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Brain inflammation linked to suicidal thinking in depression

Date: September 21, 2017

Source: Elsevier

Summary: Patients with major depressive disorder (MDD) have increased brain levels of a marker of microglial activation, a sign of inflammation, according to a new study. Scientists have found that the increase in the inflammatory marker was present specifically in patients with MDD who were experiencing suicidal thoughts, pinning the role of inflammation to suicidality rather than a diagnosis of MDD itself.

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FULL STORY

Patients with major depressive disorder (MDD) have increased brain levels of a marker of microglial activation, a sign of inflammation, according to a new study in *Biological Psychiatry* by researchers at the University of Manchester, United Kingdom. In the study, Dr. Peter Talbot and colleagues found that the increase in the inflammatory marker was present specifically in patients with MDD who were experiencing suicidal thoughts, pinning the role of inflammation to suicidality rather than a diagnosis of MDD itself.

"Our findings are the first results in living depressed patients to suggest that this microglial activation is most prominent in those with suicidal thinking," said Dr. Talbot. Previous studies suggesting this link have relied on brain tissue collected from patients after death.

"This paper is an important addition to the view that inflammation is a feature of the neurobiology of a subgroup of depressed patients, in this case the group with suicidal ideation," said Dr. John Krystal, Editor of *Biological Psychiatry*. "This observation is particularly important in light of recent evidence supporting a personalized medicine approach to depression, i.e., that anti-inflammatory drugs may have antidepressant effects that are limited to patients with demonstrable inflammation."

In the study, first author Dr. Sophie Holmes and colleagues assessed inflammation in 14 patients with moderate-to-severe depression who were not currently taking any antidepressant medications. Immune cells called microglia activate as part of the body's inflammatory response, so the researchers used a brain imaging technique to measure a substance that increases in activated microglia.

The evidence for immune activation was most prominent in the anterior cingulate cortex, a brain region involved in mood regulation and implicated in the biological origin of depression, confirming the results of a previous study that first identified altered microglial activation in medication-free MDD patients. Smaller increases were also found in the insula and prefrontal cortex.

"The field now has two independent reports -- our study and a 2015 report by Setiawan and colleagues in Toronto -- showing essentially the same thing: that there is evidence for inflammation, more specifically microglial activation, in the brains of living patients during a major depressive episode," said Dr. Talbot.

This link suggests that among depressed patients, neuroinflammation may be a factor contributing to the risk for suicidal thoughts or behavior. According to Dr. Talbot, the findings "emphasise the importance of further research into the question of whether novel treatments that reduce microglial activation may be effective in major depression and suicidality."

Story Source:

Materials provided by **Elsevier**. Note: Content may be edited for style and length.

Journal Reference:

1. Sophie E. Holmes, Rainer Hinz, Silke Conen, Catherine J. Gregory, Julian C. Matthews, Jose M. Anton-Rodriguez, Alexander Gerhard, Peter S. Talbot. **Elevated Translocator Protein in Anterior Cingulate in Major Depression and a Role for Inflammation in Suicidal Thinking: A Positron Emission Tomography Study.** *Biological Psychiatry*, 2017; DOI: 10.1016/j.biopsych.2017.08.005

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Tim Newman, Medical News Today

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Jenny U Johansson et al., J Clin Invest, 2014

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Child abuse affects brain wiring

Impaired neural connections may explain profound and long-lasting effects of traumatic experiences during childhood

Date: September 25, 2017

Source: McGill University

Summary: For the first time, researchers have been able to see changes in the neural structures in specific areas of the brains of people who suffered severe abuse as children. The researchers believe that these changes may contribute to the emergence of depressive disorders and suicidal behavior.

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FULL STORY

For the first time, researchers have been able to see changes in the neural structures in specific areas of the brains of people who suffered severe abuse as children. Difficulties associated with severe childhood abuse include increased risks of psychiatric disorders such as depression, as well as high levels of impulsivity, aggressivity, anxiety, more frequent substance abuse, and suicide.

Crucial insulation for nerve fibres builds up during first two decades of life

For the optimal function and organization of the brain, electrical signals used by neurons may need to travel over long distances to communicate with cells in other regions. The longer axons of this kind are generally covered by a fatty coating called myelin. Myelin sheaths protect the axons and help them to conduct electrical signals more efficiently. Myelin builds up progressively (in a process known as myelination) mainly during childhood, and then continue to mature until early adulthood.

Earlier studies had shown significant abnormalities in the white matter in the brains of people who had experienced child abuse. (White matter is mostly made up of billions of myelinated nerve fibres stacked together.) But, because these observations were made by looking at the brains of living people using MRI, it was impossible to gain a clear picture of the white matter cells and molecules that were affected.

To gain a clearer picture of the microscopic changes which occur in the brains of adults who have experienced child abuse, and thanks to the availability of brain samples from the Douglas-Bell Canada Brain Bank (where, as well as the brain matter itself there is a lot of information about the lives of their donors) the researchers were able to compare post-mortem brain samples from three different groups of adults: people who had committed suicide who suffered from depression and had a history of severe childhood abuse (27 individuals); people with depression who had committed suicide but who had no history of being abused as children (25 individuals); and brain tissue from a third group of people who had neither psychiatric illnesses nor a history of child abuse (26 people).

Impaired neural connectivity may affect the regulation of emotions

The researchers discovered that the thickness of the myelin coating of a significant proportion of the nerve fibres was reduced ONLY in the brains of those who had suffered from child abuse. They also found underlying molecular alterations that selectively affect the cells that are responsible for myelin generation and maintenance. Finally, they found increases in the diameters of some of the largest axons among only this group and they speculate that together, these changes may alter functional coupling between the cingulate cortex and subcortical structures such as the amygdala and nucleus accumbens (areas of the brain linked respectively to emotional regulation and to reward and satisfaction) and contribute to altered emotional processing in people who have been abused during childhood.

The researchers conclude that adversity in early life may lastingly disrupt a range of neural functions in the anterior cingulate cortex. And while they don't yet know where in the brain and when during development, and how, at a molecular level these effects are sufficient to have an impact on the regulation of emotions and attachment, they are now planning to explore this in further research.

Story Source:

Materials provided by **McGill University**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Pierre-Eric Lutz, Arnaud Tanti, Alicja Gasecka, Sarah Barnett-Burns, John J. Kim, Yi Zhou, Gang G. Chen, Marina Wakid, Meghan Shaw, Daniel Almeida, Marc-Aurele Chay, Jennie Yang, Vanessa Larivière, Marie-Noël M'Boutchou, Léon C. van Kempen, Volodymyr Yerko, Josée Prud'homme, Maria Antonietta Davoli, Kathryn Vaillancourt, Jean-François Thérout, Alexandre Bramoullé, Tie-Yuan Zhang, Michael J. Meaney, Carl Ernst, Daniel Côté, Naguib Mechawar, Gustavo Turecki. **Association of a History of Child Abuse With Impaired Myelination in the Anterior Cingulate Cortex: Convergent Epigenetic, Transcriptional, and Morphological Evidence.** *American Journal of Psychiatry*, 2017; appi.ajp.2017.1 DOI: 10.1176/appi.ajp.2017.16111286

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Kristina Fiore, *MedPage Today*, 2015

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Coping skills affect women's anxiety levels, study shows

Date: September 5, 2017

Source: European College of Neuropsychopharmacology (ECNP)

Summary: Having a strong sense of coherence and good coping skills can help women facing adversity to overcome anxiety, research shows. The work found that women encountering difficult circumstances, such as living in a deprived community, who reported good coping skills did not have anxiety. However, women living in deprived communities but without these coping skills were at high risk of suffering from anxiety. This work is the largest study ever conducted on coping and the anxiety that arises from facing adverse circumstances, such as living in deprivation.

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FULL STORY

Research shows that having a strong sense of coherence and good coping skills- can help women facing adversity to overcome anxiety. The work found that women encountering difficult circumstances, such as living in a deprived community, who reported good coping skills did not have anxiety. However, women living in deprived communities but without these coping skills were at high risk of suffering from anxiety. This work, presented at the ECNP Conference, is the largest study ever conducted on coping and the anxiety that arises from facing adverse circumstances, such as living in deprivation. This study opens the possibility that teaching women coping strategies may be a way of overcoming the anxiety that stems from facing adverse circumstances, such as living in deprivation.

Lead researcher, Olivia Remes (University of Cambridge), explained, "Individuals with this sense of coherence, with good coping skills, view life as comprehensible and meaningful. In other words, they feel they can manage their life, and that they are in control of their life, they believe challenges encountered in life are worthy of investment and effort; and they believe that life has meaning and purpose. These are skills which can be taught."

The researchers, from the University of Cambridge, surveyed 10,000 women over the age of 40 who were taking part in a major cancer study in Norfolk, UK. They used health and lifestyle questionnaires to record information on living conditions, history of physical health and mental health problems, and linked that to 1991 census data to determine if the women were living in a deprived community. They also checked on each person's sense of coherence using a questionnaire developed from Aaron Antonovsky's groundbreaking work on how people find meaning and purpose in life. They found that 261 (2.6%) of the 10,000 women had Generalised Anxiety Disorder. Among women without coping skills, those living in a deprived area were about twice (98%) more likely to have anxiety than those living in more affluent communities. On the other hand, living in a deprived or affluent community made very little difference to the levels of anxiety experienced by women if they had good coping skills.

Olivia Remes commented, "In general, people with good coping skills tend to have a higher quality of life and lower mortality rates than people without such coping skills. Good coping can be an important life resource for preserving health. For the first time, we show that good coping skills can buffer the negative impact of deprivation on mental health, such as having generalized anxiety disorder. And importantly, these skills, such as feeling like you're in control of your life and finding purpose in life, can be taught."

There is a huge number of people living in deprivation, and significant numbers have Generalised Anxiety Disorder. For the first time, we have been able to show that how you cope in life can impact the level of anxiety you are experiencing. Of course, more work needs to be done on this, but this points us in an important direction.

Many people with anxiety are prescribed medication-and while it is useful in the short-term-it is less effective in the long run, is costly and can come with side effects. Researchers are therefore now turning to coping mechanisms as a way to lower anxiety. This is particularly important for those people who do not experience any improvement in their anxiety symptoms following commonly-prescribed therapies."

Commenting, Professor David Nutt (Ex-Chair of the ECNP, Imperial College, London) said, "These data suggest a trial of training in coping skills could be valuable for women lacking in them -- such training needs to be developed and then a study of its efficacy needs to be carried out."

