

# Social contact may help preserve brain function in later life

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A study of the impact of social isolation on cognitive performance and brain structure has highlighted the importance of a good social support system in maintaining a healthy brain into later life.

The results, published today in *eLife*, suggest that a lack of quality social contact can lead to a decrease in volume of a region of the brain called the hippocampus—which plays a crucial role in the formation and retrieval of memories—and poorer [cognitive performance](#). This may also increase the likelihood of developing conditions such as Alzheimer's dementia.

However, the results also indicate that maintaining a healthy social network, with frequent contact with supportive friends or family, can help preserve brain structure. Therefore, targeting those at risk of [social isolation](#) with tailored strategies to increase social contact may help prevent the onset of dementia.

According to the World Health Organization, over 55 million people across the globe live with dementia, with over one trillion US dollars spent annually to help treat the condition. As the [elderly population](#) continues to grow in many countries, this number is likely to double in the coming decades. In addition, rates of loneliness have increased since the COVID-19 pandemic.

"Research on drugs targeting dementia development [has] not yet yielded any results with a clear clinical benefit, offering at most a minor alleviation of symptoms," says lead author Laurenz Lammer, a MD student at Cognitive Neurology, University Hospital Leipzig and Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany. "Therefore, [preventative measures](#) aimed at stopping or delaying the onset of the disease are of utmost importance, and identifying [risk factors](#) for developing the disease may be our most promising target."

To investigate the effects of social [isolation](#) on brain structure and cognitive performance, Lammer and colleagues conducted a [longitudinal study](#) of 1335 cognitively healthy participants at baseline, and followed

up with 912 participants after six years. The cohort were taken from the Health Study of the Leipzig Research Centre for Civilization Diseases ("LIFE-Adult"). Social isolation was quantified using the Lubben Social Network Scale (LSNS), which is designed to measure the quantity and quality of social relationships among adults. The scale consists of a series of questions related to the size of one's social network, frequency of contact with family and friends, and perceived support from those relationships.

The brain structure and cognitive ability of the participants were quantified using freesurfer segmentations on high-resolution MRI scans. The team found that both baseline social isolation, and an increase in social isolation at follow-up were significantly associated with a loss of gray matter in the hippocampus, and reduced thickness of the cortex of the brain. Gray matter contains the cell bodies of neurons and is involved in processing information and decision making. The cortex is involved in higher brain processes, such as memory, learning and emotional regulation. In addition, those who showed high social isolation at baseline showed even smaller hippocampal volume at follow-up. Those who did not show risk of social isolation tended to not live alone, were married, or were gainfully employed.

"Simply put, assuming that everything else remains stable, the difference between having three or four close and supportive friends is comparable to a one-year difference in hippocampal aging," explains Lammer.

Furthermore, the team found significant associations between social isolation and lower executive functions (processes that enable individuals to organize and adapt their behaviors to achieve goals), memory, and processing speeds. However, the authors caution that further research is required to determine whether this was as a result of the reduction in hippocampal volume. In addition, further research is required in order to confirm the causal link between social isolation and [cognitive decline](#), as

these findings may have arisen by reverse causation through health selection—those participants with accelerated brain aging are more likely to become socially isolated.

Participants who did not present with a risk of social isolation at baseline, but experienced increased social isolation at follow-up showed a decrease in hippocampal volume and an increase in cognitive decline. This finding offers some hope for clinical treatment, as it shows that the observed association is not the result of a varying trait between participants. Therefore, strategies to reduce isolation may help to preserve the integrity of the hippocampus as a person ages, and may help prevent the onset of conditions such as dementia.

"Our study adds support to the view that social isolation is associated with accelerated brain aging and cognitive decline in mid- to late-life adults," concludes senior author Veronica Witte, Group Leader in the Clinic for Cognitive Neurology, University of Leipzig Medical Center and Department of Neurology, Max Planck Institute for Human Cognitive and Brain Sciences, Germany. "Our findings further imply that [social contact](#) prevents detrimental processes and thereby preserves [brain structure](#) and function. Henceforth, targeting social isolation through tailored strategies might contribute to maintaining [brain](#) health into old age and preventing the onset of diseases such as Alzheimer's dementia."

**More information:** Laurenz Lammer et al, Impact of social isolation on grey matter structure and cognitive functions: A population-based longitudinal neuroimaging study, *eLife* (2023). [DOI: 10.7554/eLife.83660](https://doi.org/10.7554/eLife.83660)

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