

Poor diet may affect long-term spatial memory, study finds

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Consuming junk food may have long-term effects on spatial memory. Credit: Unsplash

UNSW researchers have found links between junk food consumption and loss of spatial memory in a recent animal study.

Unhealthy eating may have negative long-term effects on spatial memory, a new study by UNSW researchers suggests.

The [animal study](#), published this week in *Scientific Reports*, investigated cognitive function in rats that alternated between a 'cafeteria [diet](#)' of foods high in fat and sugar (like pies, cake, biscuits and chips) and their regular, healthy diet. Over a period of 6 weeks, the rats were fed junk food in intervals of either three, five, or seven consecutive days, separated by their healthy chow diet.

The UNSW researchers found that the rats' spatial memory recognition deteriorated in increments according to their pattern of access to junk food—the more days in a row they ate junk food, the worse their memory got.

"Anything over three days a week of eating badly impacted memory in these animals," said Professor Margaret Morris, Head of Pharmacology from the School of Medical Sciences and senior author of the study.

The researchers tested the rats' spatial memory by first familiarizing them with two objects. They then repositioned one of the objects and monitored the rats' ability to recognize a change in their environment. A healthy animal, Professor Morris explained, would be more likely to explore the object that had been moved.

"We all know that a [healthy diet](#) with minimal junk foods is good for our overall health and performance, but this paper shows that it is critical for optimal brain function as well."

Professor Morris and her team previously showed diet-related changes in rats' hippocampuses, which she explained as the part of the brain responsible for helping us find things and navigate spaces. "This particular brain region is important in all of us," she said. "It's also

already known to be affected in humans by poor diet."

In addition to the reduced spatial [memory](#) recognition, the study also identified physical differences between rats who consumed the junk food on the three-day and five-day intervals.

The rats who were fed the cafeteria diet on the five-day schedule were considerably heavier, longer and had greater fat mass than those on the three-day schedule. Their metabolic profile also bore a closer resemblance to those on the seven-day schedule than those on the three-day schedule.

Lead author of the paper, Dr. Michael Kendig, sees the results as encouraging.

"What it suggests, at least over this relatively short-term study, is that cutting down [an unhealthy diet] even a little bit may have positive effects on cognitive ability," he said.

"What we're trying to do is to explore how much an unhealthy diet is likely to damage us," said Professor Morris. "We want to live and enjoy life, but we do need to temper it with healthy eating most of the time—this study certainly confirms this."

The study adds to existing research on cognitive function and unhealthy diets—but it differs from the body of evidence in important ways. Many existing studies test animals that have unrestrained access to junk food, which doesn't resemble how junk food is consumed by humans.

"People tend to look at research where animals have had access to [junk food](#) 24/7 and might wonder how relevant those results are," said Dr. Kendig. "That's not really how people eat. We tend to alternate between days or weeks where we eat well and then days or weeks where we eat

less well.

"I think these kinds of experiments where [animals](#) have access only some of the time is a better model—I hope this paper starts to add to a more accurate idea of what happens when we eat unhealthily part of the time, not all of the time."

The researchers said that while the study produced important results, more research was needed before the findings could be translated to humans.

"It is notoriously difficult to do this kind of work in humans, due to ethical concerns," Professor Morris said. "Getting accurate data on [food](#) intake is challenging, but the studies that have been carried out already do point to deficits in executive function in humans eating unhealthily for short periods—and long-term impacts are likely to be greater."

More information: Michael D. Kendig et al. Pattern of access to cafeteria-style diet determines fat mass and degree of spatial memory impairments in rats, *Scientific Reports* (2019). [DOI: 10.1038/s41598-019-50113-3](#)

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