Story Source:

Materials provided by **European College of Neuropsychopharmacology (ECNP)**. *Note: Content may be edited for style and length.*

European College of Neuropsychopharmacology (ECNP). "Coping skills affect women's anxiety levels, study shows." ScienceDaily. ScienceDaily, 5 September 2017. <www.sciencedaily.com/releases/2017/09/170905125529.htm>.

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Don't multitask while you read this

Distractions diminish people's ability to remember, but important facts still stick

Date: August 24, 2017

Source: University of California - Los Angeles

Summary: How much do all of the distractions in our lives reduce our ability to remember? A new psychology study found that divided attention does impair memory, but people can still selectively focus on what is most important -- even while they're multitasking.

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FULL STORY

"In a world of computers and iPhones, it's rare that we're fully focused," said Alan Castel, a UCLA professor of psychology.

But how much do all of those distractions diminish our ability to remember? A new study led by Castel and Catherine Middlebrooks, a UCLA graduate student, found that while divided attention does impair memory, people can still selectively focus on what is most important -- even while they're multitasking.

In one experiment, the researchers showed 192 students 120 words, divided into six groups of 20 words each. Each word was visible on a computer screen for three seconds, and each was paired with a number from 1 to 10. Researchers explained to the students that they would receive scores based on the point value of each word they remembered, making the words with high point values "more important" than the others.

The participants, all UCLA students, were assigned to one of four groups: One group gave the task their undivided attention. For the second group, researchers played audio of a voice reading numbers from one to 9 while students were viewing the words and their numeric values; students were told to press the space bar on their computer keyboard every time they heard three consecutive odd numbers.

(Having to juggle those two tasks proved very distracting: Each participant heard eight sequences of three odd numbers, but on average, they identified only 1.87 of the eight.)

A third group of participants heard familiar pop songs by Katy Perry, Maroon 5, Lady Gaga and Rihanna while they viewed the words. And a fourth group was asked to watch the words while listening to pop songs they hadn't heard before.

After each set of 20 words, participants were asked to type as many of the words as they could remember. The researchers calculated a total score for each student after each set of 20 words based on the number on the screen when each word appeared. So, if they remembered the word "twig," which appeared on screen at the same time as a 10, and "corner," which appeared with a 6, the participant would receive 16 points. The researchers then repeated the process for each student five times, taking them through all 120 words.

The researchers found that the first group of participants -- those who viewed the words and numbers with no distractions -- recalled an average of eight words from each set of 20, while those who were distracted by having to listen for consecutive odd numbers recalled an average of just five words. Both groups of students who listened to music while watching their screens remembered the words almost as well as the group of undistracted students.

But the scientists also found that multitasking did not affect students' ability to recall the information they were told was most important -- the highest value words. Participants in all four groups were nearly five times as likely to recall a 10-point word as they were to remember a one-point word.

"Everybody consistently prioritized the high-value words and shifted their attention towards those," said Middlebrooks, the study's lead author. "They all came to the realization that they needed to remember what is the most valuable, even though some were distracted and some weren't."

The researchers set up a second, similar experiment with 96 other students -- showing each participant six sets of 20 words, each with a numeric value from 1 to 10, but this time changing the distractions.

Again, one group of students viewed the words without any disruptions. But for the other three groups, the researchers played a series of tones: one group was told to identify whether each tone was the same as the previous one, another was told to indicate whether two tones played one after the other were the same pitch or not, and the final group was told to identify each sound as high-pitched or low-pitched.

As in the first experiment, students who weren't distracted remembered an average of eight words from each set of 20. Those who were distracted by the other tasks remembered an average of about five out of every 20 -- and the information they forgot tended to be the "less important" words. Participants in all four groups were again nearly five times more likely to recall a 10-point word than a one-point word.

"The data are very clear in showing that with divided attention, we don't remember as much, but we are still able to focus on what's most important," Castel said.

The researchers also found that students' ability to remember information improved as the experiments progressed: In both studies, students in all four groups generally remembered more words by the sixth round of 20 words than they did in the first set.

Middlebrooks recommends that people who are studying or learning new information avoid distractions as much as possible.

"All is likely not lost if you're occasionally interrupted by a text or if someone nearby turns on music while you're studying," she said. "Our world is filled with tantalizing distractions, and we seem to adapt by being selectively focused."

The research, which is published in the August issue of *Psychological Science*, was funded by the National Institute on Aging. Tyson Kerr, a former UCLA undergraduate student, is a co-author of the paper.

Story Source:

Materials provided by **University of California - Los Angeles**. Original written by Stuart Wolpert. *Note: Content may be edited for style and length.*

Journal Reference:

1. Catherine D. Middlebrooks, Tyson Kerr, Alan D. Castel. **Selectively Distracted: Divided Attention and Memory for Important Information.** *Psychological Science*, 2017; 28 (8): 1103 DOI: 10.1177/0956797617702502

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from research organizations

How the shape and size of your face relates to your sexuality

New study links the dimensions of a person's face with their sex drive

Date: September 19, 2017

Source: Springer

Summary: Men and women with shorter, wider faces tend to be more sexually motivated and to have a stronger sex drive than those with faces of other dimensions. The research investigates the role that facial features play in sexual relationships and mate selection.

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FULL STORY

Men and women with shorter, wider faces tend to be more sexually motivated and to have a stronger sex drive than those with faces of other dimensions. These are the findings from a study led by Steven Arnocky of Nipissing University in Canada. The research investigates the role that facial features play in sexual relationships and mate selection and is published in Springer's journal *Archives of Sexual Behavior*.

The study adds to a growing body of research that has previously shown that certain psychological and behavioral traits are associated with particular facial width-to-height ratios (known as FWHR). Square-faced men (who therefore have a high FWHR) tend to be perceived as more aggressive, more dominant, more unethical, and more attractive as short-term sexual partners than their thinner and longer-faced counterparts.

Researchers attributed differences in facial proportions to variations in testosterone levels during particular developmental periods, such as puberty. This hormone plays a role in forming adult sexual attitudes and desires.

In this paper, Arnocky and his colleagues report two separate studies conducted among students. In the first, 145 undergraduates who were in romantic relationships at the time completed questionnaires about their interpersonal behavior and sex drive. The researchers also used photographs of the participants to determine their facial width-to-height ratio. The second study involved 314 students and was an extended version of the first study, which included questions about participants' sexual orientation, the chances of them considering infidelity, and their sociosexual orientation. The latter is a measure of how comfortable participants are with the concept of casual sex that does not include love or commitment.

According to Arnocky, their findings suggest that FWHR can be used to predict a measure of sexuality in both sexes. Men and women with a high FWHR (therefore, square and wide faces) reported a greater sex drive than others.

"Together, these findings suggest that facial characteristics might convey important information about human sexual motivations", says Arnocky.

It was also found that men with a larger FWHR not only have a higher sex drive than others, but also are more easy-going when it comes to casual sex and would consider being unfaithful to their partners.

Story Source:

Materials provided by **Springer**. Note: Content may be edited for style and length.

Journal Reference:

1. Steven Arnocky, Justin M. Carré, Brian M. Bird, Benjamin J. P. Moreau, Tracy Vaillancourt, Triana Ortiz, Nicole Marley. **The Facial Width-to-Height Ratio Predicts Sex Drive, Sociosexuality, and Intended Infidelity**. *Archives of Sexual Behavior*, 2017; DOI: 10.1007/s10508-017-1070-x

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Medical News Today, 2012

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Min Kim, *JMIR Public Health Surveill*, 2016

Detailed Knowledge About HIV Epidemiology and Transmission Dynamics and Their Associations With Preventive and Risk Behaviors Among Gay, Bisexual, and Other Men Who Have Sex With Men in the United States

Akshay Sharma et al., *JMIR Public Health Surveill*, 2017

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Infection in pregnant pigs leads to antisocial piglets

Date: September 20, 2017

Source: University of Illinois College of Agricultural, Consumer and Environmental Sciences (ACES)

Summary: When a pregnant woman gets a bad case of the flu, her immune system may react in a way that affects her baby's developing brain, which could lead to behavioral disorders like autism in the child or schizophrenia in the young adult. The link is well established in humans, which is one reason it's standard practice to get a flu shot during pregnancy. But until now, the majority of studies testing the underlying causes have been done with rodents, including two that were released just last week.

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FULL STORY

When a pregnant woman gets a bad case of the flu, her immune system may react in a way that affects her baby's developing brain, which could lead to behavioral disorders like autism in the child or schizophrenia in the young adult. The link is well established in humans, which is one reason it's standard practice to get a flu shot during pregnancy. But until now, the majority of studies testing the underlying causes have been done with rodents, including two that were released just last week.

Some scientists think that immune cells called microglia are affected in the fetal brain when the mother's body starts fighting an infection. Microglia play an important role in normal fetal brain development, but if their activity is altered, they could attack healthy synapses or prevent new neurons from forming. And that could increase the risk of learning or behavioral disorders after birth.

"This hypothesis has been supported by research in rodents, but brain development and morphology in rodents are quite different than in humans. The goal in our study was to test this hypothesis in domestic pigs because their brains develop similarly to humans," says Rodney Johnson, professor of integrative immunology and behavior in the Department of Animal Sciences at the University of Illinois.

Adrienne Antonson, a doctoral student working with Johnson, and lead author of the new study, gave pregnant pigs a virus that causes flu-like symptoms and then compared piglets from those mothers with piglets from mothers that were not infected during pregnancy. "We wanted to understand how the mother's immune response impacted the piglets' behavior and their own immune responses to later infections," she says.

The researchers looked at the piglets' immune response to *E. coli* lipopolysaccharide (LPS) -- a molecule given to mimic a bacterial infection. They expected piglets from infected mothers to have an exaggerated immune response to LPS, but that's not what happened. Their immune systems functioned normally. But that was only the first surprise.

Because people with autism and schizophrenia often struggle with learning difficulties and social scenarios, the researchers wanted to assess those abilities in the piglets as well. In a spatial learning task, piglets had to find their way to a chocolate milk reward using visual cues -- in this case, SpongeBob SquarePants and Mario Kart posters placed in different spots around a simple maze.

"They learn to locate their reward whether it's next to the SpongeBob poster or Mario Kart. Instead of learning to come out of their start box and just turn left, we alternate what side the reward is on. So they have to learn instead of going left every time, they have to turn according to SpongeBob and Mario," Antonson says.

Again, the researchers were surprised to find that the piglets completed the task just fine whether or not their mothers had been infected during pregnancy. The result suggested that the hippocampus, the brain region responsible for spatial learning, was largely unaffected in piglets from infected mothers. But Johnson says more research is needed to confirm their suspicion.

