

MIND ^{OVER} MATTER[®]

A NEW BRAIN HEALTH PROGRAM FOR KIDS

CONSEQUENCES OF FASTING

HOW ANGER IMPACTS YOUR BRAIN HEALTH

ADHD OR EARLY SIGNS OF DEMENTIA?

IS SITTING THE NEW SMOKING?

THE MAGIC OF MUSHROOMS

Insight into the latest research findings to combat brain-aging diseases and what you need to stay brain healthy longer.



Women's Brain Health Initiative

EXPLORERS WANTED.



Being an explorer means having the courage and persistence to follow one's curiosity. I hope my research will inspire new scientific questions, and make a positive lasting impact on society.

- Dr. Julia Kam
Future Leader in Canadian Brain Research

Canada's next generation of brain researchers has enormous potential. They are building their careers just as science and technology begin to unlock the secrets of the brain. Their work could uncover cures for anything from depression to Alzheimer's to brain injuries. It is an incredible moment in time to be a brain researcher. The generosity of our supporters ensures that our best and brightest have the funding they need to conduct research that impacts the quality of our lives and the lives of our loved ones.

Unfortunately, our best and brightest do not always feel this thrill of potential. And, emerging researchers cannot provide research data without funding to kick start their projects. Even top ranked early-career researchers struggle for that first grant.

Join us and help Canada's future leaders explore the vast unknown of the brain research universe.

Support Brain Canada Foundation today.

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EDITOR'S LETTER

Women's Brain Health Initiative (WBHI) is approaching an incredible milestone: 2022 marks the tenth anniversary of our founding. The seed of an idea has grown into a multifaceted array of programs and initiatives that we believe are making a profound difference. Thanks to our generous donors, committed partners, and dedicated staff and volunteers, WBHI has made significant advances in our mission, but we have much more in mind for our second decade.

WBHI produces various educational programs that spread the word about the ways in which we can protect and preserve our brain health, including the magazine you are reading. I am thrilled to tell you about our latest initiative in which we are pushing the boundaries of our outreach.

Jade Crystal, a member of our Young Person's Cabinet - a dedicated group of young adults under the age of 40 who want to impress on their millennial peers the importance of protecting their brain health today - approached me with an idea. Why not go even younger? A middle school teacher, Jade was eager to help tailor our educational materials on brain health to students in grades five through eight. WBHI's Executive Director, JoAnne Korten, had previously suggested creating a similar initiative, and felt that the timing was now ideal to undertake this important cause.

The result is our new program, Brainable™, which will be rolled out in the Greater Toronto Area in January 2022. We were elated by the enthusiastic response that we received from countless schools and parents alike, and the many requests to expand the program to high schools.

You can read about this exciting initiative in this issue of Mind Over Matter® and/or visit brainable.ca for more information.

Many of the things that we do as children have a substantial impact on our health as adults. In recognition of this (and in honour of our newest program), rather than featuring a mother-daughter duo on the cover of Mind Over Matter®, we are showcasing a grandmother and her granddaughter. Research suggests that when it comes to decreasing the risk of Alzheimer's disease and other types of dementia, it is never too early to start prioritizing your brain health.

As part of our efforts to reach and teach more, WBHI funds research that better meets the needs of women, and we raise awareness about the inequity of scientific investigations that fail to consider differences between the sexes.

We are proud for our role in establishing the world's first Research Chair in Women's Brain Health and Aging, held by Dr. Gillian Einstein at the University of Toronto. Dr. Einstein also leads a major research program exploring sex, gender, and dementia as part of the Canadian Consortium on Neurodegenerative Diseases in Aging (CCNA). She is a force of nature, a wonderful mentor to emerging researchers, and an

internationally recognized expert in her field. I encourage you to read the article in which Dr. Einstein discusses the great progress that she and her colleagues are making in addressing sex and gender disparities in aging and dementia research.

As always, Mind Over Matter® is a trusted source for the latest information on brain health and for useful tips for protecting your cognitive vitality. In this edition, we write about the benefits of music and the promising research into the use of psychedelics for the treatment of depression and even Alzheimer's disease, as well as discuss how "sitting is the new smoking."

Check out our article on this year's Stand Ahead® Challenge and mark your calendars for the third annual Women's Brain Health Day on December 2nd. The winning suggestion for this year's challenge came from a native of Northern Ireland, who drew upon a skill that she learned as a young student. One of the best ways to prevent cognitive decline is to continually challenge your brain to do new things. We hope that our supporters will have fun trying this year's challenge, and will inspire others to stand up against research bias and to stand ahead for women's brain health, and donating to the cause.

The Stand Ahead® Challenge is a flagship fundraising initiative for WBHI, generating more than \$1.2 million to date, money that is already funding important programs. Our valued partner Brain Canada continues to be a generous supporter, once again offering to match contributions up to \$250,000.

Brain Canada is also a key partner in the production of Mind Over Matter®. I am very grateful to say that this is the eleventh edition that they have supported.

We are in the final stages of preparing a series of initiatives that will allow us to share the brain health message on different platforms in new and innovative ways. I cannot wait to tell you about them!

Although almost ten years old, we are only just beginning.

I wish you continued good health and happiness. 🍀



Lynn Posluns
Founder and President,
Women's Brain Health Initiative



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AMY CRYSTAL // CONTRIBUTING EDITOR

Amy is a real estate lawyer at DelZotto, Zorzi LLP, one of Canada's top real estate boutique law firms. "Although many people think of dementia as a disease that affects older adults, the disease begins to impact the brain decades before symptoms are even noticed. WBHI is inspiring a new generation of women to take care of our brain health today, since research now shows that the earlier you protect your brain health, the better the cognitive outcome."



STEPHANIE HAHN // WRITER

Stephanie is a writer and yoga instructor living in Waterloo Region, Ontario. It was through the "gift" of back pain that Stephanie learned to slow down, listen to her body, and rediscover the joys of moving. "Writing for this magazine allowed me to merge my love of writing with my love of spreading the word that stress relief is critical for health."



DILIA NARDUZZI // WRITER

Dilia is a writer and editor living in Hamilton, Ontario. She has been interested in the benefits of a healthy lifestyle for over twenty years. She studied gender dynamics while doing graduate work at McMaster University and is truly honoured to be using those skills to write for Mind Over Matter®. "I want the medical profession and all women to know that women's bodies require specialized medical care."



SEAN MALLEN // WRITER

Sean is a Toronto-based communications consultant, media trainer, and writer. Having seen close family members deal with dementia, he is a passionate supporter of WBHI's mission and is inspired by telling the stories of researchers who are expanding our knowledge of women's brain health. Sean's first book, *Falling for London: A Cautionary Tale* from Dundurn Press, is widely available across Canada, the U.S., and the U.K.



SUSANNE GAGE // WRITER

Susanne is a marketing/communications agency and events professional, with a solid appreciation for smart thinking. A believer in life balance and healthy body and mind, Susanne is also a passionate advocate for giving back. "As a business woman, wife, mother, daughter, and friend, I am inspired by the impact of WBHI and the collaborative opportunities to make a real difference."



SUBHA RAMANATHAN // WRITER

Subha is a director and research consultant for Atmoco Ltd., specializing in health promotion through physical activity. With a PhD in public health, Subha helps non-profits collect relevant information, make research findings understandable, and put recommendations into action. Subha also teaches a university course in sustainable happiness, exploring how to promote our own well-being and that of other people, the environment, and future generations. Writing for Mind Over Matter® unites Subha's knowledge, skills, and desire to share information and strategies that enhance brain health and overall well-being.



SUSAN MINUK // WRITER

As a Toronto-based freelance writer, Susan is drawn to news, health, entertainment, and community stories. Susan is a passionate supporter of WBHI, having interviewed some of our ardent champions such as Lynn Posluns, Arianna Huffington, Dr. Pauline Maki, Kristine Stewart, and Jeanne Beker. On CJTV, a Canadian Jewish talk show on OMNI Television, she sits down with some of Toronto's most inspiring women. About our cover story, Susan said, "Joan's zest for life is inspiring to all."

LOOKING FOR MORE COPIES?

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**VITINA BLUMENTHAL //
CREATIVE DIRECTOR**

Vitina, co-founder of Align Creative Minds, is creative to her core with a passion for a healthy lifestyle (especially all things yoga), and sharing her love of mindfulness with others. Through her business, she encourages millennials to start taking care of their brain health and mental health.



**GREGORY CIRA //
CREATIVE DESIGNER**

Gregory is an established design entrepreneur with an acuity for information design and understands the importance of communicating clearly. Having had family members who suffered from dementia, he has been inspired to raise awareness of the importance of brain health and uses his visual communication skills to help bring that awareness to others.



**JOAN LUNDEN & HER GRANDDAUGHTER PARKER //
ON THE COVER**

Joan Lunden is all smiles with her eldest grandchild on the cover of Mind Over Matter®. Joan enjoys spending time with Parker and her other young grandchildren. That intimate bond derived from shared love and play restores her energy, optimism, and youthfulness, as well as models the importance of good brain health for her grandchildren from a young age. Recent studies show that emotional closeness between grandparent and grandchild can protect against depression, boost brain function, and lead to a longer life. "It's so important that parents [and grandparents] establish healthy routines and create a positive path that will impact kids throughout their lifetime," said Joan.

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Brain Canada recognizes Women's Brain Health Initiative for its role in educating the public about the importance of women's brain health and the role of prevention, but neither Brain Canada nor the Minister of Health or the Government of Canada are responsible for the accuracy of the contents of this magazine.

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BENT OUT OF SHAPE

HOW YOU HANDLE ANGER IMPACTS YOUR HEALTH

How many things in your life do you find irritating, frustrating, unfair, offensive, or threatening, and how do you respond to such things? Do you feel angry about them, and if so, are you angry occasionally or often? When you experience anger, is it mild or intense? Do you express it outwardly or keep it bottled up inside? If you express it outwardly, then do you do so in a burst of fury, or in a calm and constructive way? Your answers to these questions have important implications for your health.

Emotional suppression, defined as a tendency to inhibit the expression of emotion, has long been suspected to influence health. It is a type of coping strategy that involves intentionally avoiding distressing or uncomfortable thoughts by holding feelings in or focusing on other matters. When used from time to time, emotional suppression does not appear to have significant negative consequences. However, repeatedly suppressing your emotions may potentially lead to serious health outcomes in the future.

Anger is an emotion that everyone experiences, but in different ways. It is normal and healthy to feel angry sometimes; in fact, anger can play a key role in survival, as part of an instinctual reaction to threats. However, excessive and/or intense anger is associated with poor mental and physical health. Anger is common among individuals with psychiatric disorders, where it worsens the mental illness symptoms and can make recovery more complicated.

ANGER HAS ALSO BEEN ASSOCIATED WITH A VARIETY OF PHYSICAL CONDITIONS, INCLUDING CHRONIC DISEASES OF THE HEART, DIGESTIVE, AND IMMUNE SYSTEMS.

All of these psychiatric and physical conditions related to anger impact our brain health.

ANGER'S EFFECTS ON THE CARDIOVASCULAR SYSTEM

Anger and hostility were found to be linked with future coronary heart disease (CHD) in a meta-analytic review of 25 studies of initially healthy people and 19 studies of people with pre-existing CHD. While anger and hostility predicted a 19% increase in CHD events for the initially healthy participants, that number was higher (24%) for those with pre-existing CHD.

Anger has long been understood to have potentially harmful effects. In Buddhism, anger is considered one of the three "poisons of the mind" that drive suffering in the world.

ANGER VS. HOSTILITY

Anger is transient (i.e., it comes and goes), whereas hostility is a habitual attitude (i.e., an enduring personality trait).

It is important to note that these findings - from Dr. Yoichi Chida and Dr. Andrew Steptoe, published in 2009 in *Journal of the American College of Cardiology* - were based on observational studies, so they only reveal associations between variables and do not establish causality. It is possible that the association between anger/hostility and CHD may be complex and indirect. Indeed, further analysis of the data in this review showed that other variables such as sleep, smoking, and diet may be playing a role.

EVEN ACUTE EPISODES OF ANGER (I.E., SHORT, TEMPORARY OUTBURSTS) HAVE BEEN LINKED WITH DETRIMENTAL CARDIOVASCULAR OUTCOMES.

A meta-analysis of nine studies involving thousands of participants - conducted by Dr. Elizabeth Mostofsky and colleagues, published in 2014 in *European Heart Journal* - examined the association between angry outbursts and the rate of cardiovascular events.

The researchers found that episodes of anger are associated with a higher rate of heart attack and stroke, within two hours immediately following an outburst.

"Within two hours of episodes of anger, there is a nearly five-fold higher rate of heart attacks and a three-fold higher rate of ischemic strokes (the type due to insufficient blood to the brain)," said Dr. Mostofsky, an instructor in the Department of Epidemiology at Harvard T.H. Chan School of Public Health. She highlighted that the risk is highest among individuals with other risk factors for heart disease and stroke.



THE RISK OF EXPERIENCING A HEART ATTACK OR STROKE AFTER ANY SINGLE ANGRY OUTBURST IS FAIRLY LOW, BUT THAT RISK IS HIGHER FOR PEOPLE WHO HAVE FREQUENT OUTBURSTS OF ANGER, AND PEOPLE WHO HAVE OTHER RISK FACTORS SUCH AS CIGARETTE SMOKING, HYPERTENSION, AND DIABETES.

Not all research into the association between anger and CHD has reached consistent conclusions, though. While many studies suggest a significant link, others do not. Some studies have even suggested that anger might be protective. Emotions like anger are inherently challenging to study. →

Perhaps the impact anger has on heart health varies depending on how the anger is expressed. Dr. Mostofsky and a colleague conducted a study investigating that possibility and shared their findings in 2010 in *American Heart Journal*. In that research, which involved 785 Canadian women and men (50% of each) who did not have CHD at the beginning of the study, the researchers looked at the links between the rates of CHD events and three different types of anger expression:

1. constructive anger - using a goal-oriented, problem-solving approach (e.g., discussing anger to resolve a situation);
2. destructive anger justification - self-justification and blaming others to defend one's position and excuse oneself from blame; and
3. destructive anger rumination - brooding over an anger-inducing incident (e.g., holding grudges and discussing or thinking about anger repeatedly, thereby intensifying angry feelings over time).

Much anger research relies on self-reporting tools, but this research used a different approach. For this study, trained observers assessed the participants' type of anger expression, in order to provide a more accurate portrayal of the motivation underlying the anger expression. (Research has shown that individuals usually believe that their anger expression is mostly constructive, even if friends, family, and observers may report it as primarily destructive.)

Their findings showed that the ways in which anger is expressed may indeed have implications for heart health. "Over an average follow-up of 8.4 years, higher levels of constructive anger were associated with a 41% lower rate of CHD among the men only, while higher levels of destructive anger justification were linked with a 31% higher rate of CHD in women and men," said Dr. Mostofsky.

“
BY MODIFYING OUR WAYS OF COPING WITH FEELINGS OF ANGER AND LEARNING HOW TO EXPRESS THIS ANGER IN A CONSTRUCTIVE WAY, WE MAY BE ABLE TO LOWER CARDIOVASCULAR RISK.

PHYSIOLOGICAL RESPONSES TO ANGER THAT NEGATIVELY IMPACT HEALTH

Feeling angry triggers your body's stress response, starting with the activation of the amygdala (the region of the brain primarily associated with emotional processes), which kicks off a cascade of effects ultimately leading to the release of stress hormones such as adrenaline and cortisol from your adrenal glands.

The body's stress response is important and healthy when it helps us prepare for (and to deal with) the occasional threatening situation, but it can become problematic if it is activated frequently and can negatively affect our mental and physical health in many ways.

