



Mind's 'Daydream' Centers May Hold Clues to Autism

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THURSDAY, May 11 (HealthDay News) -- Stopped at a red light or waiting in a doctor's office, people's idle thoughts may focus on themselves, other people in their lives, nearby strangers or their plans for the day. But a new brain-imaging study suggests the minds of autistic individuals do not engage in these "daydreams" about themselves or other people whenever their brains are free to wander.

The finding could bring experts a better understanding of the inner lives of autistic people, and perhaps even the causes of autism itself. Such insights might have a dramatic impact on the estimated one in every 175 school-age children in the United States with the disorder -- a total of more than 300,000 youngsters.

The interconnected network of brain sites that supports daydreaming also "supports thinking about other people, emotional processing and the processing of familiar faces -- all things that we know are abnormal in autism at a behavioral level," said Daniel Kennedy, a graduate student in neurosciences and psychology at the University of California, San Diego, who conducted the work while at the Center for Autism Research at the Children's Hospital Research Center in La Jolla, Calif.

He and co-researcher Elizabeth Redcay published their findings in this week's issue of the *Proceedings of the National Academy of Sciences*.

According to Kennedy, what people think of as daydreaming isn't a low-energy task, neurologically speaking. "It's actually got a very high metabolism -- it's using lots of oxygen, glucose, the neurons are really firing," he said. This activity is spread throughout a number of key sites in both the brain's executive centers in the forebrain, as well as areas toward the back of the brain. "It's a really distributed set of brain regions. That's why we call it a 'network,'" Kennedy said. "We call it a 'resting network;' other people have called it a 'default mode' of brain functioning." In the normally functioning brain, this resting network tends to focus on the self or the self's interaction with others. "Some people think that maybe it has a lot to do with the construction of the self and self-awareness," Kennedy said. He and Redcay suspected the resting network might work differently in people with autism, however. First, they knew that studies of autistic brains had shown anatomical abnormalities in regions of the resting network. One area, the medial-frontal cortex, "actually grows too big and too fast" in people with autism, Kennedy said.

Autistic people also tend to have trouble with behaviors specifically linked to areas that make up the resting network -- social interactions, face processing and emotions.

But while other researchers had looked at specific parts of the resting network, "nobody has looked at the entire network at once," Kennedy said.

In their experiments using functional (real-time) MRI scans, he and Redcay compared changes in brain-energy usage in 15 people with autism-spectrum disorders (ranging from autism to less-severe conditions such as Asperger's syndrome) vs. 14 healthy controls.

They first measured the brain activity of each study participant at rest. Then, they had each participant engage in the Stroop test -- a standard visual test of attention and cognition that has been used by experimental psychologists for decades. "Previous work has shown that autistics and non-autistics handle this task equally," Kennedy said.

As expected, the brains of healthy controls switched their focus of energy-usage away from the resting network to other cognitive centers as they struggled to solve the Stroop test.

"The resting network shuts down or 'deactivates,' so you can perform the task and let other regions take over," Kennedy explained.

But the researchers saw no such deactivation in the brains of autistic people. "The resting network shuts down in normal subjects, because it was already running high during rest. We didn't see a similar shutdown in autistic subjects -- because it wasn't ever there to begin with," he said.

In other words, it looks as if autistic people may not daydream -- at least not in the way non-autistic people do, Kennedy said.

"We also found that the more abnormal the neural activity in this resting network, the more abnormal their social behaviors," Kennedy said, suggesting that impairment of the resting network increases as autism becomes more severe.

So, what are autistic people thinking about when not engaged in specific tasks? Kennedy said that, so far, researchers have found it tough to get good answers to that question from severely impaired autistic individuals. "We do know, though, that they tend to have repetitive, stereotyped thoughts -- their attention is drawn to things like calendars, schedules, maps, computers -- rigid, concrete things," he said.

"We think that they probably have a much different internal process at rest," Kennedy said.

He stressed that the new findings don't answer the central question of what causes autism, although they do offer tantalizing clues.

"We know that autism is a neurodevelopmental disorder, so what's happening in the first couple years of life are going to be crucial to understanding what is causing autism," he said. "Right now, though, we know very little about this network in early development. In adults, these regions have an extremely high metabolism and use a high amount of energy. So, if that energy supply was cut off or impaired, you'd think that these regions might be the first to be affected," Kennedy said.

Another expert said the finding meshes with what is known about autism.

"They'd be consistent with some of the phenomenology that you see in people with autism and related conditions," said Dr. Eric Hollander, chairman of the department of psychiatry at the Mt. Sinai School of Medicine in New York City, and director of the Seaver and New York Autism Center of Excellence. "These areas might in some way play a role in this particular type of symptomatology," he said.

More information

For more on autism, visit the [U.S. National Institute of Mental Health](https://www.nimh.nih.gov/).