Like humans, pigs are highly social animals that usually prefer the company of others to isolation. Individuals with autism and schizophrenia, on the other hand, tend to isolate in social situations. So, in the last test, researchers gave piglets the choice of meeting a stranger or spending time alone.

Piglets were placed in an arena with two crates separated by an empty space. When a stranger piglet was placed in one of the crates, the researchers watched to see if the study piglets chose to visit the stranger or not. After about 10 minutes, another stranger was added to the second crate. If the piglet spent significantly more time with the new stranger, it would have been showing a preference for "social novelty," a common behavior in social species.

In this test, an important effect of maternal immune activation was revealed. Unlike piglets from healthy mothers, piglets whose mothers had infections during pregnancy stayed away from the strangers.

Following the behavioral tests, the researchers examined microglial cells to see if there were differences between piglets whose mothers had an infection during pregnancy and those that came from healthy mothers.

"I think the most important finding is that the antisocial behavior caused by maternal immune activation was not accompanied by a change in microglial cell activity after birth," Johnson says. "If microglial cells are contributing to antisocial behavior, those changes are likely happening in utero. It's possible microglia become activated during maternal immune activation, alter fetal brain development, and then return to normal before birth."

Antonson's next project is to look at what's happening in the brains of fetal pigs during the maternal infection, to try to pinpoint changes in real time.

The researchers are quick to point out that getting an infection during pregnancy does not guarantee the occurrence of neurodevelopmental problems in children. Instead, it's all about levels of risk.

"We all know we're supposed to wear seat belts," Johnson says. "If I don't put on my seat belt when I go home tonight, does that guarantee I'm going to die in a crash? Of course not. It just increases the likelihood, should an entire sequence of unfortunate events occur. It's not a guarantee. It just adds risk."

Antonson adds, "You have to mount a pretty significant immune response to see something like this. If it's a less severe infection, it's likely not going to trigger the same responses."

The article, "Maternal viral infection during pregnancy elicits anti-social behavior in neonatal piglet offspring independent of postnatal microglial cell activation," is published in *Brain, Behavior, and Immunity*. Additional authors of the study include Emily Radlowski, Marcus Lawson, and Jennifer Ryttych, all from U of I. The project was supported by a "Dual Purpose with Dual Benefit" grant program administered through the National Institutes of Health and the U.S. Department of Agriculture.

Story Source:

Materials provided by **University of Illinois College of Agricultural, Consumer and Environmental Sciences (ACES)**. Original written by Lauren Quinn.
Note: Content may be edited for style and length.

Journal Reference:

1. Adrienne M. Antonson, Emily C. Radlowski, Marcus A. Lawson, Jennifer L. Ryttych, Rodney W. Johnson. **Maternal viral infection during pregnancy elicits anti-social behavior in neonatal piglet offspring independent of postnatal microglial cell activation.** *Brain, Behavior, and Immunity*, 2017; 59: 300 DOI: 10.1016/j.bbi.2016.09.019

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Austin T Mudd et al., *Adv Nutr*, 2017

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Catharine Paddock PhD, *Medical News Today*

Science News

from research organizations

Less REM sleep tied to greater risk of dementia

Date: August 23, 2017

Source: American Academy of Neurology (AAN)

Summary: People who get less rapid eye movement (REM) sleep may have a greater risk of developing dementia, according to a new study. REM sleep is the sleep stage when dreaming occurs.

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FULL STORY



Healthy woman sleeping. (Stock image)

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People who get less rapid eye movement (REM) sleep may have a greater risk of developing dementia, according to a new study published in the August 23, 2017, online issue of *Neurology*®, the medical journal of the American Academy of Neurology. REM sleep is the sleep stage when dreaming occurs.

There are five stages of sleep. Stage one is light sleep. Stage two is when the body begins to prepare for deeper sleep, including stages three and four. Stage five is REM sleep. During this dream stage, the eyes move rapidly and there is increased brain activity as well as higher body temperature, quicker pulse and faster breathing. The first REM stage occurs about an hour to an hour-and-a-half into sleep and then recurs multiple times throughout the night as the cycles repeat.

"Sleep disturbances are common in dementia but little is known about the various stages of sleep and whether they play a role in dementia risk," said study author Matthew P. Pase, PhD, of Swinburne University of Technology in Australia. "We set out to discover which stages of sleep may be linked to dementia and while we did not find a link with deep sleep, we did with REM sleep."

For the study, researchers looked at 321 people with an average age of 67 from Massachusetts who participated in The Framingham Heart Study. During that study, sleep cycles were measured for each participant. Researchers collected the sleep data and then followed participants for an average of 12 years. During that time, 32 people were diagnosed with some form of dementia and of those, 24 were determined to have Alzheimer's disease.

The people who developed dementia spent an average of 17 percent of their sleep time in REM sleep, compared to 20 percent for those who did not develop dementia. After adjusting for age and sex, researchers found links between both a lower percentage of REM sleep and a longer time to get to the REM sleep stage and a greater risk of dementia. In fact, for every percent reduction in REM sleep there was a 9 percent increase in the risk of dementia.

The results were similar after researchers adjusted for other factors that could affect dementia risk or sleep, such as heart disease factors, depression symptoms and medication use.

Other stages of sleep were not associated with an increased dementia risk.

"Our findings point to REM sleep as a predictor of dementia," said Pase. "The next step will be to determine why lower REM sleep predicts a greater risk of dementia. By clarifying the role of sleep in the onset of dementia, the hope is to eventually identify possible ways to intervene so that dementia can be delayed or even prevented."

Limitations of the study include a small sample size. Studies on larger groups of people need to be done to confirm findings. There was also no data available on shift work among study participants, which can cause unusual sleep patterns and possibly lead to sleep disorders.

Story Source:

Materials provided by **American Academy of Neurology (AAN)**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Matthew P. Pase, Jayandra J. Himali, Natalie A. Grima, Alexa S. Beiser, Claudia L. Satizabal, Hugo J. Aparicio, Robert J. Thomas, Daniel J. Gottlieb, Sanford H. Auerbach, Sudha Seshadri. **Sleep architecture and the risk of incident dementia in the community**. *Neurology*, 2017; 10.1212/WNL.0000000000004373 DOI: 10.1212/WNL.0000000000004373

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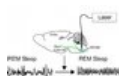
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Listening to happy music may enhance divergent creativity

Participants hearing positive, arousing music came up with most original solutions

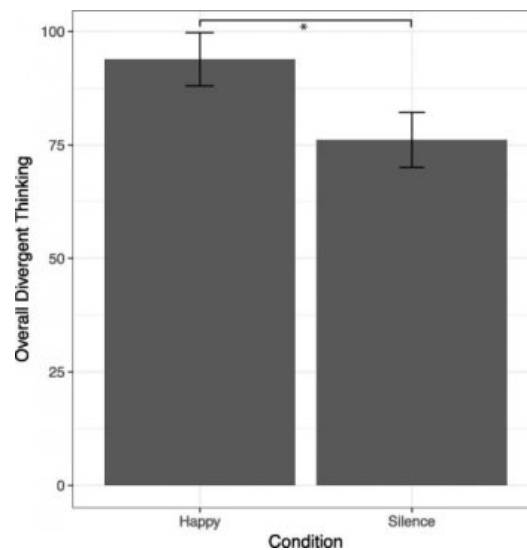
Date: September 7, 2017

Source: PLOS

Summary: Listening to happy music may help generate more, innovative solutions compared to listening to silence, according to a study.

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FULL STORY



Overall divergent thinking (ODT) score.

Credit: Ritter et al (2017)

Listening to happy music may help generate more, innovative solutions compared to listening to silence, according to a study published September 6, 2017 in the open-access journal *PLOS ONE* by Simone Ritter from Radboud University, The Netherlands and Sam Ferguson from the University of Technology Sydney, Australia.

Creativity is an important quality in our complex, fast-changing world, as it allows us to generate innovative solutions for a wide range of problems and come up with fresh ideas. The question of what facilitates creative cognition has long been studied, and while music has previously been shown to benefit cognition, little is known about how listening to music affects creative cognition specifically.

To investigate the effect of music on creative cognition, researchers had 155 participants complete questionnaires and split them into experimental groups. Each group listened to one of four different types of music that were categorized as calm, happy, sad, or anxious, depending on their emotional valence (positive, negative) and arousal (high, low), while one control group listened to silence. After the music started playing, participants performed various cognitive tasks that tested their divergent and convergent creative thinking. Participants who came up with the most original and useful solutions to a task scored higher in divergent creativity, while participants who came up with the single best possible solution to a task scored higher in convergent creativity.

The researchers found that listening to happy music, which they define as classical music that is positive valence and high in arousal, facilitates more divergent creative thinking compared to silence. The authors suggest that the variables involved in the happy music condition may enhance flexibility in thinking, so that additional solutions might be considered by the participant that may not have occurred to them as readily if they were performing the task in silence.

This study shows that creative cognition may be enhanced through music, and further research could explore how different ambient sounds might affect creativity and include participants of diverse cultures, age groups, and levels of music experience. The authors suggest that their study may also demonstrate that music listening could promote creative thinking in inexpensive and efficient ways in various scientific, educational and organizational settings.

Story Source:

Materials provided by **PLOS**

. *Note: Content may be edited for style and length.*

Journal Reference:

1. Simone M. Ritter, Sam Ferguson. **Happy creativity: Listening to happy music facilitates divergent thinking.** *PLOS ONE*, 2017; 12 (9): e0182210
DOI: 10.1371/journal.pone.0182210

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PLOS. "Listening to happy music may enhance divergent creativity: Participants hearing positive, arousing music came up with most original solutions." ScienceDaily. ScienceDaily, 7 September 2017. <www.sciencedaily.com/releases/2017/09/170907142704.htm>.

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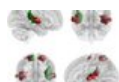
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Kristina Fiore, *MedPage Today*, 2015

Science News

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Lively tunes boost sales in crowded stores

Consider Taylor Swift or Lady Gaga if aisles are packed

Date: August 29, 2017

Source: Journal of Retailing at New York University

Summary: If a store is crowded, people tend to buy more if the sound system is playing a fast-paced song rather than a ballad. That's what a team of researchers found in a field experiment across a chain of grocery convenience stores in Northern Europe.

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FULL STORY

If a store is crowded, people tend to buy more if the sound system is playing a fast-paced song rather than a ballad. That's what a team of researchers found in a field experiment across a chain of grocery convenience stores in Northern Europe.