Certain parts of the brain are especially vulnerable to elevated cortisol levels. The prefrontal cortex and hippocampus both experience loss of neurons when exposed to too much cortisol, negatively impacting the ability to use good judgement in decision making and planning for the future, as well as weakening short-term memory.

Excessive cortisol also decreases serotonin levels, which can lead to depression and increased aggression, as well as a tendency to feel anger and pain more easily. (Notice the potential for a vicious cycle here: anger leads to increased cortisol levels, which in turn leads to an increase in anger and aggression.)

In addition, excessive stress hormones are known to affect numerous body systems, including the cardiovascular system, which experiences symptoms such as increased blood pressure and arterial tension, increased blood glucose and blood fatty acid levels, and eventually damaged and clogged blood vessels, contributing to increased risk of heart attack and stroke.

AN ANGER PREVENTION STRATEGY: GET ENOUGH SLEEP

Lack of sleep - either sleep deprivation or sleep debt - is associated with increased anger and aggression, according to a 2018 academic review by Dr. Javeria Syeda and colleagues, published in *Cureus*. The researchers looked at 17 studies that had been published within the previous five years, all involving humans (i.e., no animal studies were included).

SLEEP DEPRIVATION WAS FOUND TO EXACERBATE PRE-EXISTING MOOD DISTURBANCES, INCLUDING ANGER, AND PEOPLE OF ALL AGES ARE AFFECTED IN SIMILAR WAYS.

Sleep deprivation refers to getting an inadequate amount of sleep, while sleep debt is the term used to describe the cumulative experience of having multiple consecutive days of sleep deprivation.

When people get enough sleep each night, they tend to exhibit fewer angry outbursts and aggressive behaviours. Just one sleepless night can have a negative impact, so it is important to ensure that you get enough sleep regularly.

ADDICTED TO ANGER

Despite its many negative consequences, anger can be a challenging habit to break for some people. Anger can feel quite good in the moment. By inducing a release of dopamine in the brain, the expression of intense anger can provide a “rush” similar to what is experienced during thrill-seeking activities or when using commonly abused drugs like opiates and cocaine. The brain registers that “rush” as pleasure, which can positively reinforce the angry behaviour (i.e., driving one’s desire to have more angry outbursts).

STRATEGIES FOR HEALTHY ANGER EXPRESSION

Just because intense angry outbursts can have an addictive quality does not mean that they are inevitable. It is possible to learn how to better express anger through practice and training. Remember, feeling angry is normal and healthy; the key is learning how to handle any anger you feel in healthy ways. Here are some strategies to help:

➤➤ Try yoga, meditation, and/or mindfulness training to decrease your stress overall, develop bodily awareness to help you

recognize early signs of anger brewing, and learn to be less reactive to triggers.

➤➤ In an angry moment, take some slow, deep breaths. (It is common to hold your breath when you are seething with anger.) Perhaps take a time out, removing yourself from the triggering situation until you calm down, so that you can respond in a constructive way when you return. A short time out with a focus on calm breathing may be enough, or you might want to engage in something more vigorous to blow off some steam, like going for a run.

➤➤ Be constructive in how you deal with anger (i.e., approach the situation with the intention to solve the problem, perhaps through direct discussion), rather than destructive (i.e., where you focus on how right you are and wrong others are, or endlessly ruminate about the situation and hold grudges). If it is not possible to solve a situation through discussion with the other individual(s) involved, perhaps diarize your feelings or talk to someone else to process and then release your angry emotions.

➤➤ Get professional support if you need it, such as neurofeedback training or cognitive-behavioural therapy for anger management. 🧠



A BREATH OF FRESH AIR

OXYGEN'S CRUCIAL ROLE IN BRAIN HEALTH

Oxygen is critical to the healthy functioning of the entire body but is especially so for the brain. Although the brain is relatively small (representing approximately 2% of body weight in the average adult human), it uses approximately 20% of oxygen intake to function normally. The brain requires a steady supply of oxygen; without it, brain cells begin to die within as few as five minutes.

Hypoxia refers to a deficiency in the amount of oxygen reaching bodily tissues.

Cerebral hypoxia refers to insufficient oxygen supply in the brain.

Cerebral hypoxia is associated with a host of serious consequences that vary depending on the cause of the lack of oxygen, as well as the severity and duration, and may include memory problems, motor function difficulties, cognitive decline, seizures, dementia, and even death.

There are many causes of lack of oxygen in the brain. Some are acute (i.e., severe and sudden), such as when blood flow to the brain is blocked completely during an ischemic stroke, or when a person is experiencing a severe asthma attack, choking, or drowning. Others are chronic (i.e., long-term), like in cases of chronic obstructive pulmonary disease (COPD) or sleep-disordered breathing.

BRAIN HEALTH IMPLICATIONS OF IMPAIRED BREATHING

Breathing is key to your brain receiving the oxygen it needs. Your lungs take in oxygen when you inhale and release carbon dioxide when you exhale. The oxygen breathed in binds with red blood cells and is carried through your blood circulation system to all parts of your body, including your brain.

COPD and sleep-disordered breathing are two common disorders that negatively impact breathing, and accordingly affect blood oxygen levels and cognitive function.

One systematic review and meta-analysis - published in 2018 in the

Chronic obstructive pulmonary disease (COPD) is a group of lung conditions, including emphysema and chronic bronchitis, which limit air flow and make breathing difficult. Common symptoms include shortness of breath, wheezing, and mucus production.

Sleep-disordered breathing is an umbrella term for several chronic conditions, including obstructive sleep apnea, where a person stops breathing during sleep (either partially or completely), thereby causing intermittent hypoxia. In addition to hypoxia, a person with sleep-disordered breathing experiences sleep fragmentation from recurrent arousals from sleep. Both hypoxia and sleep fragmentation can negatively impact cognitive function.

International Journal of Chronic Obstructive Pulmonary Disease - reported that the global prevalence of COPD is 9.23% in men and 6.16% in women. The World Health Organization lists COPD as the third-leading cause of death worldwide, with over 80% of those deaths occurring in low- and middle-income countries.

In a systematic review published in *Sleep Medicine Reviews* in 2017, researchers found a wide range in the reported prevalence rates for obstructive sleep apnea in adults in the general population (because of substantial variation in research methodology). The overall prevalence rate ranged from 9% to 38% when considering all levels of severity of sleep apnea and was higher in men. Further, prevalence was found to increase with age and, in some elderly groups, was as high as 90% among the men and 78% in the women.

What is the impact of COPD and obstructive sleep apnea on cognitive function? A meta-review conducted by researchers in Australia reported on the collective findings from 18 systematic reviews and meta-analyses that looked at the impacts of COPD, untreated obstructive sleep apnea, and other sleep-related problems on cognitive function in adults. They found that, compared to people in the control groups,

PARTICIPANTS WITH OBSTRUCTIVE SLEEP APNEA OR COPD HAD DEFICITS IN A WIDE RANGE OF COGNITIVE AREAS: ATTENTION, MEMORY, EXECUTIVE FUNCTION, PSYCHOMOTOR FUNCTION, AND LANGUAGE ABILITIES.

These findings were shared in April 2018 in *Sleep Medicine Reviews*.

COPD and sleep-disordered breathing have also been linked with increased risk of dementia, and that association appears to be related (at least in part) to the lack of oxygen experienced in both conditions. When oxygen therapy is used in cases of COPD, it reduces the risk of cognitive impairment, dementia, and death.

Moreover, treating obstructive sleep apnea with continuous positive airway pressure (CPAP) prevents intermittent hypoxia throughout the night, and has been found to improve (or delay the decline in) cognitive function and reduce the risk of dementia. Interestingly, the administration of supplemental oxygen has also been found in different studies to positively affect cognitive processing in healthy adults, both young and old. In other words, optimal oxygen levels can give a cognitive boost to healthy individuals, and not just help those with breathing disorders.

One study - by Dr. Kristine Yaffe and colleagues, published in 2011 in the *Journal of the American Medical Association (JAMA)* - looked specifically at the cognitive impacts of sleep-disordered breathing in nearly 300 older women, 105 of whom had moderate to severe obstructive sleep apnea (with the remaining women serving as the control group). →

OVER THE FIVE-YEAR STUDY PERIOD, THE WOMEN WITH SLEEP-DISORDERED BREATHING WERE 85% MORE LIKELY TO DEVELOP MILD COGNITIVE IMPAIRMENT (MCI) OR DEMENTIA THAN THE WOMEN IN THE CONTROL GROUP.

Measures related to hypoxia were found to be associated with the increased risk of developing MCI or dementia, while measures of sleep fragmentation were not, suggesting that insufficient oxygen may be the key culprit underlying the cognitive difficulties experienced by those with untreated sleep-disordered breathing.

These findings emphasize the importance of diagnosing and treating sleep apnea. Using CPAP or supplemental oxygen therapy addresses this problematic nighttime oxygen loss, and could have a large public health impact, given the high prevalence of sleep-disordered breathing and cognitive impairment among older adults.

HOW BLOOD OXYGEN LEVELS IN THE BRAIN AFFECT MEMORY LOSS

The brain requires an abundant supply of oxygen and when it does not receive enough, there are cognitive consequences. But what exactly is happening inside the brain during periods of insufficient oxygen that negatively impacts memory in particular? A team of researchers from the University of Sussex recently shared study findings that provide some insight into the importance of oxygen for the “brain’s memory centre” (i.e., the hippocampus).

The researchers compared brain activity and blood flow in the hippocampus versus the visual cortex of mice. Compared to the visual cortex, the hippocampus was found to have lower resting blood flow and blood oxygenation. Additionally, blood vessels in the hippocampus dilated less frequently and to a smaller degree in response to increased neuronal activity than in the visual cortex.

The researchers then looked at simulations of oxygen diffusion and concluded that these differences in how the blood vessels operate in the hippocampus may restrict oxygen availability in this region of the brain. The differences could also help to explain why the hippocampus is so sensitive to damage in neurological conditions such as Alzheimer’s disease, where reduced oxygen levels might promote the toxic accumulation of proteins that cause brain damage.

“These findings provide a potential explanation for why memory loss is an early symptom in Alzheimer’s disease. The brain finely regulates oxygen supply through neurovascular coupling, a process where active neurons signal to dilate local blood vessels

to increase blood flow and oxygen/glucose supply to the active brain regions. Yet our study showed that neurovascular function in the hippocampus is different than in another part of the brain; the hippocampus appears to be not as good at shifting its oxygen supply in response to fluctuating energy demands from neurons,” said Dr. Catherine Hall, Senior Lecturer in Psychology at the University of Sussex and lead researcher on this study.



INCREASING BLOOD FLOW IN THE HIPPOCAMPUS MIGHT BE A REALLY EFFECTIVE WAY TO PREVENT DAMAGE FROM HAPPENING IN THAT CRITICAL AREA FOR MEMORY; AND IF THAT’S TRUE, IT PROVIDES FURTHER SUPPORT FOR THE IMPORTANCE OF ALL OF THE HEALTHY LIFESTYLE CHOICES TYPICALLY ADVISED FOR HEART HEALTH, LIKE REGULAR EXERCISE AND A HEALTHY DIET.

The coronavirus disease (COVID-19) is another cause of hypoxia. Of particular concern are those individuals with serious cases of the virus who have abnormally low blood oxygen levels, but do not exhibit symptoms such as shortness of breath or trouble breathing. Despite experiencing potentially life-threateningly low oxygen levels, they may feel fine and not seek medical attention. Researchers call this “silent hypoxia” because the low oxygen levels are quietly inflicting damage in the absence of obvious symptoms.

In their study of 1,095 people hospitalized with COVID-19 in the United States, Dr. Neal Chatterjee and colleagues found that blood-oxygen saturation and respiration rate were associated with higher mortality rates. These findings – published in April 2021 in *Influenza and Other Respiratory Viruses* – led the researchers to recommend that those with COVID-19 should be aware of the following measures, which can easily be monitored at home:

➤➤ The simplest measure to watch is respiratory rate, which does not require any equipment; simply have someone count your number of breaths per minute at a time when you are not paying attention, and if you hit 23 breaths per minute, contact your doctor.

➤➤ Watch for low blood oxygen levels using a pulse oximeter, a clip-like device that fits over a fingertip and monitors oxygen saturation of red blood cells. Contact your doctor if you get a reading below 92%. This is of particular importance for people who are at higher risk of adverse COVID-19 outcomes, such as older or obese individuals.

TIPS FOR GETTING MORE OXYGEN TO YOUR BRAIN

- » If you have an untreated breathing disorder, such as COPD or sleep-disordered breathing, see your doctor as soon as possible. There are effective treatments available that can help you breathe better, get more of the oxygen you need, and help prevent, halt, or even reverse cognitive decline related to the disorder.
- » Make lifestyle choices that support healthy cardiovascular function - for example, exercise, eat nutritious food, do not smoke, and limit your alcohol intake. Additionally, if you have high blood pressure or cholesterol, take any medications that your doctor has prescribed.
- » Meditate with an emphasis on slow, deep breathing to help reduce stress and improve your oxygen intake.
- » Grow plants indoors. The Lung Health Institute lists the following five plants as great options for increasing oxygen indoors and purifying the air: Chinese Evergreen, Gerbera Daisy, Money Plant, Snake Plant, and Areca Palm.
- » When weather allows and the outdoor air quality is good, open up your windows to let in fresh air and make breathing easier. 🌿





I'VE GOT THE MUSIC IN ME

MUSIC TRIGGERS MEMORY IN THOSE
WITH ALZHEIMER'S DISEASE

Music has been a cultural universal throughout human history. Listening to music can move us deeply, evoking a spectrum of emotions and bringing back memories, often pleasant ones. One does not need to be particularly “musical” to enjoy and respond to music. Rather, music appeals to people of all ages and can even have positive impacts on individuals with dementia, who may not respond to much else.

MUSICAL MEMORY IN PEOPLE WITH ALZHEIMER'S DISEASE

Musical memory (i.e., the ability to recognize music from one's past) is preserved in the early stages of Alzheimer's disease (AD) and is sometimes retained in the later stages as well, despite severe impairments in cognitive function.

An early case study provided evidence of musical memory in a severe instance of AD. In 2005, Dr. Lola Cuddy and Dr. Jacalyn Duffin shared noteworthy findings from testing that they conducted with an 84-year-old woman whose family claimed showed signs of musical memory, despite significant cognitive impairment.

At the time of the study, the woman's score on the Mini-Mental Status Examination (MMSE) was eight (out of a possible 30), and she was experiencing severe problems with memory, language, and cognition. The researchers found that the woman sang along with songs she recognized, sometimes continuing to sing after the music had stopped, yet she was nonresponsive to unfamiliar songs.

Moreover, she was able to recognize when the melody of familiar songs had been distorted - she would frown, or laugh, or say "Oh, dear!" when she heard any incorrect notes. Her scores on the music tests matched those of healthy age-matched controls. These findings were published in *Medical Hypotheses*.

Since then, research has confirmed that the 2005 case study findings were not an anomaly: many individuals with AD display similar preservation of musical memory. For example, Dr. Cuddy conducted another study with different colleagues, this one involving 50 younger adults, 100 older adults, and 50 older adults with a diagnosis of AD.

In this study (published in *Music Perception* in 2012), the participants were subdivided into three groups based on AD severity

Musical semantic memory is about the music itself - recognition of familiar songs or melodies, as well as the ability to hum, whistle, and/or sing along or potentially name the tune. It is the organized knowledge we possess about music.

Musical episodic memory is about memories associated with music - recalling details about the context in which a song was heard before (i.e., when, where, and how). It is musical memory tagged with reference to specific temporal-spatial locations.

Brain scan research suggests that these two types of musical memory likely involve different parts of the brain.

and were asked to complete six tests involving different aspects of melody and language processing. Key findings of the research include the following:

» Long-term familiarity for melody and lyrics was found across all levels of AD.

