

Every day we often get immersed in dreams, memories or plans. This happens most often when we are engaged in some activity that does not require much concentration, such as washing dishes. A characteristic feature of this type of thoughts is the fact that they seem to appear in our head "by themselves". In cognitive psychology, this type of mental phenomena is referred to as "spontaneous retrieval processes." According to the latest research, these at first glance inconspicuous mental processes have the potential to revolutionize modern methods of early detection of dementia in older people.

Most modern neuropsychological memory tests for diagnosing dementia are based on intentional, strategic retrieval processes. This means that during their conducting the patient is directly informed when to remember the material and when it is time to recall it. However, the latest research on neuronal correlates of dementia indicate that brain structures responsible for spontaneous, unintentional retrieval processes degenerate much earlier during the development of dementia than structures responsible for strategic processing. This means that contemporary neurodegenerative diseases diagnosticians would have a chance to recognize and estimate the risk of dementia at a preclinical stage much earlier if they would assess spontaneous functions. At first glance this is a very counter-intuitive statement - it would seem that relatively simple and effortless spontaneous processes should weaken much later in dementia than functions which require more mental resources. However, psychological studies conducted in recent years involving people at preclinical stages of dementia showed that they achieved significantly lower results than healthy people in experimental tasks, which were based more on spontaneous processes than in tasks based on strategic processes. All these information made a foundation to the formulation of the so-called Spontaneous Retrieval Deficits Hypothesis, according to which cognitive processes based more on spontaneous processes will be a better marker of dementia at its early preclinical stage than strategic processes. The hypothesis was confirmed both in studies involving people at an early stage of Alzheimer's Disease and those with Mild Cognitive Disorders. The purpose of this study is to check whether the hypothesis will be confirmed also in the case of another group which, according to the studies, has an elevated risk of dementia, i.e. people with periodontitis. Studies show that older people who have had periodontitis for many years are more likely to develop Alzheimer's disease. According to the most popular hypothesis, this happens because the periodontitis bacteria that cause prolonged inflammation in the gums lead to an autoimmune response in the brain that results in neurodegeneration. In my study, I want to check whether older people with periodontitis will demonstrate a reduced level of spontaneous mental activity measured by the amount of spontaneous thoughts in an experimental task designed for this purpose. I assumed that since the neurodegenerative process precedes the appearance of the first symptoms of dementia by up to 20 years and since periodontitis according to research is an important risk factor for dementia, people with this disease should - due to spontaneous cognitive deficits - have significantly reduced levels of spontaneous retrieval. To verify this hypothesis I will use an experimental computer task during which the participants will perform a simple, concentration-free task consisting in assigning objects from the photos presented on the computer screen to the appropriate category. Once in a while on the screen will appear a question, if they will have been thinking about something just before the question appeared. If the answer will be affirmative, further questions will be asked to determine to what extent the thought declared by the participant was spontaneous and what caused it. The main analysis will consist of comparing the differences in the average number of spontaneous thoughts declared during the study between a group of people with periodontitis and a healthy control group.

An additional goal of the study is to verify if periodontitis is an early indicator of dementia risk at its preclinical stage. In order to do it, all persons qualified for participation in the study will be examined with a molecular test for the presence of periodontitis bacteria and a battery of neuropsychological tests. This will measure the extent to which general cognitive performance and the number of bacteria of periodontitis are interrelated. I assume that the more bacteria will be detected in a given person, the lower will be their cognitive performance measured by neuropsychological tests (due to potential early dementia process) and the lower will be the number of declared spontaneous thoughts in an experimental task (due to spontaneous extraction deficits).

The current study has a chance to improve modern methods of diagnosis of dementia and confirmation of the role of periodontitis as a potential risk factor for neurodegenerative diseases.