

# Dementia patients' thinking ability may get worse in winter and early spring

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Thinking ability declines with age in those with dementia. Credit: [Sam Wheeler/Unsplash](#), [CC BY](#)

The seasons may affect the memory and thinking abilities of healthy older adults. A new study suggests changes in cognitive function may be

associated with the time of year, declining significantly in winter and early spring. We also see new cases of mild cognitive impairment and dementia in these seasons.

Published today in the journal [PLOS One](#), the study suggests fluctuations in memory and thinking performance across seasons are equivalent to an approximate four-year difference in age. That is, the performance of people given memory and thinking tests in the summer and autumn would be equivalent to those about four years younger than when tested in spring and winter.

The authors also found new cases of [mild cognitive impairment](#) (a transitional diagnosis given prior to a [dementia](#) diagnosis) and dementia were 30% more likely in spring and winter relative to summer and autumn.

Dementia is when a person experiences a significant deterioration in memory and thinking abilities (cognitive function), noticed by themselves or a significant other. This goes together with a decline in their ability to perform everyday tasks such as paying bills, keeping on top of work, or even keeping themselves oriented to time and place, as well as mood changes.

These findings suggest there may be a need for more dementia care resources and community awareness during these colder months.

## **What the research showed**

A group of researchers from Canada and the United States sought to answer the question of whether the [season](#) might influence poorer cognition in healthy adults, as well as those with dementia. Their questioning was based on previous findings in other areas of human biology, such as [seasonal affective disorder](#) (depression associated with

seasonal changes) and [first-episode schizophrenia](#). These findings suggest an association with time of year.

Researchers have suggested these seasonal peaks in psychosis could be associated with stress and other social factors that may correspond with seasonal trends.

In the current study, the authors investigated data on around 2,700 healthy older adults from Chicago and around 500 dementia patients from Toronto. They found individuals tested in the months of July to October (summer-autumn in the Northern Hemisphere) displayed better performance than those tested in other months. This was true for both healthy adults and those with a [dementia diagnosis](#).

They also found working memory (the ability to hold things in mind for a short time, such as memorising someone's phone number) and speed of processing (how quickly someone is able to perform a task such as drawing a clock on a piece of paper) were most affected by the season. And the findings did not change if they accounted for the person's mood, level of physical activity, sleep quality, time of day of testing, or thyroid integrity.

So, the authors argued this association was unlikely to be driven by outside environmental factors such as lower physical activity in winter months. Other confounding influences cannot be discounted. These include season-related injuries or pain such as arthritis, social isolation, changes in exposure to pollution or unaccounted-for biological factors.

## **Biological changes**

Researchers also found changes in the biology of Alzheimer's disease associated with the season. Alzheimer's disease is a form of dementia mainly defined by two hallmark pathologies in the brain – a buildup of

proteins called amyloid and tau.

In the purest sense, Alzheimer's disease can only be diagnosed after death. But it is possible to measure levels of amyloid and tau during life using an imaging technique known as positron emission tomography (PET). This technology is still largely confined to research.

Amyloid is known to become abnormal very early in the disease process. Examining spinal fluid extracted from participants, researchers found amyloid protein fluctuations in the cerebrospinal fluid of healthy older adults became more abnormal during winter months.

While the authors could not provide an explanation for this cyclical pattern in amyloid levels in the spinal fluid, they pointed out this aligned closely with memory and thinking patterns seen in the same adults.

## **How should we read the findings?**

These findings are interesting and are some of the first in this area. But they need to be interpreted with a degree of scientific caution.

One major drawback is they're predicated entirely on cross-sectional data. That is, people were not specifically followed during each season across the year to determine changes in their cognition. Researchers analysed data already available.

Further, these studies rely entirely on Northern Hemisphere data. This might not be applicable to the Southern Hemisphere.

These findings are correlational, so it cannot be said a particular season causes cognitive decline – it is merely associated with it. What one can imply from these data is more dementia care resources and community awareness may be needed during these months.

At a population level, these findings suggest a trend towards poorer cognitive performance and greater incidence of dementia cases in spring and winter, which might not simply be a case of "the winter blues". These findings remind us to be mindful of dementia in our community, and that some may be particularly vulnerable at certain times of the year.

What remains to be done are studies specifically set up to measure cognitive performance in individuals throughout each season to determine if there really is something to feeling a bit mentally sluggish in the winter months.

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