» Participants with mild AD retained the ability to sing a melody when prompted by lyrics alone, without melodic cues (i.e., their performance was comparable to the healthy older adults). However, the median performance on this test was significantly lower for moderate and severe AD participants compared to the healthy older adults. Interestingly, though, variability across individuals within the moderate and severe AD groups was quite high. Although these groups, on average, performed poorly compared to their healthy peers, several of the participants with moderate AD, and one with severe AD, performed near the top of the healthy range.

» When it came to detecting melodic distortions (i.e., incorrect notes), participants with mild, and some with moderate, AD performed within the same range as the healthy older adults.

» In contrast to the above findings, which showed preservation of musical memory in those with AD, the researchers found that the ability to detect grammatical distortions in lyrics (i.e., inclusion of grammatically incorrect words) was negatively impacted, even in the mild stage of AD.

"Our findings suggest that musical semantic memory may be an aspect of cognitive function that is uniquely spared in some individuals with Alzheimer's disease," said Dr. Cuddy, Professor Emerita in the Department of Psychology at Queen's University in Kingston, Ontario.



IT APPEARS TO BE QUITE COMMON FOR PEOPLE WITH MILD ALZHEIMER'S DISEASE TO RETAIN THE ABILITY TO RECOGNIZE FAMILIAR SONGS AND REMEMBER MELODIES AND LYRICS, AND THESE ABILITIES CONTINUE TO BE PRESERVED FOR MANY THROUGH THE MODERATE STAGE (AS WELL AS FOR SOME IN THE SEVERE STAGE) OF THE DISEASE. →

THE MANY BENEFITS OF LISTENING TO MUSIC

It is fortunate that musical memory is retained by people with AD. It means that a simple and enjoyable activity like listening to music can provide a range of potential benefits for these individuals, at a time when other activities become difficult or impossible.

Listening to music can be especially helpful in improving mood and behaviour among people with AD. In particular, music has been shown to help alleviate anxiety and reduce agitation. It may help improve quality of life and boost some aspects of cognitive function as well.

One particularly valuable way that listening to music can help people with AD is by evoking autobiographical memories and positive feelings of nostalgia.

WHAT ARE AUTOBIOGRAPHICAL MEMORIES AND WHY ARE THEY IMPORTANT?

Autobiographical memories are recollections about the self from the past. These types of memories serve many important functions, including helping to preserve self-identity, self-knowledge, and self-esteem.

Listening to music is one way to evoke autobiographical memories spontaneously and effortlessly. (Other things that can evoke autobiographical memories include odours, photographs, and movies.)

Nostalgia is a particular response to meaningful autobiographical memories - specifically, a sentimental longing or predominantly positive affection for the past. However, not all recollections of memories about oneself from the past will provoke nostalgia. Sometimes, autobiographical memories generate negative feelings or no feelings at all rather than positive, nostalgic ones.

AUTOBIOGRAPHICAL MEMORY IS IMPAIRED IN ALZHEIMER'S DISEASE, BUT MUSIC CAN HELP

Alzheimer's disease has devastating consequences on a person's autobiographical memory. People with AD are known to have fewer and less detailed autobiographical memories than healthy older adults, and as a result, they struggle with their sense of self.

So, anything that has the potential to help individuals with dementia experience more, or richer, autobiographical memo-

Listening to music can be beneficial for everyone, not just individuals with Alzheimer's disease. Research has shown the benefits of listening to music include reducing anxiety, blood pressure, and pain; improving sleep quality and mood; and boosting mental alertness and memory.

ries is of great interest to researchers. Music is one such tool; it is very efficient at evoking autobiographical memories, even in people with AD.

Numerous studies have revealed strong evidence that listening to music evokes autobiographical memories in people with AD more effectively than when they are asked to recall memories in silence. Some research has shown that when the music is self-chosen, it can be more effective than if the music is selected by the researcher.

MEMORIES EVOKED WHILE LISTENING TO SELF-CHOSEN MUSIC ARE RECALLED MORE QUICKLY, ARE MORE SPECIFIC AND GRAMMATICALLY COMPLEX, AND HAVE HIGHER EMOTIONAL CONTENT, COMPARED TO RESEARCHER-CHOSEN MUSIC OR SILENCE.

Dr. Cuddy and colleagues conducted another informative study in which they used familiar instrumental tunes to gauge whether music alone (i.e., songs without lyrics) would be successful at evoking music-evoked autobiographical memories (MEAMs). Participants listened to excerpts from 12 instrumental tunes that were known to be familiar to them, and then described the first memory from their past that spontaneously arose while listening to the music or shortly after the music stopped playing. Participants could also indicate if no memory had surfaced.

Most AD participants not only recalled memories, but also on average responded similarly to healthy controls on several measures, including length of the described memories (i.e., number of words), and self-rated vividness and positivity of the memories. These findings were published in 2017 in *Cogent Psychology*.

"This research builds upon earlier findings that music is an effective cue for retrieval of autobiographical memories in people with AD. While not every participant with Alzheimer's in this study was able to recall memories in response to the music, most did," said Dr. Cuddy. "And the tune itself appears to be a powerful memory cue all on its own, even in the absence of song lyrics."

CREATING A PLAYLIST FOR SOMEONE WITH DEMENTIA

Listening to music is such a simple, enjoyable, inexpensive, and low-risk activity that incorporating it into the daily routine of a person with dementia is an ideal goal. Many long-term care homes and day centres offer music programs, sometimes run by professional music therapists.

In addition to any guided group music sessions, individuals with dementia can enjoy listening to music on their own (perhaps with some help selecting music and setting up/using the technology to play the music).

When choosing music to include on a playlist for someone with dementia, keep the following tips in mind:

- »» If possible, involve the person with dementia in the process of selecting the music.
- »» Begin by identifying a favourite genre(s) - e.g., does the person love rock 'n roll, country, classical, or some other type of music?
- »» Listen to samples of different songs with the goal of identifying a compilation of 25 to 50 songs that resonate with the person.
- »» Focus in on particular songs from the favourite genre(s), specifically from the years when the person was between the ages of 10 and 30 years old. (That is a key period in our lives when autobiographical memory formation is at a peak, a phenomenon referred to as the "reminiscence bump." Research has shown that songs from this time period are more likely to trigger memories.)
- »» If the person is in a later stage of dementia and is unable to guide you in selecting music, ask family members or friends about her or his favourite songs or music genre(s). If you are unable to obtain that information, try an assortment of music that was popular during the person's younger years (i.e., during the reminiscence bump). Then, play some songs from the chosen era/genre and observe how the person reacts - often you will be able to tell which songs resonate with the person, even if that person can no longer express herself or himself verbally. 🎧

The "reminiscence bump" refers to the tendency for middle-aged and elderly people to have increased or more vivid recollection of events that happened during their adolescence and early adulthood.



GET UP!

IS SITTING THE NEW SMOKING?

Sitting for long periods of time can make us feel uncomfortable and can be taxing on our bodies - leading to aching backs, sore shoulders, swollen feet, cramped legs, and poor blood circulation. Studies have shown that too much sitting, like smoking, increases the risk of heart disease, diabetes, and premature death. Perhaps more surprisingly, though, recent research suggests that sedentary behaviour may pose a neurological risk as well.

One of the most significant implications of sitting for too long is that it slows the flow of blood to our brain. This can have a long-term impact because this natural flow of blood is critical to oxygenate and provide nutrients to your brain cells so that they remain healthy. Because this flow is so necessary, the brain tightly regulates it, tracking a variety of physiological signals, including the levels of carbon dioxide in our blood, to keep the flow rate within a very narrow range.

Small fluctuations, however, do occur (both sudden and lingering), and may have repercussions. Previous research indicates that slight, short-term drops in brain blood flow can temporarily cloud thinking and memory, while longer-term declines are linked to higher risks for some neurodegenerative diseases, including dementia.

WHEN SITTING FOR LONG PERIODS OF TIME, YOUR LARGE MUSCLES ALSO RELAX AND WHEN THEY ARE IN THAT STATE FOR AN EXTENDED LENGTH OF TIME, THEY ABSORB VERY LITTLE GLUCOSE FROM THE BLOOD.

This, in turn, can lead to an increased risk of type 2 diabetes. Even if you are reasonably active, sitting for hours tightens the hip flexor and hamstring muscles, as well as stiffens the joints themselves. Overly tight hip flexors and hamstrings affect gait and balance, which make activities like walking more difficult, and may contribute to lower back pain and knee stiffness.

Researchers at the University of California, Los Angeles set out to examine the ways in which sedentary behaviour influences brain health, especially regions of the brain that are critical to memory formation. They recruited 35 individuals between the ages of 45 and 75 and asked about their physical activity levels, as well as the number of hours they spent sitting each day over the previous week. Each of the participants also underwent a high-resolution magnetic resonance imaging (MRI) scan.

THE RESEARCHERS FOUND A LINK BETWEEN SEDENTARY BEHAVIOUR AND THE THINNING OF THE MEDIAL TEMPORAL LOBE (MTL) – A REGION OF THE BRAIN INVOLVED IN THE FORMATION OF NEW MEMORIES.

The researchers noted that the thinning of the MTL can be a precursor to cognitive decline and dementia in middle-aged and

DID YOU KNOW?

By standing for three additional hours each day over the course of a year, you can burn up to 30,000 extra calories and eight pounds of fat. That is the equivalent of running approximately ten marathons!

GLOBAL FACTS

- » 12 hours is the amount of time the average person is sitting (i.e., sedentary) a day
- » 4th leading risk factor for global mortality is physical inactivity
- » 3.2 million deaths a year are related to physical inactivity

older adults. Accordingly, reducing sedentary behaviour may be a possible target for interventions designed to improve brain health in people at risk for Alzheimer's disease.

Unfortunately, the researchers indicated that physical activity, even at higher levels, is insufficient to offset the harmful effects of sitting for extended periods.

In other words, you cannot subsequently "make up" for a long period of sitting with activity; rather, it must be integrated into the actual sitting time itself. These findings were published in the April 2018 issue of *PLOS ONE*.

Another group of researchers found that approximately 13% of Alzheimer's cases may be due to inactivity, and that even a 25% reduction in sedentary behaviour could potentially reduce Alzheimer's prevalence by approximately one million cases worldwide. Earlier studies have also hinted that more time spent sitting may be linked to worse cognitive performance, which may be a symptom of existing changes to the brain itself.

A systematic review and meta-analysis published in the July 2020 issue of *Translational Psychiatry* sought to evaluate the association between sedentary behaviour and the risk of dementia.

THE RESEARCHERS FOUND THAT COMPARED WITH INDIVIDUALS WHO HAD NOT BEEN EXPOSED TO SEDENTARY BEHAVIOUR, THOSE WHO WERE EXPOSED TO SEDENTARY BEHAVIOUR HAD A 30% HIGHER RISK OF EXPERIENCING DEMENTIA.

Moreover, sedentary behaviour was associated with several chronic diseases that were also linked with cognitive impairment and risk of dementia. The researchers noted that considering the significant health and economic burden of dementia, the results

of their study may provide additional practical and valuable treatments for dementia prevention.

THE COVID-19 PANDEMIC HAS IMPACTED THE MENTAL HEALTH, PHYSICAL ACTIVITY, AND SEDENTARY BEHAVIOUR OF PEOPLE WORLDWIDE.

In one study published in the November 2020 issue of *Annals of Internal Medicine*, the researchers collected the daily step count data from a sample of global users from 187 countries using a smart-phone app. While there were differences between countries influenced by government restrictions and enforcement, along with behaviour changes, the overall results indicated a decline in activity.

More recently, Dr. Jennifer Heisz, an Associate Professor in the Department of Kinesiology at McMaster University and a Canada Research Chair in Brain Health and Aging, co-authored a study of Canadians throughout the pandemic that found that most people were approximately 30 minutes more sedentary each day than they were prior to the pandemic. The researchers also noted that 40.5% of inactive Canadians became less active, while 22.4% of active individuals became less active during the pandemic.

Interestingly, the participants who were able to maintain their activity levels noticed a shift in what motivated them: they were less motivated by physical health and appearance, and more motivated by mental health and well-being. Stress relief, anxiety reduction, and sleep improvements were among the top motivators that increased during the pandemic, and indeed, research supports the use of physical activity for brain health, stress management, and sleep quality.

The researchers noted, however, that their findings highlighted a paradox in which mental health was both a motivator and barrier to physical activity. People wanted to be active to improve their mental health but found it difficult to be active due to their poor

mental health. The results of this study - which were published in the April 2021 issue of *PLOS ONE* - highlight the need for additional psychological supports to help people maintain their physical activity levels during stressful times.

The progress of sedentary research and the impact it has on our lifestyle choices (and the broader medical and health education community) is both significant and timely. It is becoming increasingly evident that less sitting (and more moving) contributes to our overall physical, mental, and brain health.

The following are some tips to help avoid sitting for prolonged periods of time:



TAKE A WALK

- » Walking at least every 30 minutes can help restore blood flow
- » Even as little as two minutes can make a difference



EXERCISE WHILE WORKING

- » Consider using a treadmill while reading/working
- » Walk with colleagues for meetings if possible or host a conference call while walking instead of sitting on a virtual call if possible
- » Stand while talking on the phone or watching television



ELIMINATE BARRIERS

- » Ensure that when you set up your exercise equipment, you do so in a way that facilitates easy access
- » Consider an adjustable standing desk to switch up your work position every so often



SCHEDULE BREAKS

- » Schedule time for yourself to take breaks so that it becomes a priority and is integrated as part of the time management of your work/tasks
- » Scheduling will make your efforts consistent and naturally become part of your routine
- » Set a timer so that you force yourself to get up and move. There are even apps for your smart phone to encourage and track this activity



TEST YOURSELF

- » Try using the "Sitting Time Calculator" to reveal the extent of your sedentary behaviour and work on a solution to improve your brain health and overall well-being (for more information, visit <http://sittingtime.juststand.org>)

THE HEALTH RISK NUMBERS

People who sit the most, compared to those who sit the least, have a greater risk of disease and death:

- » 112% increased risk of diabetes
- » 147% increased risk of cardiovascular events like heart attack and stroke
- » 90% increased risk of death from cardiovascular events
- » 49% increased risk of death from any cause



WHITE MATTER DISEASE

TAKE STEPS TO PROTECT THE
SMALL VESSELS IN YOUR BRAIN

WHAT IS WHITE MATTER?

The central nervous system (i.e., brain and spinal column) consists of a combination of grey matter and white matter. Approximately 40% of the brain is grey matter, which forms an outer cover over most of the surface of the brain, surrounding the white matter found inside (which makes up the remaining 60%).

While grey matter is focused on information processing and other cognitive functions, white matter plays the key role of connector, sending electrical communication signals throughout the brain and the rest of the body via long-range axons. These axons are encased in a fatty white tissue called myelin (hence the name “white” matter).

As people age, it is common for abnormalities to appear in the white matter of their brains, and for those changes to get progressively worse over time, particularly after midlife. These abnormalities appear on different types of brain scans and are referred to by a variety of terms, including white matter hyperintensities, leukoaraiosis, white matter lesions, and white matter disease.

White matter hyperintensities (WMHs) are present to some degree in the brains of most individuals aged 60 and over, with prevalence increasing with age until an estimated 95% to 100% of those aged 80 and over show some degree of WMHs. Not only does the prevalence of WMHs increase with age, but so does the severity (i.e., the amount of WMHs present). →

WHILE THE PRESENCE OF WHITE MATTER ABNORMALITIES IS COMMON AND WAS ONCE CONSIDERED A TYPICAL PART OF BRAIN AGING, THERE IS GROWING EVIDENCE THAT THESE ARE NOT BENIGN CHANGES.