The researchers -- Klemens M. Knoeferle of the BI Norwegian Business School in Oslo; Vilhelm Camillus Paus, of Saatchi & Saatchi in Oslo; and Alexander Vossen of the University of Siegen, in Germany -- conducted a longitudinal experiment to determine whether and to what extent music played a role in influencing shoppers when stores were more or less crowded. The authors noted that customer spending tracked an inverted U-shape as stores became more crowded. They found that when stores weren't crowded, music had little effect, but as social density increased, music with an up-tempo beat spurred spending.

In "An Upbeat Crowd: Fast In-store Music Alleviates Negative Effects of High Social Density on Customers' Spending," appearing in the September issue of *The Journal of Retailing*, the authors describe a six-week field experiment in 2014 that tested the interaction between manipulated music tempo and measured social density. The sample included 460 small stores and recorded a total of 43,676 observations about shopping basket value (SBV) and the number of purchased items. Compared with no music, as a store became more crowded, the average SBV was roughly 8 percent greater. The authors also observed that SBV was higher due to shoppers' buying more items rather than more expensive ones.

Managerial implications were clear: first, the authors say, retail managers should be aware of crowding's effect on spending patterns and find ways to control it; second, ambient music is a relatively easy tool for retailers to mitigate crowding effects; and third, the authors provide a metric for measuring when social density demands some lively tunes. In addition, when customers are few, retailers might save royalty fees by not playing music, and because fast music in crowded stores motivated customers to buy more low-priced items, managers should prepare for a run on impulse purchases.

Story Source:

Materials provided by **Journal of Retailing at New York University**. *Note: Content may be edited for style and length.*

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Manipulating a single gene defines a new pathway to anxiety

Date: August 24, 2017

Source: University of Utah Health

Summary: Removing a single gene from the brains of mice and zebrafish causes these animals to become more anxious than normal. Researchers show that eliminating the gene encoding Lef1 disrupts the development of certain nerve cells in the hypothalamus that affect stress and anxiety. These results are the first implication that Lef1 functions in this brain region to mediate behavior, knowledge that could one day prove useful for diagnosing and treating human brain disorders.

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FULL STORY

Removing a single gene from the brains of mice and zebrafish causes these animals to become more anxious than normal. Researchers from University of Utah Health show that eliminating the gene encoding Lef1 disrupts the development of certain nerve cells in the hypothalamus that affect stress and anxiety. These results are the first implication that Lef1 functions in the hypothalamus to mediate behavior, knowledge that could prove useful for diagnosing and treating human brain disorders.

"Anxiety is an essential behavior that is much more complex than we thought," says first author Yuanyuan Xie, Ph.D., who led the research in collaboration with senior author Richard Dorsky, Ph.D., professor of Neurobiology and Anatomy at U of U Health. Lef1 is a component of the Wnt signaling pathway, which has roles in animal development, physiology, and disease.

"This work is making us think about how brain structures control behavior in a different way," Xie says. The study appears in *PLOS Biology* on Aug. 24.

Humans, mice, fish, and even flies exhibit anxiety, triggering behaviors that heighten awareness. Despite its reputation, the uneasy feeling can be a good thing: in the case of zebrafish causing them to freeze in their tracks so they can hide in plain sight from predators. But being anxious at inappropriate times is counterproductive and can be a sign of unnecessary stress, a characterization that holds true not only for fish but also for people.

When Xie and Dorsky started their investigation, they had no reason to believe that Lef1 had a specific role in anxiety. Brains of fish missing the gene were relatively normal except there were cells missing from a region called the hypothalamus. This part of the brain controls many "hard-wired" behaviors such as sleep and feeding, as well as hormone release through the pituitary gland. "Before we did the experiments we had no idea that the neurons impacted by Lef1 would preferentially impact one type of behavior," says Dorsky.

Tallying the genes that were most perturbed by loss of Lef1 in this brain region revealed that over 20 were involved in mood disorders like depression and anxiety. The scientists then noticed that the fish had telltale signs consistent with these disorders. The animals were reluctant to explore their environment when placed into a new tank, preferred to remain immobile at the bottom. And they grew slowly, another condition often related to elevated stress.

Different Paths to One Behavior

Despite the fact that brain structure and complexity vary greatly from flies to humans, Lef1 appears to mediate anxiety across species. The new study shows that unexpectedly, the gene utilizes diverse mechanisms to get the job done.

Similar to zebrafish, mice in which Lef1 had been removed from the hypothalamus showed signs of anxiety, including being smaller and a reluctance to explore. They also had fewer brain cells in the region where Lef1 is normally present. However, the missing cells make Pro-melanin concentrating hormone (Pmch), a brain signal that was not perturbed in zebrafish. By contrast, zebrafish and *Drosophila* fruit flies lacking their versions of Lef1 are missing cells that make Corticotropin releasing hormone binding protein (Crhbp), and these cells were unaffected in mice.

These results suggested that Lef1 could regulate anxiety through two different nerve cell signals. Support for this scenario was unexpectedly found in humans, where expression of Crhbp and Pmch are extremely closely linked in the hypothalamus, indicating they may actually be present in the same cells and together act downstream of Lef1 to regulate behavior.

"When you think about genes with a conserved function you think everything that gene does must be the same in all animals. But our study shows that that isn't necessarily true," says Dorsky.

The observation could explain how a gene that specifies a particular behavior can adapt to accommodate changes in brain circuitry that happen over evolutionary time. "Our results suggest that during evolution, the brain can innovate different ways to get to the same outcome," Dorsky explains.

The findings highlight specific sets of genes and the brain cells they affect as being involved in regulating anxiety. Future work will focus on determining whether these pathways may define a subset of human behavioral and mood disorders.

Story Source:

Materials

provided by **University of Utah Health**. *Note: Content may be edited for style and length.*

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1. Yuanyuan Xie, Dan Kaufmann, Matthew J. Moulton, Samin Panahi, John A. Gaynes, Harrison N. Watters, Dingxi Zhou, Hai-Hui Xue, Camille M. Fung, Edward M. Levine, Anthea Letsou, K. C. Brennan, Richard I. Dorsky. **Lef1-dependent hypothalamic neurogenesis inhibits anxiety**. *PLOS Biology*, 2017; 15 (8): e2002257 DOI: 10.1371/journal.pbio.2002257

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MedPage Today, 2013

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Science News

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Maternal diet could affect kids' brain reward circuitry

Rats that ate junk food during pregnancy had pups that preferred the taste of fat during childhood and had altered brain circuitry into adulthood

Date: September 25, 2017

Source: Frontiers

Summary: Researchers have found that rats who ate junk food during pregnancy had heavier pups that strongly preferred fat straight after weaning. However, a balanced diet in childhood seemed to reduce the pups' desire for fat. The pups also showed altered brain reward circuitry into adulthood. The findings could have implications for childhood nutrition and obesity in Western countries.

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FULL STORY

Researchers in France found that rats who ate a junk food diet during pregnancy had heavier pups that strongly preferred the taste of fat straight after weaning. While a balanced diet in childhood seemed to reduce the pups' desire for fat, they nevertheless showed altered brain reward circuitry into adulthood.

The Western diet is full of energy-rich foods -- from hamburgers to chocolates, we consume significant quantities of fat and sugar. The health costs of this are well known, and conditions such as obesity and diabetes are related to overeating.

Factors underlying obesity include how we metabolize food, and our tendency to overeat and seek out energy-rich foods. The pleasure we derive from food stems from the brain reward circuitry, and changes in these reward circuits can contribute to overeating.

Surprisingly, pregnant or breastfeeding mothers who eat significant quantities of energy-rich foods can increase their child's risk for obesity in later life. However, scientists don't yet fully understand the mechanism behind this phenomenon.

In a study recently published in *Frontiers in Endocrinology*, scientists used rats to investigate the relationship between a mother's diet and their offspring's weight, relationship with food, and brain circuitry. The research team fed rats a high fat/high sugar diet (which they called the 'Western Diet'), or a balanced diet, during pregnancy and suckling. They monitored the mothers' pups straight after weaning, during adolescence and into early adulthood.

The pups primarily ate a balanced diet once they were weaned, but at specific times the researchers allowed some of the pups to choose between tasting a fatty or non-fatty liquid. The liquid wasn't fatty enough to affect the pups, but allowed the team to assess their preference for fat. Using brain tissue samples, the team also investigated gene expression and brain changes associated with the pups' reward circuitry.

While the pups from Western Diet mothers were a normal weight at birth, they gained more weight during suckling and were abnormally heavy at weaning. This may have been caused by the Western Diet mothers producing richer milk or more milk.

When the team allowed the just-weaned pups to choose between a fatty and non-fatty liquid, pups from Western Diet mothers strongly preferred the fatty liquid compared with pups from the balanced diet mothers.

However, when the team repeated this fat preference test with adolescent pups, they found that both groups showed a similar high preference for fat -- and interestingly, the pups from Western Diet mothers gradually lost their interest in fat after a few days. This might have been a compensatory mechanism to protect the pups from further exposure to fat. By adulthood, both types of pups had similar strong preferences for fat.

The pups from Western Diet mothers also showed significant changes in their reward circuitry, including differences in a brain region call the hypothalamus and changes in gene expression associated with a neurotransmitter called GABA.

"Previous studies have shown that when pups from Western Diet mothers have unlimited access to junk food they maintain their preference for fatty food into adolescence," says Vincent Paillé, a researcher involved in the study. "While the pups from Western Diet mothers in our study showed extensive changes in their reward circuitry, a balanced diet in childhood seemed to protect them from an increased fat preference at adolescence."

These findings could have implications for nutrition and obesity in human children in Western countries.

The team plan to further investigate the changes in reward circuitry caused by a maternal Western diet. "How these altered reward circuits integrate information could be different, and these pups might behave differently under stress or when they have free access to fatty food," says Paillé.

Story Source:

Journal Reference:

1. Julie Paradis, Pierre Boureau, Thomas Moyon, Sophie Nicklaus, Patricia Parnet, Vincent Paillet; **Perinatal Western Diet Consumption Leads to Profound Plasticity and GABAergic Phenotype Changes within Hypothalamus and Reward Pathway from Birth to Sexual Maturity in Rat**. *Frontiers in Endocrinology*, 2017; 8 DOI: 10.3389/fendo.2017.00216

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Melissa Anne Fernandez et al., *Adv Nutr*, 2017

A Systematic Examination of Food Intake and Adaptation to the Food Environment by Refugees Settled in the United States

Youfa Wang et al., *Adv Nutr*, 2016

Homemade vs. Commercial Baby Food: Which Is Better?

Jeff Miner, *MedPage Today*, 2016

Science News

from research organizations

Older drivers adapt their thinking to improve road hazard detection

Date: September 26, 2017

Source: North Carolina State University

Summary: A recent study finds older drivers adapt their responses in heavy traffic to better identify road hazards.

