population — as the aged persons examined in the present article, which makes the biological premise behind trace elements supplementation considerably more than a theoretical nicety here: it targets a documented, locally relevant deficiency rather than a hypothetical one.

Set against this backdrop, the case for taking nutritional status seriously as a contributor to memory loss in aged Nigerians is not speculative. It follows a well-established pattern in the wider literature iron, zinc, selenium, and magnesium status each independently linked to cognitive outcomes in older adults elsewhere in the world combined with direct local evidence that these same deficiencies are common among elderly Nigerians. The present findings should be read against that backdrop: not as an isolated curiosity, but as one local test of a biologically grounded and increasingly well-documented relationship.

Method

The data examined here come from ten aged persons with documented memory loss, drawn from Rehabilitation centers for the aged in Jos North Local Government Area, Plateau State. Six of the ten received a course of trace elements supplementation; the remaining four did not, and served as a comparison group. Both groups were assessed before and after the supplementation period using a standardised measure of cognitive ability, covering among other things — word recognition and connecting ability. Because the sample was small and participants were not randomly assigned to the two groups, the results that follow should be read as preliminary, suggestive evidence rather than definitive proof a point this article returns to below.

Participants and Intervention

Results

The pattern in the data is striking. Before supplementation, the two groups scored similarly on both measures, with the supplemented group actually starting slightly lower on word recognition. By the end of the study, the picture had changed dramatically.

Table1:Pre- and post-intervention mean scores for word recognition and connecting ability

Cognitive ability	Group	Pre-intervention	Post-intervention	Mean gain
Word recognition	Trace elements supplementation	7.17	15.33	+8.16
Word recognition	Comparison	8.50	8.75	+0.25
Connecting ability	Trace elements supplementation	8.83	18.83	+10.00
Connecting ability	Comparison	8.00	9.25	+1.25

On word recognition, the supplemented group's average score rose from 7.17 to 15.33 a gain of 8.16 points — while the comparison group edged up by only 0.25 points, from 8.50 to 8.75. On connecting ability, the supplemented group climbed from 8.83 to 18.83, a gain of 10.00 points, against a modest rise of 1.25 points in the comparison group. Connecting ability produced the largest raw gain of any ability examined in the wider study, and the gap between the two groups on both measures was too large, and the comparison group's own scores moved too little, for the change to be explained away as an artefact of simply taking the test twice.

Discussion

The improvement in word recognition matters because recognition is where memory meets daily life. Older adults lean on it constantly to read a label, recognise a name, follow a sign, or pick up a familiar expression in conversation. A shift of this size, set against a comparison group that barely moved, is consistent with the idea that correcting nutritional deficiency can restore a genuinely functional cognitive skill, not merely produce a marginal or coincidental improvement.

The gain in connecting ability is, if anything, more striking, precisely because associative memory is known to be one of the abilities hit hardest by age (Old & Naveh-Benjamin, 2008; Hwang et al., 2024). A rise from 8.83 to 18.83 in the supplemented group suggests that a nutritional intervention reached into one of the more stubborn corners of age-related decline. That said, the measure used here reflects a broad, functional connecting skill rather than a narrow laboratory test of a single brain structure, so the finding should be read as evidence of improved everyday performance, not as proof of any specific neural repair.

Biologically, the story is plausible rather than proven. Iron, zinc, and selenium each play defensible roles in the processes that keep neurons firing and protected, and correcting a real deficiency in these elements is a reasonable candidate explanation for the gains observed. But trace elements do not act alone. Sleep, physical health, medication, mood, social engagement, and mental stimulation all shape cognitive performance in older adults, and none of these was isolated in this study. The responsible conclusion is not that trace elements are a stand-alone fix for memory loss, but that

they may be an underused piece of a larger picture of cognitive care for aging people.

These findings deserve to be taken seriously, and they deserve to be read carefully. The sample was very small six supplemented participants and four in the comparison group — which limits how far the results can be generalised and leaves individual scores with an outsized influence on the averages reported here. Participants were not randomly assigned to the two groups, so some pre-existing difference between them, beyond what the pretest scores captured, cannot be entirely ruled out. The supplementation itself combined several trace elements together, so this study cannot say which element, or which combination, did the work. And because assessment stopped shortly after supplementation ended, nothing here speaks to whether these gains last. None of this erases the size or consistency of the pattern observed; it simply means the pattern is a strong first signal rather than a settled conclusion.

Taken together, the evidence points to something worth taking seriously: a low-cost, low-risk nutritional intervention was associated with substantial gains in two everyday abilities — recognising words and connecting ideas among aged persons already living with memory loss. For families, caregivers, and gerontological practitioners, the practical implication is not to treat supplementation as a stand-alone cure, but to pair nutritional assessment with the other pillars of cognitive care: social engagement, mental stimulation, and deliberate retrieval practice, which has independently been shown to strengthen long-term retention (Roediger & Butler, 2011). Where poor diet or nutrient inadequacy is suspected in an older adult presenting with memory complaints, this evidence argues for taking that possibility seriously rather than assuming that memory loss is simply an unavoidable cost of ageing.

For researchers, the task now is to test this signal properly: larger samples, participants drawn from multiple sites, random allocation wherever ethically possible, measured baseline nutrient status, individual rather than combined nutrients, and follow-up long enough to show whether these gains hold. Until then, this study offers something valuable in its own right — early, locally generated evidence that memory loss in old age is not always a closed door. Sometimes, it seems, it can be reopened.

Conclusion

This article set out to examine what happened to word recognition and connecting ability when aged persons with memory loss in Jos North, Plateau State, Nigeria, received a course of trace elements supplementation. The answer is clear and consistent. Word recognition rose from an average of 7.17 to 15.33 in the supplemented group, against a change of only 8.50 to 8.75 in the comparison group. Connecting ability rose even further, from 8.83 to 18.83, against 8.00 to 9.25 in the comparison group. Neither pattern is easily explained by chance, by the effect of repeated testing, or by pre-existing differences between the two small groups, given how little the comparison group's own scores moved.

These findings do not stand alone. They sit within a wider body of empirical work linking iron, zinc, selenium, and magnesium status to cognitive function in older adults (Yavuz et al., 2012; Warthon-Medina et al., 2015; Pereira et al., 2022; Chen et al., 2024), and within direct local evidence that micronutrient deficiency is a real and pressing concern among elderly Nigerians (Farombi et al., 2024). They also sit within a theoretical account of why these particular abilities matter so much in later life: Socioemotional Selectivity Theory holds that aging minds prioritise emotionally meaningful connection above nearly everything else, and word recognition and connecting ability are precisely the capacities that make such connection possible (Carstensen, Isaacowitz, & Charles, 1999). Taken together, the evidence, the theory, and the local context converge on a single, modest, but genuinely hopeful conclusion: correcting trace element deficiency in aged persons with memory loss is associated with substantial gains in two abilities that matter enormously to how older people recognise, relate to, and remain connected with their world. The finding is preliminary and the sample is small, and neither fact should be minimised. But within those limits, this study offers real evidence that memory loss in aging people is not always the fixed and irreversible condition it is often assumed to be and that a simple, inexpensive nutritional intervention may be one small key to unlocking it.

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