For many people, WMHs appear in their brain scans yet they have no noticeable symptoms, at least initially. Over time, though, as the volume of WMHs grows, that often changes. WMHs have been linked to a variety of negative impacts, including:

- » cognitive impairment and dementia;
- » functional impairment - i.e., declining ability to perform activities of daily living (ADL) independently;
- » walking and balance problems;
- » increased risk of stroke, worse stroke severity, and worse short- and long-term post-stroke outcomes; and
- » depression.

WHAT CAUSES THESE AGE-RELATED ABNORMALITIES IN WHITE MATTER?

Although a variety of conditions can potentially lead to abnormalities in the white matter of aging brains, a common cause is cerebral small vessel disease - an umbrella term used to describe various abnormalities related to the brain's small blood vessels.

Deep white matter areas of the brain lie at the ends of the arterial circulation system, where the smallest of arteries are found. These small arteries are particularly susceptible to decreased blood flow and oxygenation, which is often caused by atherosclerosis (a buildup of plaque on the artery walls).

As plaque increases in the arteries, they become narrower, potentially leading to a stroke from blocked blood flow (ischemic stroke) or a burst artery (hemorrhagic stroke). Yet, white matter abnormalities are observed in the brains of people who have not had an ischemic or hemorrhagic stroke.

One possible explanation for this occurrence is multiple "silent" strokes (i.e., mini, symptomless strokes). Dr. Daniel Mandell and colleagues conducted a study investigating that possibility and shared their findings in *Annals of Neurology* in October 2014. The researchers looked at brain scans from five adults with leukoariosis, taken over a 16-week period.

The participants ranged in age from 57 to 79 and had moderate to severe abnormalities in their white matter and no evidence of previous strokes at the commencement of the study. A magnetic resonance imaging (MRI) scan of each participant's brain was taken each week throughout the study, allowing the researchers to observe subtle changes over time.

The brain scans revealed evidence of tiny strokes appearing in the white matter of most participants over time, yet the participants did not experience any symptoms. When these tiny strokes were new, they were visible on the MRI scan, but ultimately became indistinguishable from the existing white matter disease. These findings suggest that repeated tiny silent strokes are a cause of leukoariosis.

"By studying participants' brains each week, we were able to identify the presence of tiny, symptomless strokes. If we had only conducted MRIs at the beginning and end of the study, instead of every week, we would not have been able to tell that these strokes had happened, because they are so small and eventually just blend in with the existing leukoariosis," said Dr. Mandell, an Associate Professor at the University of Toronto.



WE SUSPECT THAT EACH TINY STROKE IS SO SMALL IT ONLY HAS A MINOR IMPACT ON BRAIN FUNCTION, SO MINOR THAT IT IS NOT NOTICEABLE. BUT AS PEOPLE HAVE NUMEROUS TINY STROKES OVER TIME, THE DAMAGE ACCUMULATES UNTIL THERE IS SUFFICIENT QUANTITY FOR SYMPTOMS TO APPEAR, AT WHICH TIME THE PERSON MAY BE WELL ALONG THE PATH OF DEVELOPING DEMENTIA.

Dr. Mandell and his team are currently engaged in phase two of this study - this time using a new technique known as a super-resolution MRI scan, which can detect much smaller silent strokes. The researchers will first identify which study participants are showing signs of active micro-strokes during ten consecutive weeks of scans, and then see whether those who experienced active injuries during that initial period go on to develop worsening white matter disease and declining cognitive performance (during follow-up scans one and two years later).

"So far we've worked with five participants in this phase two study, and we're seeing smaller silent strokes than ever before," said Dr. Mandell. "These early results are promising, suggesting a potential future screening tool. I believe it may be possible to use a single scan with this very high resolution to identify who has active disease in the small vessels of their brain, thereby helping with early identification of people at high risk of later cognitive decline."

WHITE MATTER DISEASE CAN HAVE WIDESPREAD COGNITIVE EFFECTS

Dr. Brandon Vasquez and a colleague conducted a meta-analysis to examine the impacts of white matter disease on various cognitive functions. They reviewed cognitive performance scores for more than 2,500 people across 27 research studies. Nearly 800 of these individuals had been diagnosed with cognitive impairment due to a vascular cause (i.e., white matter disease) but not serious enough to compromise daily life function, and the rest were healthy controls. Their findings were published in the *Journal of Neuropsychology* in March 2015.

Compared to the healthy controls, the participants with vascular cognitive impairment showed weaknesses in all eight cognitive domains that were measured: namely, executive functioning, thinking speed, general functioning, language, immediate memory, delayed memory, working memory, and visuo-spatial construction. Thinking speed showed the greatest impairment, followed by immediate and delayed memory. Working memory and visuo-spatial abilities were the least affected.

"Our findings expand on the growing body of evidence about the impacts of white matter disease on cognitive function by showing that a large number of areas are affected, more than previously thought," said Dr. Vasquez, a Clinical Neuropsychologist at Baycrest Health Sciences in Toronto.



WHITE MATTER DISEASE APPEARS TO BE A DISCREET SABOTEUR IN THE BRAIN WITH WIDESPREAD NEGATIVE IMPACT ON COGNITIVE FUNCTION.

THE ROLE OF WHITE MATTER CHANGES IN ALZHEIMER'S DISEASE

Accumulating evidence from brain scan studies suggests that cerebral small vessel disease (appearing as higher WMH volume on MRI scans) is linked with the risk and progression of Alzheimer's disease (AD). Researchers previously believed that WMHs played an additive role in AD, contributing to the symptoms experienced but not being a core feature of the disease.

More recently, however, researchers are considering the possibility that WMHs (along with AD's hallmark plaques and tangles in the brain) may play a key role in the clinical manifestation of the disease. Plaques and tangles rarely exist in isolation (i.e., without evidence of cerebrovascular disease being present as well).

An estimated 30% of older adults have elevated amyloid-beta levels without any symptoms of AD. Additionally, the amount of

amyloid-beta present in the brain is only weakly correlated with the severity of AD symptoms. In other words, having higher levels of amyloid-beta does not always mean that a person will have worse symptoms. Dr. Adam Brickman, a Professor of Neuropsychology at Columbia University in New York, noted that



ALZHEIMER'S DISEASE HAS LONG BEEN ASSOCIATED WITH AMYLOID-BETA PLAQUES AND TAU TANGLES. HOWEVER, RESEARCH CONDUCTED BY MY TEAM AND OTHERS SUGGESTS THAT WHITE MATTER ABNORMALITIES LIKELY PLAY A KEY ROLE IN ALZHEIMER'S DISEASE, TOO.

"While amyloid-beta is a defining pathological feature of Alzheimer's disease, it is not enough on its own to cause Alzheimer's-related symptoms. The presence of white matter hyperintensities, likely caused by cerebral small vessel disease, may contribute to clinical symptoms of Alzheimer's disease in a synergistic way to the effects of amyloid-beta," he continued.

"Or, it may be a primary factor, all on its own, in the development of the Alzheimer's disease clinical syndrome. This area of research is exciting because much is already known about how to treat and prevent vascular disease, including cerebral small vessel disease. So, perhaps by taking steps to intervene on vascular disease, we could mitigate the symptoms of Alzheimer's disease."

TREATMENT & PREVENTION OF CEREBRAL SMALL VESSEL DISEASE

The general approach to preventing or treating cerebral small vessel disease is to address any underlying vascular risk factors, such as high blood pressure, high cholesterol, high blood sugar, and smoking. This can mean making lifestyle changes like quitting smoking, engaging in regular exercise, adopting a healthy diet, getting enough sleep, and taking steps to reduce stress. It might also involve taking medications prescribed by your doctor to address high blood pressure, high cholesterol, or diabetes.

WHAT'S HEALTHY FOR YOUR HEART IS WHAT'S HEALTHY FOR YOUR BRAIN.

By taking proactive measures to help prevent heart attack and stroke, you may also help prevent, delay, or slow cognitive decline, Alzheimer's disease, and more. And, the sooner you do so, the better. "White matter hyperintensities tend to accumulate in the brain gradually over time. This suggests that preventative steps will likely be most effective if they are taken starting in midlife or earlier," said Dr. Brickman. 🌱



SHARING HER STORY

FOR DR. VIVIANE POUPON, WORK & CAREGIVING COALESCE

Dr. Viviane Poupon's life in science was foretold as a toddler when her grandmother observed her boundless curiosity as she played in the family home in Paris.

"When I was three years old, and I was opening tiny things and looking at them, my grandmother told my mother that I would work with a microscope later in life, because I was interested in the small details and making sense of things," the President and CEO of Brain Canada told Mind Over Matter®.

There was little in Dr. Poupon's family history to indicate a career in science. Her father was a teacher and scholar who specialized in early twentieth-century French poetry, while her mother was a physiotherapist.

Her innate desire to explore and learn was nurtured by an inspirational grade school biology teacher who stressed the importance of understanding how things work - culminating in the 12-year-old Poupon making a declaration to her parents. "I came back from school one day and told them that I wanted to be a researcher. There was this spark that my biology teacher had ignited, but there was always really a keen interest in observing nature and understanding how things function - especially related to living things."

The life path that was hinted at as a pre-schooler, and then declared as an adolescent, was affirmed in adulthood by her studies in neurology at École Normale Supérieure de Paris, a PhD at Université

Pierre et Marie Curie and at the Necker Hospital in Paris, followed by postdoctoral studies at the University of Cambridge, and a research career that focused on the brain. "I always had a great interest in how the brain functions, and how it defines who we are."

Dr. Poupon's research primarily sought to better understand the ways in which cells communicate, with a particular interest in the brain as an organ and multiple sclerosis (MS) as a disease. In 2003, Dr. Poupon moved across the Atlantic to begin a position with the Montreal Neurological Institute-Hospital, where she personally witnessed the devastating effects of MS.



IT BROUGHT A DIFFERENT PERSPECTIVE, BECAUSE I WAS EXPOSED TO PATIENTS WHO WERE LIVING AND SUFFERING WITH A DISEASE THAT I WAS STUDYING. THE RESEARCH BECAME EVEN MORE MEANINGFUL BECAUSE ALL OF A SUDDEN IT'S SOMETHING THAT CAN HELP OTHERS AND IT BECAME VERY CONCRETE.

Dr. Poupon's studies of the brain hit even closer to home when her father, Marc, was diagnosed with Parkinson's disease.

Although Parkinson's was not her specialty, Dr. Poupon's circumstances demanded that she learn more about the disease.

"He was always asking questions about what's the next exciting thing they're discovering, very good questions, where I didn't have all of the answers. I had to do my own research." He and her mother, Marguerite, moved to Canada about four years ago, partly so that they could spend more time with Dr. Poupon and her daughter, and partly because of his deteriorating condition. Marguerite carried the principal burden, bringing to bear her professional experience as a physiotherapist, with her daughter playing a supporting role.

"They always had a very strong relationship, supporting each other. My mother was the primary caregiver, but she never complained. She could be exhausted and never complain."

DR. VIVIANE POUPON, THE BRAIN RESEARCHER, NOW HAD FIRST-HAND EXPERIENCE OF THE CHALLENGES FACED BY CAREGIVERS AND THEIR FAMILIES.

"To be honest, the support system is not that present. We need more support for caregivers. If you stop supporting the caregiver, you stop supporting the patient." Dr. Poupon found her father's attitude inspiring. Even as his condition worsened and he relied ever more heavily on Marguerite, he remained interested in the world and savoured every moment of life right up until his death at the age of 89.

"It was hard, and he was suffering, but at the same time he was making his best effort to get through it in the best way."

Dr. Poupon lost her father just a few months after commencing her new role as President and CEO of Brain Canada, one of the nation's leading funders of research into neurodegenerative diseases, with more than \$72 million invested over the past ten years.

"The opportunity to help researchers in a different way was very exciting for me," she said.

Dr. Poupon sees Brain Canada's role as not only funding innovative research and researchers, but also uniting different players with the common goal of developing new treatments for neurodegenerative diseases. "That's where I want Brain Canada to deliver, to reinforce that we need strong research and support, but we also need to ensure that this research is translated so that it helps the community and the patients."

One of Brain Canada's valued partners is Women's Brain Health Initiative (WBHI). Through its partnership with the Government

of Canada, through Health Canada, Brain Canada plays a key role in supporting the production of Mind Over Matter®. Dr. Poupon lauds WBHI's mission of promoting brain health and ensuring that researchers consider the differences between the sexes when studying conditions such as Alzheimer's disease.

"Women's brain health is an important concept, and we must ensure that researchers don't have a narrow focus. If we want to help everyone, we have to include everyone. That's always been important to me."

As she settles into her new role at Brain Canada, Dr. Poupon retains the curiosity of that three-year-old girl playing in her childhood home in Paris, but now as a leader of an organization dedicated to furthering knowledge of our most complex and mysterious organ. "This mission is really important to sustain." 🌍



DIVERSITY MATTERS

UPDATE ON CANADA'S LARGEST COLLABORATIVE RESEARCH INTO NEURODEGENERATIVE DISEASES

Until recently, the scientific research community showed little interest or inclination in understanding why women are more likely to develop Alzheimer's disease (AD) than men. Indeed, females (both human and non-human) have historically been excluded from clinical research and trials, in part due to the common belief that females were more "complicated" than males. However, both sex (biological attributes) and gender (sociocultural factors) affect our risk of developing certain diseases, how well we respond to medical treatments, and how often we seek health care.

Importantly, studying sex and gender differences is no longer an outlier, but rather has become an essential component in Canada's largest research study of neurodegenerative diseases.

"There's lots going on. In fact, sex and gender research is teeming with activity," said Dr. Gillian Einstein, who holds the Wilfred and Joyce Posluns Chair in Women's Brain Health and Aging, and is the lead of the Women, Sex, Gender and Dementia (WSGD) cross-

The Canadian Consortium on Neurodegeneration in Aging (CCNA) is a national initiative to foster broad collaboration and knowledge sharing among researchers who study neurodegenerative diseases that affect cognition in aging.

Based on their area of specialization, CCNA's researchers are divided into 19 teams throughout Canada, and are working in the areas of prevention, treatment, and quality of life. They draw on the data of national platforms, and are supported by cross-cutting programs that assist teams in overarching aspects of research such as considerations of sex and gender.

cutting program in the Canadian Consortium on Neurodegeneration in Aging (CCNA).

"I think the consciousness is really raised, and that's exciting," Dr. Einstein told Mind Over Matter®.

THE MANDATE OF THE WSGD CROSS-CUTTING PROGRAM IS TO ENSURE THAT EVERY CCNA RESEARCH PROJECT EXPLORES HOW AGING AND NEURODEGENERATIVE DISEASES AFFECT WOMEN AND MEN DIFFERENTLY, AND ENDEAVOURS TO LEARN MORE ABOUT THE UNDERLYING REASONS FOR THE DISPARITIES BETWEEN THE DIVERSE GENDERS.

As a dramatic measure of the progress, there were 20 publications from the CCNA group in 2020 that addressed sex and gender disparities in dementia, compared to 11 the previous year.

Across the breadth of different research projects, the scientists uniformly observed that the field had been neglected.

Dr. Nadia Gosselin found this to be the case in her studies of the relationship between sleep apnea and dementia.

"Because sleep apnea is more prevalent in men, all of the literature has been more focused on men than women. In fact, women tended to be excluded from the literature altogether," said Dr. Gosselin, a neuropsychologist who is an Associate Professor of Psychology and Director of the Center for Advanced Research in Sleep Medicine.

Poor sleep has been identified as a risk factor for dementia. Dr. Gosselin's research specifically examines the impact of sleep apnea, a disorder in which a person's breathing pauses or becomes more shallow than normal during sleep. While younger men suffer from

this disorder at a higher rate than women, this gender disparity disappears after menopause.