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FULL STORY

A recent study finds that older drivers showed adaptive responses according to the amount of traffic in a driving scene when identifying road hazards. Although younger drivers are faster and more accurate at identifying driving hazards than older drivers, older drivers were capable of adapting their response criteria to help them identify road hazards when the amount of traffic in a driving scene increased.

"This work shows that older adults are still adaptive, displaying mental flexibility in responding to changes in their driving environment," says Jing Feng, an assistant professor of psychology at North Carolina State University and lead author of a paper on the work.

For this study, researchers developed a program called the Driver Aware Task, which allows scientists to study the attention of drivers using driving images. The Driver Aware Task was used with 16 younger adults (ages 21-30) and 21 older adults (ages 65-79).

Using the Driver Aware Task, researchers compared how sensitive younger and older drivers are to hazards in driving images, as well as their tendency to miss hazards or have false alarms. Younger drivers showed no difference between the low- and high-traffic situations. However, older drivers shifted the criteria they used to identify potential hazards. Older drivers were more likely to commit false alarms -- reporting a hazard when the hazard was absent -- in high-traffic situations.

This increase in false alarms is likely because older adults modified the criteria so they were less likely to miss road hazards.

"Older adults are adapting to changes in their environment, whereas younger adults are not -- possibly because they don't have to," says HeeSun Choi, a former Ph.D. student at NC State and a co-author on the paper. "In other words, there is an attempt by older drivers to compensate for age-related change. This flexibility is a good thing. For example, it means there is potential for training that could help older adults adapt to changing driving conditions."

The paper, "Adaptive Response Criteria in Road Hazard Detection Among Older Drivers," is published in the journal *Traffic Injury Prevention*. The paper was co-authored by Fergus Craik, Brian Levine, Sylvain Moreno and Gary Naglie of the Rotman Research Institute; and Motao Zhu of the Research Institute at Nationwide Children's Hospital.

Story Source:

Materials provided by **North Carolina State University**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Jing Feng, HeeSun Choi, Fergus I. M. Craik, Brian Levine, Sylvain Moreno, Gary Naglie, Motao Zhu. **Adaptive Response Criteria in Road Hazard Detection Among Older Drivers**. *Traffic Injury Prevention*, 2017; 00 DOI: 10.1080/15389588.2017.1373190

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Andrew P Smith, *BMJ Open*, 2016

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Open communication and emotional closeness linked to fewer low sexual interest problems

Date: September 13, 2017

Source: University of Southampton

Summary: British women living with a partner are more than twice as likely to lack interest in sex compared to men living with a partner, according to a new study.

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FULL STORY

British women living with a partner are more than twice as likely to lack interest in sex compared to men living with a partner, according to a new study published in the *BMJ Open*.

Women in relationships lasting more than a year are more likely to report lacking interest in sex than those in relationships lasting one year or less.

The findings come from the third National Survey of Sexual Attitudes and Lifestyles (Natsal-3) which is the largest scientific study of sexual health lifestyles in Britain.

Natsal-3 was carried out by researchers at University College London, the London School of Hygiene & Tropical Medicine, and NatCen Social Research. The study was funded by the UK Medical Research Council and the Wellcome Trust, with support from the Economic and Social Research Council and the Department of Health.

The nationally representative survey interviewed 6,669 women and 4,839 men aged between 16 and 74 who reported at least one sexual partner in the past year. Overall, 34 per cent of women and 15 per cent of men reported lacking interest in sex. Half of these people -- 62 per cent of women and 53 per cent of men -- said that they were distressed by their lack of interest in sex.

Those who found it always easy to talk about sex with their partner were less likely to report lacking interest. This was true for men as well as women.

Professor Cynthia Graham, of the Centre for Sexual Health Research at the University of Southampton and lead author on the paper, said: "Our findings show us the importance of the relational context in understanding low sexual interest in both men and women. For women in particular, the quality and length of relationship and communication with their partners are important in their experience of sexual interest. It highlights the need to assess and -- if necessary -- treat sexual interest problems in a holistic and relationship-, as well as gender-specific way."

The study also revealed other things linked to low interest in sex in men and women:

- Reporting an STI in the last year
- Ever experiencing sex against your will
- Poor mental and physical health
- Not feeling emotionally close to partner during sex

It also found things linked to low interest in sex among women only:

- Having three or more partners in the past year
- Having children under five years old in the household
- Not sharing the same sexual likes and dislikes as partner

Co-author Dr Kirstin Mitchell, at the MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, commented: "The findings on the strong association between open sexual communication and a reduced likelihood of sexual interest problems emphasise the importance of providing a broad sexual and relationships education rather than limiting attention only to adverse consequences of sex and how to prevent them."

Story Source:

Materials

provided by **University of Southampton**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Cynthia A Graham, Catherine H Mercer, Clare Tanton, Kyle G Jones, Anne M Johnson, Kaye Wellings, Kirstin R Mitchell. **What factors are associated with reporting lacking interest in sex and how do these vary by gender? Findings from the third British national survey of sexual attitudes and lifestyles.** *BMJ Open*, 2017; 7 (9): e016942 DOI: 10.1136/bmjopen-2017-016942

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Yella Hewings-Martin PhD, *Medical News Today*

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Catharine Paddock PhD, *Medical News Today*, 2010

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Honor Whiteman, *Medical News Today*

Investigating the relationship between substance use and sexual behaviour in young people in Britain: findings from a national probability survey

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Owners of seriously ill pets at risk of stress, anxiety and depressive symptoms

Findings may also have implications for veterinarian wellbeing

Date: September 18, 2017

Source: BMJ

Summary: Owners of seriously or terminally ill pets are more likely to suffer with stress and symptoms of depression and anxiety, as well as poorer quality of life, compared with owners of healthy animals, finds a study.

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FULL STORY



Caring for a sick or dying pet can be a serious emotional burden.

Credit: © *tuaindeed* / *Fotolia*

Owners of seriously or terminally ill pets are more likely to suffer with stress and symptoms of depression and anxiety, as well as poorer quality of life, compared with owners of healthy animals, finds a study.

This 'caregiver burden' may also lead to increased veterinarian stress, say the authors.

Research on human caregiving describes 'caregiver burden' as a response to problems and challenges encountered while providing informal care for a sick family member. But little is known about the impact of caregiver burden on owners of animals with chronic or terminal diseases -- and the veterinarians who care for them.

So a team of researchers, led by Mary Beth Spitznagel at Kent State University in Ohio, set out to assess caregiver burden and psychosocial function in 238 owners of a dog or cat.

They compared 119 owners of an animal diagnosed with a chronic or terminal disease with 119 healthy controls blindly matched for owner age and sex and animal species.

Symptoms of stress, anxiety and depression were measured using recognised scales, and quality of life was assessed by questionnaire. Owners' demographic information was also recorded.

Results showed greater burden, stress and clinically meaningful symptoms of depression and anxiety, as well as poorer quality of life, in owners of animals with chronic or terminal disease. Higher burden was also related to poorer psychosocial functioning.

The authors outline some study limitations which could have introduced bias, but they say their findings "may help veterinarians understand and more effectively handle client distress in the context of managing the challenges of sick companion animal caregiving."

And they suggest that future research is needed to better understand risks for caregiver burden in the client, how this might be reduced, and how it impacts veterinarian wellbeing.

In a linked commentary, Katherine Goldberg calls for improved training for veterinarians around provision of long term care for serious illness. This includes tailoring treatment plans to client preferences, recognising when clients are distressed, and partnering with mental health professionals to provide support.

"This inaugural exploration of caregiver burden within a veterinary setting is the first step in assessing the impact of veterinary caregiving on clients, as well as the impact of client emotional distress on veterinarian wellbeing," writes Goldberg. "It is my hope that with continued dialogue, we will continue to build the literature in these essential areas."

Story Source:

Materials provided by **BMJ**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Mary Beth Spitznagel, Dana M Jacobson, Melanie D Cox, Mark D Carlson. **Caregiver burden in owners of a sick companion animal: a cross-sectional observational study**. *Veterinary Record*, 2017; vetrec-2017-104295 DOI: 10.1136/vr.104295

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Jenny Ploeg et al., J Med Internet Res, 2017

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Oxytocin turns up the volume of your social environment

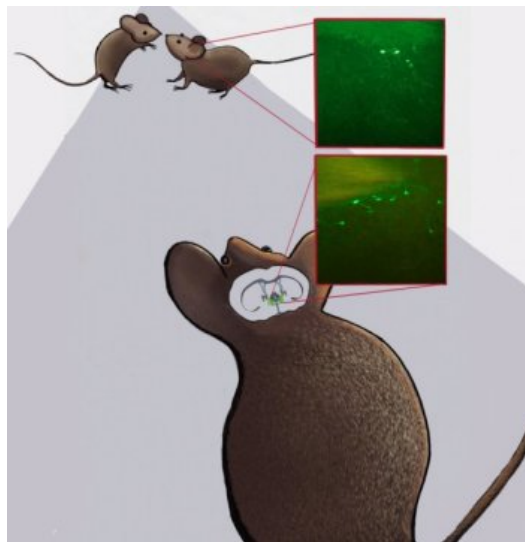
Date: September 20, 2017

Source: University of California - Davis

Summary: A new study shows that the so-called 'love hormone' oxytocin can intensify negative as well as positive experiences.

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FULL STORY



A new study from UC Davis working with a mouse model of social anxiety shows that the "love hormone" oxytocin can enhance negative as well as positive experiences. After social stress, female California mice have more active oxytocin cells in the brain and avoid novel social situations. Inhibiting the action of oxytocin in the brain can restore normal social behavior in female mice that experienced social stress.

Credit: Natalia Duque-Wilckens, UC Davis

Before you shop for the "cuddle" hormone oxytocin to relieve stress and enhance your social life, read this: a new study from the University of California, Davis, suggests that sometimes, blocking the action of oxytocin in the brain may be a better option. The results are published online in the journal *Biological Psychiatry*.

Sometimes popularly called the "love hormone," oxytocin is a hormone released in the brain that plays a major role in social relationships. The new work by behavioral neuroscientists Natalia Duque-Wilckens and Brian Trainor shows that after negative social interactions, oxytocin promotes avoidance of unfamiliar social situations.

Trainor and Duque-Wilckens worked with female California mice. When stressed, these mice can show a form of social anxiety, staying away from unfamiliar mice instead of approaching. The new study shows that a single dose of a drug that blocks the activity of oxytocin restored normal social behavior in stressed females.

The result is exciting because "for antidepressants like Prozac to have this same effect, it takes a month of daily treatment," said Trainor, a professor in the UC Davis Department of Psychology, College of Letters and Science.