Notably, women with the disorder (unlike men) seem to exhibit changes in brain structure and a decline in cognition. Women also present different symptoms, and their doctors are therefore less likely to detect the disorder. While men are more likely to report the classic symptoms of sleep apnea, such as snoring and gasping, women tend to report atypical symptoms like difficulty falling asleep, night sweats, and morning headaches.

“Women are not well diagnosed, so they are more at risk than we thought,” said Dr. Gosselin.

She and her team are trying to learn more about the relationship between sleep apnea and dementia and, crucially, the differences between women and men. Through observations of research participants who suffer from the disorder, they will monitor oxygen saturation and measure the link with cognitive decline, hoping to determine whether women’s cognition declines faster than men.

“If we want to understand the role of poor sleep quality with dementia, we need to study the sexes separately,” Dr. Einstein noted.

“It will impact how we manage or diagnose dementia or conduct intervention programs,” added Dr. Gosselin. “If women are more at risk, we’ll need to be more aggressive in our interventions to prevent cognitive decline and dementia.”

For Dr. Teresa Liu-Ambrose, a better understanding of the differences between women and men could help inform an intervention that we can all benefit from for our brain health: exercise.



THE REASON WHY SEX AND GENDER ARE CRITICAL IN THESE ASSESSMENTS IS THAT THERE IS EVIDENCE TO SUGGEST THAT OLDER FEMALES AND MALES RESPOND DIFFERENTLY TO EXERCISE TRAINING. —>



Dr. Liu-Ambrose is a Professor in the Department of Physical Therapy at the University of British Columbia, and a Canada Research Chair in Physical Activity, Mobility, and Cognitive Health. She and her team have been leading older adults in the Vancouver area through monitored exercise programs and measuring their responses. Their findings to date suggest that aerobic exercise may provide greater brain benefits to women than men.

The researchers are exploring potential explanations for this occurrence, with a focus on BDNF or “brain-derived neurotrophic factors.” BDNF plays a key role in neuronal survival and growth, serves as a neurotransmitter modulator, and participates in neuronal plasticity, which is essential for learning and memory. Blood tests that were performed on the female participants revealed increased levels of BDNF after aerobic training.

“I’d call BDNF fertilizer for your brain or brain vitamins,” explained Dr. Liu-Ambrose. “Neurotrophic means literally growth of neurons, so these factors when they are released within the brain promote cell growth.”

She cautions that much more research is needed, particularly on the potential benefits of resistance training and how the impacts differ between women and men. The recommended forms of exercise may be different and should be targeted. “Exercise is helpful, but to have the maximum benefit for the individual, we need to know specifics.”

WHILE EXERCISE IS BELIEVED TO HAVE A POSITIVE IMPACT IN STAVING OFF DEMENTIA, HEARING LOSS HAS BEEN IDENTIFIED AS A RISK FACTOR.

A major report published in *The Lancet* in 2017 (with a 2020 follow-up) described hearing loss as the single largest risk factor for dementia that had the potential to be modified. In other words, if an individual takes action to cope with declining hearing, she or he may reduce the risks.

However, *The Lancet* report did not touch on the differences between women and men; rather, it was a review of the existing literature that did not account for sex and gender.

“It’s the same story as in many aspects of health – men’s problems are better understood and better dealt with,” said Dr. Kathy Pichora-Fuller, a Professor Emerita in the Department of Psychology at the University of Toronto.

She told *Mind Over Matter*® that individuals often delay getting treatment for hearing loss because they fear that wearing a hearing aid will make them look or feel old, which can lead to a cascade of negative effects. People who have difficulty hearing (or vision problems) may choose to withdraw from social activity rather than seek help.

“Social isolation and inactivity in socializing also isn’t good for

your brain,” said Dr. Pichora-Fuller. “It’s good for your brain if you are active, socially active, mentally active, cognitively active. And sooner or later, if you’re inactive, then your brain can be under stimulated, it’s kind of a downward spiral.”

SEX AND GENDER COME INTO PLAY WITH THE TYPES OF SUPPORT THAT ARE AVAILABLE FOR INDIVIDUALS WITH HEARING LOSS.

According to Dr. Pichora-Fuller, men more frequently work in industries where noise is a known hazard and where union contracts and workers’ compensation programs provide access to hearing care, including hearing aids if needed.

“So, working in noise puts men on a fast track for developing hearing problems, but they can get help for occupational hearing loss and their wives tend to be very supportive. Conversely, hearing loss in women may not be picked up at work; their hearing problems frequently develop later in life and may not be identified or treated as early as hearing problems in men. Additionally, women tend to not receive much social support from their husbands when they do get help for hearing problems.”


Dr. Pichora-Fuller’s project is aimed at developing programs to challenge the stigma and negative attitudes associated with getting help for vision and hearing problems. “Our research will provide training about ageism and how to not fall prey to the negative stereotypes about hearing so that aging adults do not delay taking advantage of the treatments that are available and known to be effective.”

More broadly, she said that CCNA researchers are exploring sex and gender differences related to hearing and dementia, filling the gaps from past research that overlooked these critical differences.

WHETHER IT IS HEARING, SLEEP, OR EXERCISE, DR. EINSTEIN BELIEVES THAT THE GROWING RECOGNITION OF THE IMPORTANCE OF SEX AND GENDER CONSIDERATIONS IN AGING AND DEMENTIA RESEARCH IS HAVING A SIGNIFICANT IMPACT.

“It’s terrific! People see how important it is and are applying it to their own areas of expertise,” she said.

Dr. Einstein is also encouraged that new funding is on the way. A call recently went out for three new proposals, each of which would be eligible for \$90,000 for sex and gender research, with funding from Women’s Brain Health Initiative, Brain Canada, and the Canadian Institutes of Health Research.

“I’m proud of the Women, Sex, Gender, and Dementia cross-cutting program. It’s got a life of its own, which is wonderful.” 

ON THE OTHER HAND



2021 STAND AHEAD® CHALLENGE

LYNN SAMUEL | 2021 CHALLENGE CONTEST WINNER



A skill developed as a teenager inspired Lynn Samuel's winning entry in this year's Stand Ahead® Challenge. Samuel proposed the "Other Hand Challenge," which calls for a straightforward but surprisingly difficult task: write your name using your non-dominant hand. If you are right-handed and attempt it with your left (or vice versa), you may well find yourself producing an illegible scrawl that bears no resemblance to your actual signature.

That is what Samuel's friends found when she challenged them to try it themselves.

"They said no problem. But then when they tried it, they said it was trickier than they thought," she told Mind Over Matter®.

ONE OF THE BEST WAYS TO PREVENT COGNITIVE DECLINE IS TO CONTINUALLY CHALLENGE YOUR BRAIN TO DO NEW THINGS.

The idea for the "Other Hand Challenge" grew out of Samuel's experience writing exams in her native Northern Ireland. Samuel has a rare condition called Madelung's deformity, a misalignment of the bones in the wrist. Consequently, writing for extended periods of time causes her pain, which became incredibly difficult during exam time. She coped (and passed her tests) by learning to write with her left hand, so that she could alternate and minimize the discomfort.

In Samuel's video submission for the Stand Ahead® contest to determine this year's challenge, she demonstrated the other hand concept and created a legible version of her signature using her left hand.

The competition produced a variety of innovative entries, which were ultimately narrowed down to three finalists.

The "Coordination Challenge," submitted by Dr. Tatiana Habanova, tested your hand-eye coordination by requiring you to display the number 5124301435 on your screen and to show the corresponding number using your fingers, doing so in the correct order and to the beat of a fast-paced song. The "Dance Duo Challenge" required →

you to find a partner to demonstrate a series of coordinated dance moves. Physical activity, including dance, is a proven benefit for brain health.

Samuel's submission was chosen in an online vote, a result that utterly shocked her.

"Not a chance," she said, laughing, when asked about her odds of winning. "It was just on a whim. I never thought anyone would get back to me. But it was fun!"

Along with winning a Stand Ahead® gift basket worth more than \$500 and a \$1,000 Visa gift card, Samuel's "Other Hand Challenge" will be a central element of Women's Brain Health Initiative's annual Stand Ahead® fundraiser, in honour of the third annual Women's Brain Health Day on December 2nd - a day officially recognized by Health Canada.

HOW THE CHALLENGE WORKS

Participants will be asked to record themselves taking the challenge and to post their videos on social media with the hashtag #StandAhead, while calling upon two friends to do the same and to donate to Women's Brain Health Initiative.

Donations of \$20 or more will qualify for a tax receipt.

Women's Brain Health Initiative (WBHI) Founder and President Lynn Posluns thanked all those who submitted entries, along with the many supporters of the charity who cast online votes.

"I find the backstory to Lynn Samuel's idea so interesting," Posluns said. "We always get so many innovative ideas for the challenge. All three of the finalists' ideas were great!"

Samuel has only recently come to learn about WBHI's work and mission. She decided to watch last year's Stand Ahead® Challenge virtual event after she read about it on the Instagram account of Pattie Lovett-Reid, CTV News' Chief Business Commentator, and the co-host of the event.

"It piqued my interest. There were lots of interesting speakers and I started following WBHI's Instagram account and reading the bits of information they post, whether it's nutrition, stress reduction, or everyday things to help ourselves with brain health. It's something I'd like to remain involved with and try to help get the word out."

For Samuel, the concept of brain health has a personal resonance. She has had to cope with severe headaches for many years. Reading the educational materials produced by WBHI has been a revelation.

"I hadn't thought about brain health," she said. "The fact that you can potentially help yourself, regardless of your age, is very exciting. It's free, it's doable, it's accessible to everyone. We just need to remind people of that."

THE STAND AHEAD® CHALLENGE HAS RAISED \$1.2 MILLION IN ITS FIRST TWO YEARS - MONEY THAT IS BEING PUT TO GOOD USE FUNDING VARIOUS RESEARCH PROJECTS THAT BETTER MEET WOMEN'S NEEDS.

For the third consecutive year, Brain Canada is providing a generous boost by matching donations up to \$250,000. "Brain Canada is proud to be committing matching funds for the Stand Ahead® Challenge again this year. Our partnership with WBHI enables us to accelerate women's brain health research in Canada," said Brain Canada CEO and President Dr. Viviane Poupon.

"We must all acknowledge that sex and gender differences exist, and as a funding agency, we have a responsibility to support these considerations in the work we enable. In addition to our focus on sex and gender, Brain Canada's goal is to consider diversity in all its forms. Only when we include everyone, will research ultimately benefit all of society. Together with WBHI, we can be a guiding light for researchers, and along the way inspire our partners and other agencies, to enable and encourage this aspect of research through funding."

Posluns noted that Brain Canada is a crucial and valued partner to WBHI. "Brain Canada has been a big part of the success of the Stand Ahead® Challenge," she added.

Once again, WBHI is hosting an online event on December 2nd to headline Women's Brain Health Day and the Stand Ahead® Challenge. When the program was required to go virtual in 2020, it turned out to be a resounding success, reaching a much wider audience of viewers who would never have been able to attend in person, with guests joining from all over North America. Lovett-Reid and Anne-Marie Mediwake, co-host of CTV News' Your Morning, will again share hosting duties.

Along the way, viewers will be asked to participate in the "Other Hand Challenge" and to use the opportunity to make a statement: to stand up against research bias and stand ahead for women's brain health.

To learn more about the Stand Ahead® Challenge, visit StandAhead.org.

LOOK TO THE CHILDREN

EARLY INTERVENTION FOR YOUTH MENTAL HEALTH & DEVELOPMENT

Dr. Teresa Bennett's views of children's mental health were informed by a period in 2013 when she worked in the mental health emergency room at McMaster Children's Hospital in Hamilton, Ontario and noticed some familiar patterns to the stories she heard from teenagers and their families. →





As a psychiatrist who specializes in working with children and adolescents, she spoke with many teenagers who indicated that they struggled with their emotions at a young age, commencing in the sixth and seventh grade. Their stories were reinforced by their parents, who noted that their families often endured multiple challenges (including financial hardships and mental health problems with the mothers and/or fathers) and that, in retrospect, their children exhibited early signs of emotional distress.

“The ER is so important to help stabilize children and youth in crisis, but for too many kids, signs and worries had gone unnoticed until they reached that crisis level,” Dr. Bennett told Mind Over Matter®. “It became clear to me that we needed to do something earlier. Working in the mental health ER really got me thinking about prevention. If we can identify them earlier, we can not only reduce mental health risks but also make their learning and lives better.”

Dr. Bennett is a core member of the Offord Centre for Child Studies and an Associate Professor in the Department of Psychiatry and Behavioural Neurosciences at McMaster University, and holds the Jack Laidlaw Endowed Chair in Patient-Centred Care. The benefits of early intervention are at the heart of her latest research project, which is being funded by Brain Canada and the RBC Foundation.

RESEARCH HAS SHOWN THAT EMOTIONAL AND BEHAVIOURAL PROBLEMS (EBPS) SUCH AS DEPRESSION, ANXIETY, AND AGGRESSION OCCUR AT DISTURBING RATES AMONG YOUNG CHILDREN: RANGING FROM APPROXIMATELY 12% TO 26% FOR THOSE UNDER THE AGE OF SIX.

Dr. Bennett and her team are evaluating the use of an intervention program called the Family Check-up™ (FCU), which was first developed more than 20 years ago by the late Dr. Thomas Dishion and colleagues, Dr. Beth Stormshak and Dr. Daniel Shaw at the University of Oregon and the University of Pittsburgh.

The family-centered program targets known risk and protective factors for child well-being, with a focus on early intervention for youth at high risk of severe and chronic mental health problems.

Children are deeply affected by their everyday environment and the influence of their parents, and experiences early in life (both positive and negative) can have lasting consequences.

The FCU focuses on partnering with parents to build on the strengths of their children and families, achieve their own positive parenting goals, and connect them to community and healthcare supports. The actual interventions are relatively brief (two or three sessions), but the program has demonstrated robust and sustained effects across child and family mental health outcomes in several U.S. studies.

The FCU model had never been implemented in Canada and given the differences in culture and health care systems, a clinical study was needed in order to evaluate its efficacy within a Canadian setting.

Dr. Bennett’s team conducted a randomized control trial involving 206 families from the Hamilton area, all with children between the ages of two and four who were displaying behaviours that concerned their parents. Clinicians interviewed each family to get an understanding of their challenges, and then would film the participants interacting with each other as they might at home, dealing with basic household issues.

The clinicians, who have training in motivational techniques, played back the video recordings for the adult participants and gave them positive feedback on their parental abilities.

“Parents sometimes don’t see where they do well,” said Dr. Bennett. “We showed them the videos to help them recognize their strengths, which they can use to set new goals.”

PROBLEMS SUCH AS DEPRESSION, ANXIETY, AND AGGRESSION IN OUR YOUTH ARE CONSIDERED SOME OF THE LARGEST PREDICTORS OF MENTAL ILLNESS LATER IN LIFE. EVIDENCE SUGGESTS THAT EARLY INTERVENTIONS COULD MAKE A DIFFERENCE IN PREVENTING THEIR ONSET.

The clinicians also examined what is known as the “executive function” of the child participants - more specifically, their ability to regulate their emotions, manage their impulses, and to easily switch from one task to another.

“It’s a thinking skill that’s linked to better performance. Kids who can regulate their emotions and put the brakes on impulses are less likely to have emotional and behavioural problems, both now and down the road,” she said.

“We like the term ‘ecological assessment.’ The aim is to support the child’s emotional well-being but does so by addressing parenting within the broader context of the family.”

One of the advantages of the FCU is that it is uniquely tailored for each family and is offered in an accessible and convenient setting. Far too often, the families who require the most assistance stop attending parenting programs because they are too generic and do not address their particular needs.

Dr. Bennett hopes to publish the results of their study within the next year. Although she is cautious about discussing their findings before the peer review process is completed, she indicated that the families participating in the FCU appear to be experiencing significant improvements in child behaviour.

“It looks like it’s demonstrating some long-term benefits. We’re really optimistic that this is a positive tool to identify kids and families in need of support earlier in a way that’s meaningful for kids and families that need help the most,” she said.

Sex and gender aspects play a key role in her research. There are an equal number of girls and boys participating in the FCU, and the researchers will be examining whether the effectiveness of the program is the same for each.

Dr. Bennett called the study “Making the Race Fair,” inspired by one of Canada’s best-known child psychiatrists, the late Dr. David

“Dan” Offord, under whom she studied.

“Dan used to talk about how growing up in Canada is like a race, and early mental health problems make the race unfair for kids. We hope to level the playing field.”

She is grateful that an institution like Brain Canada recognized the value of this kind of work and provided crucial support.

“We know that to change kids brains in healthy ways, we need to address their environments and support their families. It takes a lot of wisdom to fund programs that may influence brains indirectly but in important ways.”

“This kind of work gives me a lot of hope,” Dr. Bennett continued. “I love it because I feel like I’m doing some meaningful innovation. Focusing on prevention is more than ever where we need to be thinking. For me personally and professionally, it’s really rewarding and exciting, and fun.” 🧠

The project has been made possible with the financial support of Health Canada, through the Canada Brain Research Fund, an innovative partnership between the Government of Canada (through Health Canada) and Brain Canada, and RBC.





BRAINABLE™

A Women's Brain Health Initiative

BRAINABLE™

A NEW STUDENT EDUCATION
PROGRAM ABOUT BRAIN HEALTH



Women's Brain Health Initiative's Millennial Minds® carries the slogan "it's not too early to start taking care of your brain." The dynamic program aims to reach and teach those under the age of 40 who want to understand what it takes to stay cognitively healthy throughout their lives.

Now, Women's Brain Health Initiative (WBHI) is bringing the latest tips for better brain health to the classroom with an innovative new educational program called Brainable™, geared towards students in grades five through eight.

"The decisions that children make today will have an impact on their minds and bodies in the future," Brainable™ Program Director Jade Crystal told Mind Over Matter®.

Crystal, who serves on WBHI's Young Person's Cabinet, proposed the Brainable™ initiative. A former middle school teacher, she had been attending Millennial Minds® events for years and felt that it was a natural extension to bring the brain health message to a younger audience. She pitched the idea to WBHI Founder and President Lynn Posluns.

"I decided to take a chance and see if she'd be willing to take the Millennial Minds® content to the middle school classroom, teaching the same material but to a younger audience, and supplementing the Ontario health and science curriculum," said Crystal.

DEMENTIA HAS BEEN TYPICALLY PORTRAYED AS A DISEASE OF THE ELDERLY, BUT THE DAMAGE CAN START DECADES EARLIER. WE KNOW THAT OUR BRAINS ARE CONTINUALLY DEVELOPING THROUGH THE TEENAGE YEARS, AND PEAK AT THE AGE OF 25.

Crystal noted that bad lifestyle choices can have a detrimental impact on young brains, while good habits can pay lifelong dividends.

"With the COVID-19 pandemic, we've seen kids getting into bad habits - less time being social with friends, staying up later, trying to cope with added stress. All of these have an effect. Our goal is to encourage better habits."

Posluns was quickly sold on the Brainable™ concept.

"When we started creating Brainable™ and ran the idea past parents and teachers, we discovered very quickly that the demand for the program was going to be huge," said Posluns.

WBHI Executive Director JoAnne Korten, who had previously suggested creating a similar initiative, started reaching out to donors and found instant interest, quickly raising more than half of the required funding to carry the program through the first two years.

Crystal is building a 75-minute program that will be taught in either English or French, and offered to schools and students who participate at no charge, thanks to the support of donors.

Students will learn about the various ways in which they can help protect their brain health. The program touches on nutrition, proper sleep, and ongoing learning, as well as gives advice on how to cope with stress. There is also essential information on behaviours that can harm brain health, such as smoking, lack of exercise, and too much sugar in the diet.

There will be supporting materials as well: a Brainable™ magazine for students modelled on Mind Over Matter®, and a tip guide for parents with fun and easy activities to support good brain health every day. Teachers will receive learning resources and recommended follow-up activities to reinforce brain-healthy behaviours.

"The content is very similar to what the entire WBHI team has been teaching to adults for almost a decade. We're just modifying to fit not only the language of kids, but also the context," said Crystal.

"The hours of sleep, for example, are different for an adult compared to a younger person. We've also focused on the effects on the developing brain. For example, substance abuse has a huge impact on the adult brain, but it has a bigger impact on the brain of a child or adolescent because it's still developing."

THE BRAINABLE™ PROGRAM WILL BE TESTED IN CLASSROOMS THIS FALL, WITH THE ROLL OUT SCHEDULED FOR JANUARY 2022.

The idea has struck a chord. Initially, the program is being offered only in the Greater Toronto Area, but the interest is already overwhelming, with more than 100 expressions of interest from schools, parents, and students in just the first three weeks. Although aimed at middle schools, WBHI has also received multiple requests from high schools asking for a similar program.

"The requests to bring Brainable™ to schools is beyond what we thought, which is pretty phenomenal," said Posluns. "Especially with the pandemic, this issue really resonates with both parents and teachers. They want to provide children with the necessary tools to help improve their mental health."

WBHI continues to raise money for Brainable™, with the goal of expanding its reach across Ontario and ultimately nationwide.

For more information about Brainable™, visit [Brainable.ca](https://brainable.ca).



L-R Lindsay Weinberg, Kim Konigsberg, Kate Konigsberg, Joan Lunden, Sarah Shapiro, Jamie Hess.

ON THE COVER

WITH JOAN LUNDEN

Trust acclaimed broadcast journalist Joan Lunden to infuse the aging process with fun. Lunden's trademark wit and humor are on full display in her newest book, *Why Did I Come Into This Room?: A Candid Conversation About Aging*.

"Aging ain't for sissies," Lunden said in an interview with *Mind Over Matter*®. "You better be prepared!"

Lunden describes herself as "enthusiastic, curious, and driven." These very traits propelled her illustrious career as co-host of ABC's *Good Morning America* from 1980 to 1997. Lunden captivated millions of viewers, reporting from 26 countries, covering five Olympic games, four presidents, two royal weddings, and countless celebrities, entertainers, doctors, scientists, and political figures.

The passage of time has not diminished Lunden's drive to educate and engage with life. At age 70, she has survived breast cancer and is an ardent advocate for prevention. The best-selling author is also a motivational speaker and successful entrepreneur who fervently believes that her family is the catalyst that keeps her youthful.

Happily married to Jeff Konigsberg, the mother of seven lives in Greenwich, Connecticut with two sets of teenage twins - 18-year-olds Kate and Max and 16-year-olds Kim and Jack. Lunden is also a grandmother of four grandchildren between the ages of two and seven.

"My adult daughters, Jamie, Lindsay, and Sarah, grew up to be kind, compassionate, and interested in the world, and are doing their part to live healthy and green," gushed Lunden. "I am very proud."

Those feelings are mutual. "I watched my mom share with the world her 'real life' journey through weight loss, wellness, and even

her very public struggle with cancer," said Lunden's eldest, Jamie Krauss Hess. "Her honesty inspired women to feel less afraid and be bolder with taking charge of their own health. That's what I always strive to be." Krauss Hess, together with her husband George, is the creator of the popular health and wellness Instagram account "NYCfitfam" (with over 115,000 followers to date). "We truly live and love the healthy lifestyle. It is the fuel that runs the motor for our happy family!"

LUNDEN BELIEVES THAT IF PARENTS FOSTER HEALTHY LIFESTYLE HABITS FROM A YOUNG AGE, CHILDREN WILL NOT BE AS PREDISPOSED TO CHRONIC ILLNESS AND COGNITIVE DECLINE AS ADULTS. ONE OF HER PRIMARY PASSIONS IS FINDING WAYS TO MAINTAIN ONE'S COGNITIVE VITALITY.

"For decades and decades, all of the research was done on men and we [women] are not just smaller male bodies by any stretch of the imagination. Our bodies and our brains are very different because of the fact that our bodies work in cooperation with our estrogen. And as your estrogen starts to go down, that's why women experience aging in such a pronounced fashion - the expanding waistline, the weak pelvic floor, the forgetfulness, the hot flashes, and the painful intercourse are all related to this lack of estrogen."

She noted that women must be "the CEOs of their own brain health" and that there are various factors that will determine how successfully you will age, including maintaining strong social connections. As Lunden explained, "Having friends - and not just that one daughter that comes to visit to take you to the doctor's office - is key. And if you can be around younger people, then that really helps to keep your brain active."

PHOTO: STACIE KOBY

Establishing a life purpose also predicts how successfully you will age. Lunden recently joined the faculty of Lehigh University as a Visiting Professor in their College of Health, teaching a course entitled "Population Health and the Media."

When asked how she felt about being in a classroom setting, interacting with 50 young adults, Lunden replied, "I am a little nervous - I am 'expanding my horizons' as my mother would have said. Taking this new job will keep my cognitive thinking process going. It will give me passion to get up in the morning and have a mission in life. It will do all these things that are recommended for keeping a young brain."

Until relatively recently, it was commonly believed that the adult brain could not generate any new brain cells and that individuals naturally lose brain cells as they age. However, a growing body of research suggests that new brain cells can be created throughout a person's lifespan in the hippocampus (the region of the brain that is responsible for learning information, storing long-term memories, and regulating emotions). One of the best ways to create new brain cells is to exercise.

"In my extensive research for my book, I learned that as you exercise, you pump blood and oxygen, as well as nutrients, into your brain and create new neurons that are very adept at connecting to the central system. If you don't connect the central system, they just wash away during sleep. Suddenly, I couldn't wait to put my sneakers on and go outside and do my power walk because I came to realize how important it was to retain my cognitive thinking. It changed my whole attitude toward moving my body."

Lunden explained that partaking in dance classes (and/or engaging in other similar physical activities) is great for the brain because you have to watch and listen before performing the physical motion. "I do things like salsa and hip-hop dancing, not because I am a good dancer but because it requires me to listen and to follow the steps. By the time the instructor says, 'let's take it from the top,' your brain is thinking, 'can I remember all of this?' And that is just fantastic for the brain."

"Positive affirmations are also extremely important for the brain," Lunden noted. Her beloved late mother Gladys (nicknamed Glitzy Gladys) was the eternal optimist who encouraged her daughter to expect (and aspire to achieve) great things in life. Growing up, Lunden received constant positive reinforcement from her mother. "She was the guru of positive thinking. It was like being raised by Ghandi, seriously."

What was the single most important thing that Glitzy Gladys taught her daughter? "The importance of letting go and not holding onto anger, regret, or revenge. My mother and I could have a tiff with each other and thirty minutes later she would be at my bedroom door, 'Okay sweetie, what are we doing this afternoon?'"

The lesson, Lunden described, was that it is okay to disagree with others from time to time but learning to move forward (and to not dwell on the negative) is critical for your overall health and well-being. "It is one lesson that I have really over the years tried to instill into my daughters. If you can learn to let go and not hold on to negative thoughts, it will create a better life and will allow you to effectively manage your stress."

Stress can have a detrimental impact on both the immune system and the brain.



STRESS IS THIS INVISIBLE THING THAT CAN HAVE A VERY SERIOUS IMPACT ON OUR BODY. THE BETTER WE CAN BE AT NAVIGATING LIFE, AND LIFE'S CHANGES AND CHALLENGES, THE LESS STRESS WILL MANIFEST ITSELF, WHICH WILL EQUAL A BETTER BRAIN AS WE GET OLDER.

Rest and sleep have been Lunden's nemeses for decades. Through her twenty years co-hosting Good Morning America, she arose every weekday morning at 3:30 a.m. "I came to understand how important sleep is. There are by-products that are created as you generate new neurons, and they kind of float around in our brain - and it's through deep sleep at night that these analogs are washed out of your brain. Kind of like a little car wash that goes on at two in the morning. If you're not getting good sleep, those are not being washed out of your brain and you wake with what feels like brain fog."

Lunden noted that we can learn to change those things that keep us awake at night. "For me, it was my to-do lists. The brain cannot have two thoughts at the same time - it's physically impossible. So at night I will count backwards, and it works because I must think about that counting and my brain can't go over my to-do list at the same time." She suggested that for some, listening to music and/or meditating can be effective ways to get a good night's rest.

We now know that the earlier in life that you start to take care of your brain, the better the cognitive outcome. Brain health includes maintaining a healthy diet, engaging in regular physical activity, getting a good night's sleep, engaging in mentally stimulating and social activities, and managing stress levels.

"Our children may not listen to us, but they will always mimic us," said Lunden. "If we are snacking unhealthy, that's what they learn by our actions - almost more than what we teach them verbally because they have a tendency to shut us out."

"When it comes to your brain health, what we do in our 20s as far as eating right and exercising can really predetermine how fast we lose our cognitive thinking," she continued. "We have to tell every 20-year-old that you can't just wait until you're 70 to worry about your brain health." 🌍



IS ANYBODY OUT THERE?

ONLINE SOCIAL INTERACTIONS & COGNITION

As you might suspect, there is a high cost associated with the widespread lockdown measures that have been instituted across the globe in response to the COVID-19 pandemic.

According to a recent study conducted by Dr. Tzung-Jeng Hwang and colleagues (published in *International Psychogeriatrics* in 2020), while robust social restrictions may be necessary to help prevent the spread of COVID-19, the implementation of unprecedented public health measures has led to elevated levels of loneliness and social isolation, particularly in older adults, which in turn produce physical- and mental-health related repercussions.

OLDER ADULTS ARE PARTICULARLY VULNERABLE TO SOCIAL ISOLATION AND LONELINESS AS THEY ARE FUNCTIONALLY VERY DEPENDENT UPON FAMILY MEMBERS AND/OR SUPPORTS BY COMMUNITY SERVICES.

It is important, though, to keep in mind that social distancing is not the same as social disconnection, the latter having detrimental implications on mortality. There are numerous ways to maintain feelings of being connected to others despite having to maintain physical distance from your loved ones and friends, including communicating through online video chats (such as Zoom and Skype) and social media platforms (such as Instagram, Facebook, and Twitter).

Loneliness and depressive symptoms are related to worsening cognition over time. A systematic review and meta-analysis led by Dr. Jisca S. Kuiper in 2015, and supported by subsequent studies, concluded that loneliness and social isolation were significantly associated with incident dementia.

A BURGEONING BODY OF RESEARCH SUGGESTS THAT LOW SOCIAL CONTACT IS A RISK FACTOR FOR DEMENTIA, WITH MULTIPLE STUDIES DEMONSTRATING THAT THOSE WITH POOR SOCIAL SUPPORT SYSTEMS OVER THE LIFESPAN DO WORSE COGNITIVELY.

A meta-analysis of 51 research articles (published in 2019 in the *Journal of Alzheimer's Disease*) looked at social isolation and cognitive function later in life and found that low levels of social isolation (characterized by high engagement in social activity and large social networks) were associated with better late-life cognitive function. Moreover, having a robust social network was found to be beneficial for protecting brain health.

Recent research published in *The Journals of Gerontology: Series B* in February 2021 investigated social contact and cognitive ability

to determine if the way in which individuals interact socially affects cognitive function. As online interactions continue to increase for all populations, including for older adults, the researchers wanted to explore the implications of this shift.