This outcome was expected based on a previous study from the lab, which showed that social stress increased the activity of oxytocin-producing cells in the brain and that females given intranasal oxytocin avoided new social contexts.

Amplifying Positive and Negative Effects

Postdoctoral researcher Duque-Wilckens said that these findings support the theory that oxytocin amplifies the effects of social experiences. That is, rather than promoting positive social interactions, oxytocin intensifies the experience of both positive and negative social interactions.

In a positive context, such as with family or friends, oxytocin could promote social approach behavior (hence the "cuddling" hormone). However, in a negative context, like bullying, oxytocin could promote social avoidance. One question left unanswered by this theory is how the same hormone could have such different effects on behavior. The new study led by Duque-Wilckens provides an explanation.

The team found that two brain regions responded to oxytocin more strongly in females than males. These regions were the bed nucleus of the stria terminalis (BNST), a brain region known to control anxiety, and the nucleus accumbens, a brain region important for reward and motivation. Duque-Wilckens found that injecting an oxytocin blocker into the BNST, but not the nucleus accumbens, reversed the effects of stress on social behavior in females. Work by other researchers has shown that oxytocin acting in the nucleus accumbens promotes rewarding aspects of social interactions.

Together, these findings suggest that oxytocin can generate social anxiety or reward by acting in different parts of the brain. At times when oxytocin is acting in the BNST, drugs that inhibit oxytocin could reduce social anxiety.

Trainor said a consistent theme in oxytocin research is that experience and the surrounding environment have important effects on how oxytocin affects behavior.

"Stressful social experiences appear to change which parts of the brain use oxytocin," he said. "Understanding how this works in a mouse gives us new ideas on how we could use drugs targeting oxytocin to reduce social anxiety."

Story Source:

Materials provided by **University of California - Davis**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Natalia Duque-Wilckens, Michael Q. Steinman, Marta Busnelli, Bice Chini, Sae Yokoyama, Mary Pham, Sarah A. Laredo, Rebecca Hao, Allison M. Perkeybile, Vanessa A. Minie, Phillip B. Tan, Karen L. Bales, Brian C. Trainor. **Oxytocin receptors in the anteromedial bed nucleus of the stria terminalis promote stress-induced social avoidance in females.** *Biological Psychiatry*, 2017; DOI: 10.1016/j.biopsych.2017.08.024

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Ana Sandoiu, Medical News Today

'Love hormone' may stimulate release of 'bliss molecule'

Tim Newman, Medical News Today, 2015

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Medical News Today

Science News

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Parents: How you manage conflict has an impact on your kids

Date: September 20, 2017

Source: University of Arizona

Summary: It's not always bad for children to be exposed to their parents' disagreements. It's how those disagreements are handled that really matters, according to a new study.

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FULL STORY

Few parents want their children to hear them arguing, but since conflict is a normal part of any relationship, it can be hard to shield little ones from every spat.

That's OK, as long as parents handle disagreements in a constructive way, says University of Arizona researcher Olena Kopystynska.

Kopystynska, a graduate student in the UA's Norton School of Family and Consumer Sciences in the College of Agriculture and Life Sciences, studies conflict and conflict resolution. In a new paper, forthcoming in the *Journal of Family Psychology*, she looks at how the way parents handle conflict with each other affects their parenting styles and how emotionally secure their children feel after being exposed to conflict between their parents.

Kopystynska's study focuses on constructive versus destructive styles of conflict management. In constructive conflict management, there is calmness and respect, despite a difference in opinion; the conflict stays focused on one topic; and progress is made toward a resolution. When conflict is handled destructively, there is anger and resentment, and the argument often strays off topic to things that may have happened in the past.

Kopystynska and her colleagues found that when even one parent handles conflict with a partner destructively, it can leave children feeling more emotionally insecure about their home life.

"Children are very good at picking up on little nuances of how parents interact with each other, so it really matters how parents express and manage their daily life challenges because that determines children's confidence in the stability and safety of their family," Kopystynska said. "If parents are hostile toward each other, even children as young as 3 years old may be threatened that their family may be headed toward dissolution. They may not necessarily be able to express their insecurities verbally, but they can feel it."

Stressors Can Feed Strife

Kopystynska's study is based on national data collected for the Building Strong Families Project, which targeted low-income families -- a population that could be at high risk for conflict, given the many stressors associated with financial strife. Parents in the study were mostly unmarried and had just conceived their first child at the start of data collection, which was done in three waves.

Kopystynska focused on the third wave of data, collected when the children in the study were 3 years old. Mothers and fathers were surveyed at that point about their perceptions of their conflict management behaviors with each other, and how their children react emotionally when they witness conflict between their parents. While similar studies have relied only on data from mothers, the inclusion of fathers helps provide a more complete picture of what's going on, Kopystynska said.

Kopystynska and her co-authors identified four different profiles of the couples surveyed: couples in which both partners handled conflict constructively; couples in which both partners handled conflict destructively; couples in which the mother was more constructive and the father more destructive; and couples in which the father was more constructive and the mother more destructive.

The researchers further looked at supportive and harsh parenting behaviors, as measured through direct observations of each parent separately interacting with his or her child. Supportive behaviors might include making positive statements, being sensitive to the child's needs and engaging the child in cognitively stimulating ways. Harsh parenting might include forceful or intrusive behaviors or expressions of anger and dissatisfaction toward the child.

Researchers found that fathers' parenting styles did not seem to be affected by how they managed conflict with their partners. In other words, fathers interacted with their children similarly in all profiles. Yet, mothers in the profile in which fathers handled conflict constructively and mothers handled conflict destructively tended to be harsher with their children than mothers in the profile in which both parents handled conflict constructively.

As far as the impact on children's emotional insecurity, researchers found that when one parent handled conflict destructively and the other constructively, children's emotional insecurity was higher than what was reported for children whose parents both handled conflict constructively.

"What we found is that when parents are using constructive conflict management, the children feel less insecure about their family climate, and when at least one parent argues destructively, there are some levels of insecurity about the family relationships," Kopystynska said.

'Arguing Constructively'

Worth noting, Kopystynska said, is that despite a common misconception that most low-income families are at risk for dysfunctional behaviors, very few couples in the study were entirely destructive in their conflict management styles. In fact, only 3 percent of couples in the sample included two partners who handled conflict destructively, suggesting that most couples in the sample participated in healthy and positive conflict patterns.

"There is often a belief out there that if you are a low-income family, you probably have a lot of dysfunction, but over 50 percent of the couples we looked at were arguing constructively," Kopystynska said. "Considering all the stressors they're dealing with, the majority of them still have a good, functional relationship, at least when it comes to conflict."

The fact that the group in which both parents were arguing in destructive ways was so small might help explain one surprising finding of Kopystynska's study -- that emotional insecurity levels were lowest for children of these parents. Also contributing to that finding could be the fact that those couples may have broken up and physically separated from each other by the time the data was collected, meaning that children may not have been as directly exposed to their parents' interactions, Kopystynska said.

"Parents who were in the concordant destructive group were less likely to stay together, so they were probably not in the same home, so children were probably not exposed to that interparental conflict," said Kopystynska, whose co-authors on the paper were UA faculty members Melissa Barnett and Melissa Curran, along with Katherine Paschall of the University of Texas, Austin.

In general, Kopystynska said, it's important for parents to be aware of how they interact with each other, and remember that conflict shouldn't necessarily be avoided but handled in a way that makes a child feel less threatened.

"Not all conflict is bad -- it's about how you manage it," Kopystynska said. "Given that children are going to encounter conflict out there in the real world, exposure to some conflict can be beneficial. However, it's really how parents handle that conflict that sets the tone for how safe children feel, and may further promote similar conflict management behaviors for when children are confronted with conflict of their own."

Story Source:

Materials provided by **University of Arizona**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Olena Kopystynska, Katherine W. Paschall, Melissa A. Barnett, Melissa A. Curran. **Patterns of Interparental Conflict, Parenting, and Children's Emotional Insecurity: A Person-Centered Approach..** *Journal of Family Psychology*, 2017; DOI: 10.1037/fam0000343

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FROM AROUND THE WEB

Science News

from research organizations

Pigeons better at multitasking than humans

Date: September 26, 2017

Source: Ruhr-Universitaet-Bochum

Summary: Pigeons are capable of switching between two tasks as quickly as humans -- and even more quickly in certain situations. These are the findings of biopsychologists who had performed the same behavioral experiments to test birds and humans. The authors hypothesize that the cause of the slight multitasking advantage in birds is their higher neuronal density.

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FULL STORY



Sara Letzner had humans compete against pigeons in a behavioural experiment.

Credit: © RUB, Marquard

Pigeons are capable of switching between two tasks as quickly as humans -- and even more quickly in certain situations. These are the findings of biopsychologists who had performed the same behavioural experiments to test birds and humans. The authors hypothesize that the cause of the slight multitasking advantage in birds is their higher neuronal density.

Dr Sara Letzner and Prof Dr Dr h. c. Onur Güntürkün from Ruhr-Universität Bochum published the results in the journal "Current Biology" in collaboration with Prof Dr Christian Beste from the University Hospital Carl Gustav Carus at Technische Universität Dresden.

"For a long time, scientists used to believe the mammalian cerebral cortex to be the anatomical cause of cognitive ability; it is made up of six cortical layers," says Sara Letzner. In birds, however, such a structure does not exist. "That means the structure of the mammalian cortex cannot be decisive for complex cognitive functions such as multitasking," continues Letzner.

Six times as densely packed

The pallium of birds does not have any layers comparable to those in the human cortex; but its neurons are more densely packed than in the cerebral cortex in humans: pigeons, for example, have six times as many nerve cells as humans per cubic millimetre of brain. Consequently, the average distance between two neurons in pigeons is fifty per cent shorter than in humans. As the speed at which nerve cell signals are transmitted is the same in both birds and mammals, researchers had assumed that information is processed more quickly in avian brains than in mammalian brains.

They tested this hypothesis using a multitasking exercise that was performed by 15 humans and 12 pigeons. In the experiment, both the human and the avian participants had to stop a task in progress and switch over to an alternative task as quickly as possible. The switchover to the alternative task was performed either at the same time the first task was stopped, or it was delayed by 300 milliseconds.

What makes pigeons faster

In the first case, real multitasking takes place, which means that two processes are running simultaneously in the brain, those being the stopping of the first task and switching over to the alternative task. Pigeons and humans both slow down by the same amount under double stress.

In the second case -- switching over to the alternative task after a short delay -- the processes in the brain undergo a change: the two processes, namely stopping the first task and switching over to the second task, alternate like in a ping-pong game. For this purpose, the groups of nerve cells that control both processes have to continuously send signals back and forth. The researchers had assumed that pigeons must have an advantage over humans because of their greater nerve cell density. They were, in fact, 250 milliseconds faster than humans.

"Researchers in the field of cognitive neuroscience have been wondering for a long time how it was possible that some birds, such as crows or parrots, are smart enough to rival chimpanzees in terms of cognitive abilities, despite their small brains and their lack of a cortex," says Letzner. The results of the current study provide a partial answer to this mystery: it is precisely because of their small brain that is densely packed with nerve cells that birds are able to reduce the processing time in tasks that require rapid interaction between different groups of neurons.

Story Source:

Materials provided by **Ruhr-Universitaet-Bochum**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Sara Letzner, Onur Güntürkün, Christian Beste. **How birds outperform humans in multi-component behavior**. *Current Biology*, 2017; 27 (18): R996
DOI: 10.1016/j.cub.2017.07.056

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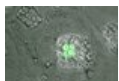
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<www.sciencedaily.com/releases/2017/09/170926090528.htm>.

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Playing a musical instrument improves audio-motor connectivity in the brain, according to a neuroimaging study

Date: July 27, 2017

Source: Asociación RUVID

Summary: Playing a musical instrument throughout life improves the connection between the hearing area and the motor zone, as revealed by a new study. The research, performed through the analysis of the brain of musicians and non-musicians in resting state using functional magnetic resonance, has also revealed that musicians who play an instrument that requires both hands have greater autonomy between them.

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FULL STORY



César Ávila and María Ángeles Palomar-García.

Credit: Image courtesy of Asociación RUVID

Playing a musical instrument throughout life improves the connection between the hearing area and the motor zone, as revealed by the study published in the journal *Cerebral Cortex* by researchers from the Neuropsychology and Functional Neuroimaging group of the Universitat Jaume I (UJI) and the McGill University of Canada. The research, performed through the analysis of the brain of musicians and non-musicians in resting state using functional magnetic resonance, has also revealed that musicians who play an instrument that requires both hands have greater autonomy between them.

The cognitive neuroscience study "Modulation of Functional Connectivity in Auditory-Motor Networks in Musicians Compared with Non-musicians" has focused on music to understand how brain function and structure can be modified through learning. Although most people have neural systems that allow them to listen to music and dance or sing at the same time, playing a musical instrument at a professional level is a complex task, since it requires the bimanual coordination of both hands and the interactions between the auditory system (ears) and the motor system (hands), which are achieved with years of practice. The research shows some of the effects that music training has on the brain structure and function.

Researchers from the UJI, together with Robert J. Zatorre from the McGill University of Canada in collaboration with ERESA in Valencia, studied the impact of music training on the brain through both functional and structural images of the brain in rest state taken through high field magnetic resonance imaging. "Functional magnetic resonance at rest, i.e., in the absence of external stimuli, is a new brain scanning methodology. It is revealing interesting data about

how the brain works when it is active and enables to study the effects of learning on the brain," emphasizes César Ávila, professor of the Department of Basic and Clinical Psychology and Psychobiology of the Universitat Jaume I.

One of the main findings of the study has been to verify that musical training produces an increase in audio-motor interactions in the right hemisphere at rest. "This indicates that when a musician trains and spends many years learning to play a musical instrument, there are more effective connections between the auditory and motor systems, which are the regions mainly involved in playing an instrument," explains María Ángeles Palomar-García, doctor in Psychology and researcher at the Universitat Jaume I.

Bimanual control

The research also revealed an adaptation in musicians' brains, in the brain areas responsible for controlling hand movement. Specifically, they found that participants with musical training had reduced connectivity between the motor regions that control both hands. This, according to María Ángeles Palomar-García, "may reflect greater skill with both hands for these musicians, compared to the participants who had no musical training, due to the need to use both hands in an independent and coordinated way to play their instrument."

The tests also showed that -- in the case of musicians playing an instrument that only requires a hand to play, such as the trumpet --, their ability with both hands was the same as the group that had no musical training. "In addition, the independence of the hands in the participants who played musical instruments that require the use of the two hands is related to the hours of practice throughout life. That is to say: the participants who have practiced more with their musical instrument have greater independence between the two hands," says María Ángeles Palomar-García. Therefore, the study concludes that the more you play a musical instrument that requires bimanual movements, the greater the independence between the spontaneous activity of each hand. This will allow musicians to play their musical instrument better.

Brain plasticity

The study reveals a degree of brain plasticity, which indicates that the brain is able to adapt itself. "Studies on brain plasticity associated with learning are fundamental to understanding the factors that determine the flexibility of the brain to adapt to a particular situation," says César Ávila. "The study of connectivity and the interaction between different brain areas in state of rest is a major component to advance the progress of brain knowledge," he adds.

The study had the participation of 34 people, 17 of whom were musicians and the other 17 were participants who only had compulsory musical training. Currently, the Neuropsychology and Functional Neuroimaging group of the UJI is continuing this line of research studying similar processes also in children, together with the UJI Department of Education.

Story Source:

Materials provided by **Asociación RUVID**. *Note: Content may be edited for style and length.*

Journal Reference:

1. María-Ángeles Palomar-García, Robert J. Zatorre, Noelia Ventura-Campos, Elisenda Bueichekú, César Ávila. **Modulation of Functional Connectivity in Auditory-Motor Networks in Musicians Compared with Nonmusicians**. *Cerebral Cortex*, 2016; bhw120 DOI: 10.1093/cercor/bhw120

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Science News

from research organizations

The brain at work: Spotting half-hidden objects

Different brain areas interact to recognize partially covered shapes, study shows

Date: September 19, 2017

Source: University of Washington Health Sciences/UW Medicine

Summary: The human and non-human primate brain is remarkable in recognizing partially hidden objects. A study, conducted during a shape recognition task, shows as more of the shape is hidden, a brain area involved in cognition starts to send signals to the visual cortex. The findings make the scientists wonder if this communication between different brain areas might be impaired in people with autism or Alzheimer's. Both conditions can cause confusion in cluttered surroundings and problems recognizing objects.

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FULL STORY

How does a driver's brain realize that a stop sign is behind a bush when only a red edge is showing? Or how can a monkey suspect that the yellow sliver in the leaves is a round piece of fruit?

The human (and non-human) primate brain is remarkable in recognizing objects when the view is nearly blocked. This skill let our ancient ancestors find food and avoid danger. It continues to be critical to making sense of our surroundings.

UW Medicine scientists are conducting research to discover ways that the brain operates when figuring out shapes, from those that are completely visible to those that are mostly hidden.

Although computers can beat the world's best chess players, scientists have not yet designed artificial intelligence that performs as well as the average person in distinguishing shapes that are semi-obsured.

Studies of signals generated by the brain are helping to fill in the picture of what goes on when looking at, then trying to recognize, shapes. Such research is also showing why attempts have failed to mechanically replicate the ability of humans and primates to identify partially hidden objects.

The most recent results of this work are published Sept. 19 in the scientific journal *eLife*.

The senior investigator is Anitha Pasupathy, associate professor of biological structure at the University of Washington School of Medicine in Seattle and a member of the Washington National Primate Research Center.

There's a computer game at the center that can be played to tell if two shapes are alike or different. A correct answer wins a treat. As dots start to appear over the shapes, the task becomes more difficult.

The researchers learned that, during the simpler part of the game, the brain generates signals in certain areas of the visual cortex -- the part for sight. The neurons, or brain nerve cells, in that section respond more strongly to uncovered shapes.

However, when the shapes begin to disappear behind the dots, certain neurons in the part of the brain that governs functions like memory and planning -- the ventrolateral prefrontal cortex -- respond more intensely.

The researchers also observed that many of the neurons in the visual cortex had two quick response peaks. The second one occurred after the response onset in the thinking section of the brain. This seemed to enhance the response of the neurons in the visual cortex to the partially hidden shapes.

The results, according to Pasupathy, suggest how signals from the two different areas of the brain -- thinking and vision -- could interact to assist in recognizing shapes that are not fully visible.

They researches believe that other regions of the brain, in addition to those they studied, are likely to participate in object recognition.

"It's not just the information flowing from the eyes into the sensory location of the brain that's important to know what a shape is when it's partially covered," she said. "Feedback from other regions of the brain also help in making this determination."

Relying only on the image of an object that appears on the eye's retina makes it hard to make out what it is, because that image could have many interpretations.

Recognition stems not only from the physical appearance of the object, but also the scene, the context, the degree of covering, and the viewer's experience, the researchers explained.

The study helps advance knowledge about how the brain typically works in solving this frequently encountered perceptual puzzle.

"The neural mechanisms that mediate perceptual capacities, such as this one, have been largely unknown, which is why we were interested in studying them," Pasupathy noted.

Their recent findings also make the scientists wonder if impairments in this and other types of communication between the cognitive and sensory parts of the brain might have a role in certain difficulties that people with autism or Alzheimer's encounter.

Pasupathy said, for example, some people with autism have a profound inability to function in cluttered or disorderly environments. They have problems processing sensory information and can become confused and distressed. Many patients with Alzheimer's disease experience what is called visual agnosia. They have no trouble seeing objects, but they can't tell what they are.

"So understanding how the sensory and cognitive areas in the brain communicate is of utmost importance to ultimately understand what might go wrong inside the nervous system that can cause these deficits," Pasupathy said.

Story Source:

Materials provided by **University of Washington Health Sciences/UW Medicine**

. *Note: Content may be edited for style and length.*

Journal Reference:

1. Amber M Fyall, Yasmine El-Shamayleh, Hannah Choi, Eric Shea-Brown, Anitha Pasupathy. **Dynamic representation of partially occluded objects in primate prefrontal and visual cortex.** *eLife*, 2017; 6 DOI: 10.7554/eLife.25784

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Yvette Brazier, Medical News Today, 2015

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Science News

from research organizations

Violent crime increases during warmer weather, no matter the season, study finds

Date: September 25, 2017

Source: Drexel University

Summary: A study analyzing crime data in Philadelphia for 10 years found that rates of violent crime and disorderly conduct are higher when the weather is warmer and more pleasant, even rising sharply during warmer-than-typical winter days.

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FULL STORY

Among police officers, there's a maxim: Being a cop gets a whole lot busier when it's hot out. Now, a study by a pair of Drexel University researchers appears to back them up.

The research, conducted by Leah Schinasi, PhD, assistant research professor, and Ghassan Hamra, PhD, assistant professor, both of Drexel's Dornsife School of Public Health, was published in the *Journal of Urban Health* and used a decade's worth of crime data in Philadelphia (from 2006 until 2015) to find that rates of violent crime and disorderly conduct increased when daily temperatures are higher.