"We know there is a growing number of older adults who are not replacing but supplementing traditional or offline interactions, like phone conversations and in-person meetings, with online communication modes. E-mailing, for example, is particularly favoured by many older adults," noted Dr. Snorri B. Rafnsson, the lead author of the study and an Associate Professor in the Geller Institute of Ageing and Memory at the University of West London in the United Kingdom.

The researchers used data from the English Longitudinal Study of Ageing (ELSA), which has followed and interviewed more than 11,000 women and men between the ages of 50 and 90 since 2002. Specifically, they looked at the ELSA's data regarding social contact, via both traditional in-person methods (for example, getting together with people and talking on the phone) and non-traditional online avenues (such as communicating through e-mail).

OFFLINE & ONLINE INTERACTION

Dr. Rafnsson and his team analyzed the data on how older adults interacted with others (both offline and online) and how frequently they did so, as well as information on episodic memory function (being the part of our long-term memory involved in recollecting specific events and experiences, such as our first day of school or our wedding day). Its impairment "is a hallmark sign of Alzheimer's disease, and therefore dementia," noted Dr. Rafnsson.

The study confirmed that frequent offline, or in-person or phone interactions, were related to better memory function over time.

PERHAPS MORE NOTABLY, THOUGH, FREQUENT ONLINE INTERACTIONS (AND SPECIFICALLY E-MAILING) WAS ASSOCIATED WITH ADDITIONAL OR FURTHER MEMORY BENEFITS. →

Social disconnection refers to either objective social isolation, perceived social isolation (or loneliness), or the co-presence of both.

Social distancing, or physical distancing, refers to non-pharmaceutical interventions or measures intended to prevent the spread of a contagious disease by maintaining a physical distance between individuals and reducing the number of times that individuals come into close contact with each other.

The participants who supplemented their in-person interactions performed better than those who rarely interacted or who did not interact at all online, even when those who did not use online interactions had a robust in-person social network.

Previous research had suggested that frequent offline social interactions help older adults with long-term cognition because being with loved ones may assist in recalling the past and engaging the memory system. Additionally, if interactions are meaningful and supportive, then “this could also possibly reduce stress and anxiety,” according to Dr. Rafnsson.

He believes that the reason supplementing offline interactions with online ones incurs more memory benefits is twofold. First, engaging online gives people an additional avenue or tool to “facilitate meaningful interactions.” Second, it is likely that using new technologies means that an older adult must learn how to do so.

Whether it is learning to use a computer, tablet, smart phone, or new software program such as e-mail, Zoom, and/or FaceTime (each of which have been especially predominant during the pandemic), it is a form of skill-building.

“We know from parallel literature that learning to use and engage with new technology may potentially offer older adults more direct cognitive stimulation,” said Dr. Rafnsson. Cognitive improvements may be discernible in those who use both offline and online modes of contact because of the simultaneous benefits of socializing (in multiple ways) and engaging the parts of the brain that help us to learn new skills.

Dr. Rafnsson also highlighted an important finding of his study: amongst those who experienced hearing loss, memory function

was positively related to both online and offline modes of engagement. He believes that this association could be because those with reduced hearing may engage differently online. For example, writing an e-mail could allow someone to “concentrate more, particularly if the hearing loss reduces or blocks out background noise.”

Accordingly, there may be unexpected cognitive benefits when hearing loss and online interactions are combined. Parenthetically, the 2017 Lancet Commission on dementia prevention, intervention, and care identified hearing loss as one of the modifiable risk factors for dementia.

Dr. Rafnsson and his team had worked on this research project prior to the pandemic. The associated increase in digital interactions makes their findings even more pressing. Some older adults with dementia fared particularly poorly when lockdowns were announced, noted Dr. Rafnsson, due to the “disruption of routines and increased social isolation,” whereas others “seem to be managing optimally and coping quite well.”

It is worth exploring whether technology played a role in these disparate experiences. Were those who managed well already using online socializing methods? Did they have support for learning these new technologies, whether through family members or institutional aid?

AGE & USE OF DIGITAL TECHNOLOGY

A 2017 Pew Research Center study found that while seniors are consistently adopting new technologies, there still exists a “digital divide” within this age cohort. Only 26% of Internet users ages 65 or older reported that they feel “very confident” when using computers, smartphones, or other electronic devices. About three-quarters of older adults indicated that they need others to show them how to use new devices, and 28% of those over the age of 65 have a disability or health issue that may impact their ability to use digital technology. This group has been found to be less likely to use a variety of digital assets - from the Internet in general to devices such as smartphones or tablet computers.

Taken together, these barriers need to be acknowledged when it comes to older adults and digital technology, as we increasingly rely upon technology for work, education, socializing, and more, and especially considering the research finding that using technology may very well improve cognitive outcomes for older adults.

A November 2020 article published in *Frontiers in Psychiatry* looked at the effects of the COVID-19 pandemic on older adults specifically and noted that while technology may have gone a long way to mitigate the negative effects of the crisis in the general population, the situation is more complicated in the elderly population. Access to (and the ability to proficiently use) technology is much lower in older populations than in younger adults.

THE DIGITAL DIVIDE

Access to (and the ability to proficiently use) technology is much lower in older populations than in younger adults. This uneven distribution of technological access and skill is often referred to as the “digital divide,” and researchers have suggested that it has continued to increase as the rate of technological innovation accelerates.

While this problem is not new, during the COVID-19 pandemic the digital divide has resulted in a large segment of the population who are unable to make use of the various digital measures put in place to help mitigate the negative physical, psychological, and social effects of the crisis.

This results in a “paradoxical situation,” in which the population most affected by the pandemic lockdowns is also the population least helped by the digital tools aiming to mitigate the negative effects, noted Gabrielle Martins Van Jaarsveld, a PhD Candidate in the Department of Psychology, Education and Child Studies at the Erasmus University Rotterdam in the Netherlands, and the author of the article.

What needs to be done, then, so that older adults can reap the benefits of digital social contact? In the short term, Martins Van Jaarsveld believes that awareness of the problem is the first step. “Digital solutions that the elderly cannot access are not solutions for them,” she said. Long-term solutions must include a focus on improving digital literacy.



WE CANNOT WAIT UNTIL THE PROBLEM SOLVES ITSELF, AS THE YOUNGER GENERATION BECOMES THE OLDER GENERATION, WHICH IS THE APPROACH COMMONLY CONSIDERED, BECAUSE WE'RE ONLY GOING TO GET MORE DIGITAL IN THE NEXT TEN TO TWENTY YEARS.

Not everyone has a willing family member to teach her or him the necessary tools. Communities and governments need to start offering technologies that older adults can use, and to teach them the skills “they need to make use of,” she said.

Dr. Rafnsson agrees that long-term solutions need to be fostered. “We shouldn’t think about the use of technology as a quick fix,” he noted. And the solutions are not necessarily one-size-fits-all. Future research will need to examine which online platforms and modes work best and for whom, since technology changes so rapidly.

In light of the recent findings that combined offline and online social contact can improve cognition, Dr. Rafnsson hopes that there might be policy implications aimed at preventing cognitive decline through the promotion of “better social connections in older adults, particularly for high-risk groups, including those living with impaired hearing, and those whose regular social engagement may be restricted or challenged.”

The pandemic has accelerated our inevitable transition into an increasingly digital future. Now that we know that digital engagement may well improve brain health, there has never been a better time to include everyone into the digital fold. 🌐



BRAIN WAVE

LIGHT & SOUND TREATMENT FOR ALZHEIMER'S DISEASE



Your brain bustles with electrical activity all the time, with your neurons sending each other electrical signals to communicate (in addition to communicating with each other via chemical neurotransmitters). The term “brain wave” is used to describe a rhythmic pattern in the brain’s electrical activity, produced when large groups of neurons fire on and off together at a certain frequency.

There are five widely recognized brain wave frequencies, each associated with specific mental states and neurological functions. One brain wave frequency may be dominant in the brain at any given time, but all frequencies are always present to some degree.

GAMMA BRAIN WAVES ARE DISRUPTED IN NEUROLOGICAL CONDITIONS

Gamma brain waves are of specific interest to dementia researchers because they can be significantly disrupted as we age, especially in people with age-related, progressive neurological disorders such as Alzheimer’s disease (AD) and frontotemporal dementia. (Gamma brain waves are associated with multiple brain functions, including attention, cognitive processing, and memory.)

BRAIN WAVES RESPOND TO SENSORY INPUT

In a phenomenon referred to as “brain wave entrainment,” our brains tend to fall into sync with the rhythm of an external stimulus. For

example, brains exposed to sound, light, or touch sensations that are vibrating within the range of brain wave frequencies can begin to generate brain waves in a matching rhythm.

GAMMA BRAIN WAVE ENTRAINMENT & AD

Knowing that brain waves can be altered by sensory input, and that gamma waves in particular are irregular in individuals with AD, researchers were curious about whether exposure to pulses of light and sound delivered in the gamma frequency range could be a treatment for the disease.

Initial explorations into that possibility began with studies using mice that were genetically engineered to exhibit hallmark symptoms of AD. Research studies that exposed the mice to light and sound oscillating at 40 Hertz (Hz) revealed some promising results, including a significant reduction in AD pathogenic hallmarks in the brain, and altered immune cells and signaling.

Based on the exciting initial findings in mice, researchers began studying the effects of gamma audio-visual stimulation on humans.

One human trial involving 40 Hz audio-visual stimulation was conducted by Dr. Annabelle Singer and colleagues. In the study, published in May 2021 in *Alzheimer’s & Dementia*, ten participants with



mild cognitive impairment due to underlying AD were exposed to the stimulation at home via light-emitting goggles and sound-emitting headphones for one hour each day.

The study took place over eight weeks, with half of the participants receiving the gamma treatment for the full eight weeks, and the other half starting midway through and receiving the treatment for the final four weeks. The researchers looked at safety, tolerance, and adherence, along with several biological outcomes, and found the results in all areas were excellent.

“Although some participants reported occasional mild discomfort, there were no serious adverse events related to the treatment and overall, the device was found to be very safe,” said Dr. Singer, Assistant Professor at Georgia Institute of Technology and Emory University.

“Because the stimulation itself is not inherently rewarding, we wondered if participants would use the device for the prescribed one hour per day for the duration of the study. We were pleased to discover that they did, with participants completing 95.5% of treatments on average.”

Further, magnetic resonance imaging (MRI) scans and cerebral spinal fluid collected as part of the research provided preliminary →

Frequency refers to the number of times a brainwave oscillates in one second and is measured in cycles per second, or Hertz (Hz). The higher the Hertz, the faster the brainwave frequency.

Brain waves can be tracked and recorded with an electroencephalogram (EEG), and are generally categorized into five frequency bands:

1. DELTA (below 4 Hz) – sleep, dreaming

2. THETA (4 - 8 Hz) – drowsiness

3. ALPHA (9 - 13 Hz) – reflective, restful

4. BETA (14 - 30 Hz) – busy, active mind

5. GAMMA (above 30 Hz) – problem solving, concentration


(There is, however, some variation across the research literature in the range of Hertz used in the definition of each brain wave band.)

evidence that the treatment affected neural networks and immune factors in the nervous system. Specifically, they found that the treatment strengthened connectivity in the default mode network - which is important for interactions across brain regions involved in memory and tends to be compromised in cases of AD.

In addition, the researchers found altered levels of cytokines (proteins used in cell signaling), which indicates that the stimulation affects the brain's immune system. The researchers believe that the brain's immune system plays a key role in AD progression and the effects of this treatment.

Of note, these human participants did not experience the decrease in amyloid-beta or tau (two proteins commonly associated with AD) that had been found in the mice research. "We expect human brains need more time to experience a drop in Alzheimer's hallmarks, compared to mice," said Dr. Singer. "More research is needed to explore that possibility and learn more about the potential clinical benefits of this treatment. These findings are preliminary, but they do support the case for longer studies with larger groups of people."

Multiple studies of gamma brain stimulation in individuals with AD have also been conducted by Cognito Therapeutics, a company founded by brain researchers in 2016. In early 2021, they shared the promising results from one of their studies at the 2021 AD/PD Conference (an international conference on Alzheimer's and Parkinson's diseases and related neurological disorders). That study included a larger number of participants over a longer period than Dr. Singer's study, and it utilized a strong research methodology (namely, it was a randomized controlled trial with a control group for comparison).

Seventy-six people with mild-to-moderate AD participated and were randomly assigned to receive either 40 Hz audio-visual stimulation or "sham" stimulation for one hour a day at home, over a six-month period. At the end of the study period, those in the treatment group (compared to those in the sham group) experienced:

- an average 61% reduction in whole brain atrophy and volumetric loss (which is typically associated with AD);
- 84% slowing of functional decline, as evidenced by the participants' scores on the Alzheimer's Disease Cooperative Study-Activities of Daily Living (ADCS-ADL) measure; and
- 83% slowing in memory and cognitive decline, as evidenced by the participants' scores on the Mini-Mental State (or Status) Examination (MMSE).

These findings suggest that this treatment has disease-modifying potential.

Disease-modifying therapies address underlying pathophysiology (i.e., target the underlying cause of a disease), whereas **symptomatic therapies** treat the symptoms of a disease without addressing the underlying cause.

Cognito Therapeutics is continuing to explore the therapeutic effects of this treatment for AD in ever larger studies. Earlier this year, they received a "breakthrough device" designation from the U.S. Food and Drug Administration (FDA), which will help to expedite the clinical development process.

It is possible that this treatment will prove to be effective on its own or in combination with other therapeutics.

As promising as the findings have been so far, there is still much to learn about using gamma brain wave stimulation as a potential treatment for AD. Is 40 Hz the ideal frequency? Is one-hour per day the ideal amount of exposure, and if so, over how many days, weeks, months (perhaps in perpetuity)? Is it possible to over-do gamma wave exposure? What type of device is best for delivering the stimulation? Might the treatment help the brains of healthy people, too (i.e., work as a preventative measure), or help those with neurological conditions other than AD?

These questions, and many others, still need to be explored. Thankfully, there is much interest and enthusiasm in this innovative approach. Hopefully answers will be available soon to many of the outstanding research questions, and possibly a disease-modifying treatment for AD. In the meantime, researchers warn people not to try improvising with light and/or sound therapies on their own; getting frequencies wrong could make things worse. 🧠

EXPERIENCED MEDITATORS HAVE ENHANCED GAMMA BRAIN WAVE ACTIVITY

Entrainment through sensory stimulation is not the only way to boost beneficial gamma brain waves. Meditation is another method that can generate more gamma in the brain. Multiple studies involving experienced meditators (e.g., monks, nuns, and yogis) have found that they have elevated gamma oscillations compared to an average person. Brain scans have shown the enhanced gamma brain wave activity was present in these meditators during actual meditation practice, but also in resting baseline measurements, suggesting that meditation had a lasting impact on their brains.



As you and your loved ones get older, you may begin to notice changes in how you think and behave. Sometimes getting distracted or being forgetful may be worrisome. Identifying when these changes started to occur, and how often, are clues to help determine what is happening and whether you should do something about it.

Until recently, trouble with memory and attention among adults (especially older adults) were usually thought of as early signs of dementia. With fine-tuned diagnostic tools and long-term data now available, medical professionals are starting to consider another diagnosis: attention-deficit/hyperactivity disorder (ADHD). →

DISTRACTED & FORGETFUL

IS IT HEALTHY AGING, EARLY SIGNS OF DEMENTIA, OR ADHD?

ADULTS CAN HAVE ADHD

Research studies from across the globe now show that cognitive and behavioural symptoms of ADHD can continue into adulthood for up to 60% of individuals.

ADHD and dementia are both neurocognitive disorders that impair the self-management systems of the brain, known as executive functions.

Overlapping symptoms of these disorders include trouble with routine activities, memory loss, being disorganized, feeling anxious (often related to being disorganized or difficulties with time management), changes in mood, and sleep disturbances.