Overall, crime rates were highest in the warmest months of the year -- May through September -- and highest on the hottest days.

For example, when the heat index (a metric that uses temperature and humidity to represent human comfort) was 98 degrees, rates of violent crime were 9 percent higher compared to days when the temperature was 57 degrees. When it came to rates of disorderly conduct, they were 7 percent higher on 98-degree days than on 57-degree days.

During the year's colder months -- October through April -- the contrast of high versus low rates of crime on more comfortable versus cooler temperature days was more striking. When temperatures reached 70 degrees during that time period, daily rates of violent crime were 16 percent higher, on average, and disorderly conduct rates were 23 percent higher, compared to 43 degree days, the median heat index for that period.

The researchers also looked at deviations of daily temperatures from seasonal averages in trying to determine the effect of anomalies on crime rates. For example, during cool months, days that were 55 degrees warmer than the seasonal average were associated with 7 percent higher rates of disorderly conduct.

"Our findings are reasonable when you think about social behavior," Schinasi said. "When temperatures are extremely cold or hot, people stay indoors. But as temperatures become more comfortable, more people are outdoors, which presents greater opportunity for crime."

Following that more pleasant weather results in more crime, it could be assumed that cooler days in hot weather months would result in more crime.

But that does not seem to be the case, as crime rates remained fairly static during the hotter-weather months when temperatures dip below the seasonal average.

"I could speculate about the reasons that cooler, more comfortable summer temperatures are not associated with higher rates of crime, but I am honestly not sure," Schinasi said. "Overall, these results still reflect that higher rates of crime occur when temperatures are warmer. Additional analyses that tease apart these effects will help us to better understand these findings and seasonal trends."

Schinasi suggested additional research into the locations of crime and the particulars of the areas, like infrastructure and neighborhood characteristics, would divulge more insight.

Regardless, seeing increases in crime during warmer days is particularly concerning when taking climate change into account. Schinasi and Hamra's research is potentially a picture of what could happen if (or when) warmer days become the norm.

"It is important to recognize the implications of these climate change effects for public health, including changes in crime rates," Schinasi said. "Although these results back up police officers' anecdotal reports about the relationship between temperature and crime, it's nice to have data to confirm these reports. Our results might help inform local law enforcement about ways to allocate resources during different seasons and with consideration of the local climate."

Story Source:

Materials provided by **Drexel University**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Leah H. Schinasi, Ghassan B. Hamra. **A Time Series Analysis of Associations between Daily Temperature and Crime Events in Philadelphia, Pennsylvania.** *Journal of Urban Health*, 2017; DOI: 10.1007/s11524-017-0181-y

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Drexel University. "Violent crime increases during warmer weather, no matter the season, study finds." ScienceDaily. ScienceDaily, 25 September 2017. <www.sciencedaily.com/releases/2017/09/170925132948.htm>.

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Women have more active brains than men

Largest functional brain imaging study to date identifies specific brain differences between women and men, according to a new report in the *Journal of Alzheimer's Disease*

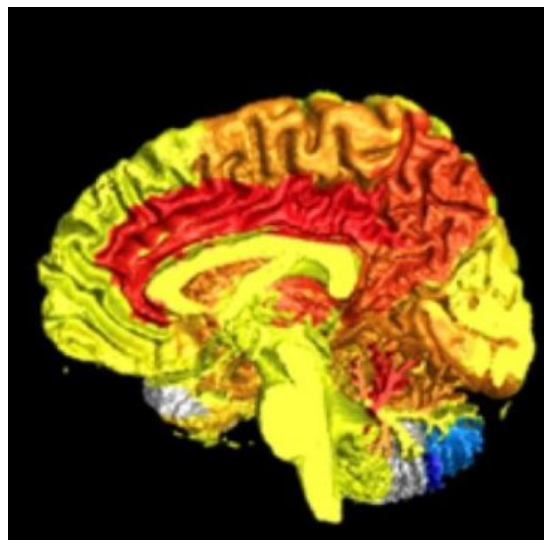
Date: August 7, 2017

Source: IOS Press

Summary: In the largest functional brain imaging study to date, researchers compared 46,034 brain SPECT (single photon emission computed tomography) imaging studies provided by nine clinics, quantifying differences between the brains of men and women.

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FULL STORY



Side view of the brain summarizing blood flow results from tens of thousands of study subjects shows increased blood flow in women compared to men, highlighted in the red colored areas of the brain: the cingulate gyrus and precuneus. Men in this image have higher blood flow in blue colored areas -- the cerebellum.

Credit: Journal of Alzheimer's Disease

In the largest functional brain imaging study to date, the Amen Clinics (Newport Beach, CA) compared 46,034 brain SPECT (single photon emission computed tomography) imaging studies provided by nine clinics, quantifying differences between the brains of men and women. The study is published in the *Journal of Alzheimer's Disease*.

Lead author, psychiatrist Daniel G. Amen, MD, founder of Amen Clinics, Inc., commented, "This is a very important study to help understand gender-based brain differences. The quantifiable differences we identified between men and women are important for understanding gender-based risk for brain disorders such as Alzheimer's disease. Using functional neuroimaging tools, such as SPECT, are essential to developing precision medicine brain treatments in the future."

The brains of women in the study were significantly more active in many more areas of the brain than men, especially in the prefrontal cortex, involved with focus and impulse control, and the limbic or emotional areas of the brain, involved with mood and anxiety. The visual and coordination centers of the brain were more active in men. SPECT can measure blood perfusion in the brain. Images acquired from subjects at rest or while performing various cognitive tasks will show different blood flow in specific brain regions.

Subjects included 119 healthy volunteers and 26,683 patients with a variety of psychiatric conditions such as brain trauma, bipolar disorders, mood disorders, schizophrenia/psychotic disorders, and attention deficit hyperactivity disorder (ADHD). A total of 128 brain regions were analyzed for subjects at baseline and while performing a concentration task.

Understanding these differences is important because brain disorders affect men and women differently. Women have significantly higher rates of Alzheimer's disease, depression, which is itself a risk factor for Alzheimer's disease, and anxiety disorders, while men have higher rates of (ADHD), conduct-related problems, and incarceration (by 1,400%).

Editor-in-Chief of the *Journal of Alzheimer's Disease* and Dean of the College of Sciences at The University of Texas at San Antonio, Dr. George Perry said, "Precisely defining the physiological and structural basis of gender differences in brain function will illuminate Alzheimer's disease and understanding our partners."

The study findings of increased prefrontal cortex blood flow in women compared to men may explain why women tend to exhibit greater strengths in the areas of empathy, intuition, collaboration, self-control, and appropriate concern. The study also found increased blood flow in limbic areas of the brains of women, which may also partially explain why women are more vulnerable to anxiety, depression, insomnia, and eating disorders.

Story Source:

Materials provided by **IOS Press**. *Note: Content may be edited for style and length.*

Journal Reference:

1. Daniel G. Amen, Manuel Trujillo, David Keator, Derek V. Taylor, Kristen Willeumier, Somayeh Meysami, Cyrus A. Raji. **Gender-Based Cerebral Perfusion Differences in 46,034 Functional Neuroimaging Scans**. *Journal of Alzheimer's Disease*, 2017; 1 DOI: 10.3233/JAD-170432

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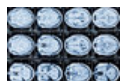
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You can 'pick up' a good or bad mood from your friends, study suggests

Study also suggests that depression doesn't have the same effect

Date: September 20, 2017

Source: University of Warwick

Summary: Both good and bad moods can be 'picked up' from friends, but depression can't, suggests new research.

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FULL STORY

New research suggests that both good and bad moods can be 'picked up' from friends, but depression can't.

A team led by the University of Warwick has examined whether friends' moods can affect an individual therefore implying that moods may spread across friendship networks.

The team analysed data from the National Longitudinal Study of Adolescent to Adult Health which incorporates the moods and friendship networks of US adolescents in schools. Their paper Spreading of components of mood in adolescent social networks has been published in the journal *Royal Society Open Science*. The team's findings imply that mood does spread over friendship networks, as do various different symptoms of depression such as helplessness and loss of interest. However they also found that they also found that the effect from lower or worse mood friends was not strong enough to push the other friends into depression.

Using mathematical modelling they found that having more friends who suffer worse moods is associated with a higher probability of an individual experiencing low moods and a decreased probability of improving. They found the opposite applied to adolescents who had a more positive social circle.

Public health statistics researcher Rob Eyre led the study. He said: "We investigated whether there is evidence for the individual components of mood (such as appetite, tiredness and sleep) spreading through US adolescent friendship networks while adjusting for confounding by modelling the transition probabilities of changing mood state over time.

"Evidence suggests mood may spread from person to person via a process known as social contagion.

"Previous studies have found social support and befriending to be beneficial to mood disorders in adolescents while recent experiments suggest that an individual's emotional state can be affected by exposure to the emotional expressions of social contacts.

"Clearly, a greater understanding of how changes in the mood of adolescents are affected by the mood of their friends would be beneficial in informing interventions tackling adolescent depression."

The World Health Organisation has estimated that depression affects 350 million people across the world, impacting on individual's abilities to work and socialise and at worse leading to suicide. This study's findings emphasise the need to also consider those who exhibit levels of depressive symptoms just below those needed for a diagnosis of actual depression when designing public health interventions.

The study also helps confirm that there is more to depression than simply low mood. At the individual level, these findings imply that following the evidence-based advice for improving mood, e.g. exercise, sleeping well, and managing stress, can help a teenager's friends as well as themselves. Whilst for depression, friends do not put an individual at risk of illness so a recommended course of action would be to show them support.

Their conclusions link in to current policy discussions on the importance of sub-threshold levels of depressive symptoms and could help inform interventions against depression in senior schools

Co-author, professor Frances Griffiths of Warwick Medical School said: "The results found here can inform public health policy and the design of interventions against depression in adolescents. Sub-threshold levels of depressive symptoms in adolescents is an issue of great current concern as they have been found to be very common, to cause a reduced quality of life and to lead to greater risk of depression later on in life than having no symptoms at all.

"Understanding that these components of mood can spread socially suggests that while the primary target of social interventions should be to increase friendships because of its benefits in reducing of the risk of depression, a secondary aim could be to reduce spreading of negative mood."

Story Source:

Journal Reference:

1. Robert W. Eyre, Thomas House, Edward M. Hill, Frances E. Griffiths. **Spreading of components of mood in adolescent social networks**. *Royal Society Open Science*, 2017; 4 (9): 170336 DOI: 10.1098/rsos.170336

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