ADHD IS COMMONLY ASSOCIATED WITH CHILDREN, PARTICULARLY BOYS, WHO HAVE DIFFICULTY SITTING STILL AND/OR PAYING ATTENTION AT SCHOOL, AND WHO EXPERIENCE MOOD SWINGS AND/OR EMOTIONAL OUTBURSTS.

Early onset of symptoms and persistence throughout one's lifetime are characteristic of ADHD; this type of presentation can be used to rule out dementia. In the case of dementia, cognitive decline usually only begins in adulthood, and typically after the age of 65. Dementia is progressive, with continued deterioration in cognitive function over time. Dementia is caused by a range of diseases and injuries that affect the brain, with Alzheimer's disease responsible for most cases. Talking to family members and long-term friends about when they started to notice symptoms of cognitive decline can help to distinguish between ADHD and early signs of dementia.

ADHD RUNS IN FAMILIES, DEMENTIA USUALLY DOES NOT

Besides age of onset, another key difference between ADHD and dementia is heritability - that is, whether there are genetic causes that make it more likely for family members to have the disorder.

Dopamine is a neurotransmitter that sends messages between nerve cells and is considered integral to processes that make us uniquely human, including our ability to focus on tasks, be motivated to achieve goals, and experience pleasure or interest. Low levels of dopamine, possibly due to genetic (hereditary) factors, is linked to ADHD.

A 2018 review published in *Molecular Psychiatry* looked at studies on ADHD with families, twins, and adopted children over the last four decades. The authors, Dr. Stephen V. Faraone and Dr. Henrik Larsson, provide clear evidence that ADHD has genetic factors, where people with ADHD are more likely to have relatives with the disorder, generation after generation.

IF YOU HAVE A CHILD OR GRANDCHILD DIAGNOSED WITH ADHD, THIS IS ANOTHER SIGN THAT ADHD MAY BE THE UNDERLYING CAUSE OF YOUR SYMPTOMS, RATHER THAN DEMENTIA.

In contrast, only rare types of dementia have a genetic link, which means that in most cases dementia is not passed down to children or grandchildren.

PREVALENCE OF ADHD

Approximately 7% of people worldwide have been diagnosed with ADHD, with more than twice as many males as females having this condition. In their 2015 review of global data in *Pediatrics*, Dr. Rae Thomas and colleagues explain that there appear to be regional variations in ADHD prevalence, but this is likely because of how information is collected, rather than true differences.

For example, in a 2017 study published in *The Canadian Journal of Psychiatry*, Dr. Helen-Maria Vasiliadis and colleagues show that less than 3% of Canadian children and adults have ADHD, with three times the number of males diagnosed as compared to females. While there has been a slight increase in ADHD prevalence over the last few decades, this is likely related to greater awareness of ADHD signs and symptoms (with more individuals proactively seeking diagnosis for themselves or their family members), and better diagnostic tools.

PREVALENCE OF DEMENTIA

The prevalence of dementia worldwide has increased over time, primarily because of increases in life expectancy. Globally, it is estimated that between 5% to 8% of those aged 60 and over have dementia. Women are disproportionately affected, even after adjusting for longer life expectancies when compared to men. Additionally, individuals in low- and middle-income countries are more likely to have dementia compared to high-income countries.

While population age distribution is largely responsible for country-to-country variations, modifiable risk factors (e.g., poor diet and physical inactivity) and uncontrolled medical conditions (e.g., hypertension and diabetes) also play a significant role. In Canada, less than 1% of those aged 65 to 69 have dementia, and this increases to approximately one quarter of the population aged 85 and older.

CAN YOU DEVELOP ADHD AS AN ADULT?

It is widely believed that people diagnosed with ADHD as adults have had the disorder all along. If you are wondering how it is possible to

have lived your entire life with ADHD without knowing it, it could be that you were taught how to work around your symptoms as a child to keep them from becoming overwhelming. Alternatively, you may have experienced mild ADHD symptoms as a child, but these symptoms only “flared up” in adulthood because of major life changes such as retirement or the death of a spouse.

In childhood, you might have learned coping strategies to help keep your ADHD in check and focus on tasks, pay attention when people were talking, and regain control when you felt your emotions bubbling to the surface. Predictable daily schedules during school with dedicated time outdoors can also help children with ADHD manage their symptoms.

Moreover, it is well established that there are effective non-pharmacological (i.e., drug-free) strategies that involve optimizing the environment or the nature of learning tasks to minimize symptoms of ADHD. Simple changes, like setting up a quiet room for learning with natural light, identifying incremental learning goals, or focussing on a lesson for a short interval, can create a positive learning environment for children with ADHD.

Yet another possibility for an ADHD diagnosis later in life is related to biological processes. As women go through menopause later in life, levels of the estrogen hormone drop. Estrogen enhances the action of the neurotransmitter dopamine, which plays a key role in tasks related to focus and attention. Consequently, when menopausal women experience a decrease of both estrogen and dopamine, pre-existing ADHD can become obvious for the first time.

WHAT SHOULD YOU DO IF YOU THINK YOU HAVE ADULT ADHD?

Family members or lifelong friends can be helpful to talk through your concerns and to determine whether the symptoms that you have noticed are new, more pronounced, or attributable to recent life events. This type of conversation is similar to a clinical interview that you would have with a medical professional to receive a diagnosis and explore treatment options.

There are several pharmacological treatments available for ADHD, with varying side effects and limitations for long-term use. Stimulants, such as methylphenidate (Ritalin) and amphetamine/dextroamphetamine

(Adderall), and non-stimulants, such as atomoxetine, guanfacine, and clonidine, can be effective for both children and adults.

Although side-effects are typically less pronounced in adults, risks to cardiovascular health, like increased blood pressure, must be weighed carefully and monitored closely. At the same time, adults do not need to worry about whether medications will affect their growth and development.

MORE RECENTLY, ADULT-ADHD TREATMENT OPTIONS HAVE SHIFTED TOWARDS NON-STIMULANTS TO PREVENT INTERACTIONS WITH OTHER MEDICATIONS AND CONDITIONS, AS WELL AS TO AVOID MISUSE.

Interestingly, some of the medical treatments currently used to enhance cognition and attention in other disorders like schizophrenia and Alzheimer’s disease are being explored for use with ADHD. Speak with your doctor and/or other medical professionals to learn more about options available to you based on your family history and other health conditions.

ESTABLISH A PHYSICAL ACTIVITY ROUTINE

No matter whether you are diagnosed as a child or adult, long-term medications for ADHD may lead to weight gain and a higher body mass index (i.e., muscle to fat ratio). This suggests that any treatment plan should include physical activity.

Anyone diagnosed with ADHD (or dementia) can benefit from establishing a physical activity routine in the same way as healthy individuals and younger counterparts. Be sure to include physical activities that you find pleasurable so that you are more likely to schedule them into your day on a regular basis.

Engaging in physical activities can help to offset the side effects of medications, provide a healthy outlet for expending restless energy, and release mood-enhancing and calming hormones (e.g., endorphins and serotonin). As a bonus, physical activity naturally elevates the brain’s level of dopamine, which helps with focus and attention.

NORMAL CHANGES IN COGNITIVE FUNCTION WITH AGE

Now, if you find yourself forgetting things, having difficulty organizing your day, or experience emotional outbursts at any age, this does not automatically mean that you have an undiagnosed cognitive disorder. Life and job stressors, lack of sleep, and of course pandemic-related changes to your daily routine can all have negative effects on your memory, ability to plan, and feelings of emotional control. There are also natural changes in cognitive function that occur with age among healthy individuals.

According to Dr. Karen Campbell, a Canada Research Chair in Cognitive Neuroscience of Aging at Brock University in →

SWEAT IT OUT

Canadian guidelines for adults recommend 150 minutes of moderate to vigorous physical activity every week for at least ten minutes at a time. Moderate to vigorous activities are those like brisk walking that increase your heart rate and make you sweat.



St. Catharines, Ontario, it is important to keep in mind that “there are age-related changes in memory and cognitive function seen in healthy individuals. Some of our research studies have shown that healthy older adults tend to get distracted by irrelevant cues and don’t do as well in memory tasks when compared to younger adults. It seems that we have trouble filtering out unnecessary information as we age, and this - rather than a problem with the memory system itself - can interfere with memory.”

Given that our brains, bodies, social environments, and family structures (amongst other things) all change over the life course, what can we do to preserve our cognitive function?

BOOST YOUR BRAIN HEALTH WITH OR WITHOUT AN ADHD DIAGNOSIS

There are countless ways to boost our brain health (at any age) and to promote healthy aging, including:

- »» Being physically active every day to increase blood flow to the brain - and better yet, do it in green spaces;
- »» Making a plan to learn something new, and then setting incremental goals to achieve it;
- »» Trying mindful breathing to reduce stress and help you cope with overwhelming emotions;
- »» Talking to your neighbours, relatives, and/or friends in person or online to maintain social interactions (for an extra boost, go for a walk while catching up); and
- »» Structuring your day to ensure that you have seven to eight hours of uninterrupted sleep to restore your mind and reset your body. 🌍

A hand holding a magic mushroom against a sparkling background. The mushroom has a brown cap and a light-colored stem. The background is a warm, golden-orange color with many small, bright, star-like sparkles scattered throughout. The hand is positioned at the bottom right, holding the stem of the mushroom. The overall mood is magical and ethereal.

MAGIC MUSHROOMS

RESURGENCE IN PSYCHEDELICS RESEARCH REVEALS PROMISING RESULTS

There is a resurgence of research underway on psychedelic substances after a decades-long hiatus. Scientists are currently studying the effects of psychedelics on a wide range of conditions, including depression, post-traumatic stress disorder, anxiety, addiction, obsessive-compulsive disorder, anorexia nervosa, and even Alzheimer's disease, and the results so far look promising.

In this article, we will examine some of the recent findings from research on "serotonergic classic psychedelics" - in particular, psilocybin (found in "magic mushrooms"), ayahuasca (which contains dimethyltryptamine or DMT), and lysergic acid diethylamide (LSD).

These substances each have unique properties but are similar in that they all produce their consciousness-shifting, mind-altering effects primarily by acting on serotonin 2A brain receptors. →

MAGIC MUSHROOMS GROW ALL OVER THE WORLD

Most psilocybin research is being conducted using synthetic psilocybin created in a laboratory, but magic mushrooms in their natural form are plants. There are more than 200 species within the *Psilocybe* genus, coming in many different shapes, sizes, and degrees of potency. They grow in a wide range of habitats all around the world – some in wild spaces and others in cities and towns – but can be difficult to identify and can be easily confused with other small brown mushrooms, some of which can be lethal.

STIGMA & SAFETY OF PSYCHEDELICS

Psychedelics garnered much negative attention in the 1960s leading to a long period of prohibition. As a result, there has been significant cultural stigma and, for some people, fear about the use of psychedelics. However, research has demonstrated that in general, when classic psychedelics are used responsibly, they are safe for most people (i.e., not toxic or addictive) and without lasting adverse effects. (Individuals with a personal or family history of psychosis, and those with severe cardiac disease, are the exception and should not take psychedelics.)

Researchers emphasize the importance of “set” and “setting” for safety and a positive experience when using psychedelics. In other words, mindset and intentions matter, as does the environment in which the experience takes place, and the support received before, during, and after the experience. It is also important to keep in mind that researchers using full doses of psychedelic substances are typically studying “psychedelic-assisted therapy,” where the administration of a psychedelic substance is just one component of the complete therapeutic package.

THE PROMISING RESEARCH FINDINGS OCCURRED WHEN PSYCHEDELICS WERE ADMINISTERED IN A CONTROLLED, SUPPORTIVE SETTING IN THE PRESENCE OF TRAINED THERAPY PROFESSIONALS (OFTEN REFERRED TO AS GUIDES).

CLASSIC PSYCHEDELICS & PSYCHIATRY

Much of the research on therapeutic applications of psychedelics has focused on their potential to help individuals with various mental disorders. Recent research (over the last 15 years) has built upon

findings from the large body of earlier research (from the 1950s and 1960s, before psychedelics were banned) using rigorous study design.

An example of a recent study using a robust methodology was conducted by Dr. Roland Griffiths and colleagues from Johns Hopkins University, one of several world-class academic institutions conducting psychedelic research.

The researchers looked at the effects of psilocybin on 51 individuals with life-threatening cancer who were experiencing symptoms of depression and/or anxiety, a common occurrence in cancer patients.

JUST ONE HIGH DOSE OF PSILOCYBIN, ADMINISTERED WITH CAREFUL ATTENTION TO SET AND SETTING, WAS FOUND TO PRODUCE SIGNIFICANT DECREASES IN MEASURES OF DEPRESSION, ANXIETY, AND MOOD DISTURBANCE, AS WELL AS INCREASES IN MEASURES OF QUALITY OF LIFE, LIFE MEANING, DEATH ACCEPTANCE, AND OPTIMISM.

Notably, these effects were still present in most participants at the six-month follow-up. These findings were published in 2016 in *Journal of Psychopharmacology*.

“When administered to carefully-screened, psychologically-distressed cancer patients with support from a trained guide, a single high dose of psilocybin produced large decreases in depression and anxiety,” said Dr. Griffiths, a Professor in the Departments of Psychiatry and Neurosciences at the Johns Hopkins University School of Medicine and Founding Director of the Johns Hopkins Center on Psychedelic and Consciousness Research.

“If psilocybin can help alleviate depression and anxiety in people with life-threatening illnesses, then perhaps it can help others who are living with depression or anxiety, too. We are excited to be exploring that possibility, and we’ve already published one additional study showing large and rapid antidepressant effects of psilocybin in participants with major depressive disorder. We’re also exploring the potential for psychedelics to help with other conditions, in additional research that is underway at our Center.”

In that recent study regarding major depressive disorder (MDD) - published in 2020 in *JAMA Psychiatry* - Dr. Griffiths and colleagues

Psychedelic plants have been used by some Indigenous cultures for healing and divination for millennia, in sacred ceremonies that emphasize the importance of preparation, context, and support by skilled guides.

conducted a randomized clinical trial with 24 participants aged 21 to 75 years who had been diagnosed with MDD and were not currently using antidepressant medications. Fifteen of the participants began psilocybin-assisted therapy immediately, and the remaining 12 (the “waiting list” control group) started after an eight-week delay.

The intervention consisted of two psilocybin sessions with supportive psychotherapy (approximately 11 hours). Results revealed that the participants who received immediate psilocybin-assisted therapy showed improvements in clinician-rated depression severity, as well as self-rated depression and anxiety symptoms, compared to those in the delayed-treatment group.

“This study adds to the growing evidence of psilocybin’s effectiveness in helping people with depression and anxiety. Large and rapid positive effects were seen, and these effects also demonstrated lasting impact. In this study, clinically significant antidepressant effects were still present for 71% of participants at the four-week follow-up,” said Dr. Griffiths.

“And the psilocybin-assisted therapy used in this study yielded effect sizes that were approximately two and a half times greater than those found in psychotherapy, and more than four times greater than the effect sizes found in psychopharmacological depression treatment studies.”

In order to gain a better understanding of the “modern-era” findings on the use of classic psychedelics as a treatment for various psychiatric conditions, Dr. Kristoffer Andersen and colleagues from Imperial College London conducted a systematic review of the research published between January 1, 2000 and May 1, 2020.

The researchers reviewed 16 academic papers about ten psychedelic-assisted therapy clinical trials - seven using psilocybin, two using ayahuasca, and one using LSD - involving 188 participants in total.

COLLECTIVELY, THE STUDIES PROVIDED EVIDENCE OF THE SAFETY OF CLASSIC PSYCHEDELICS, AS WELL AS PROMISING EARLY EVIDENCE OF THEIR EFFECTIVENESS IN TREATING DEPRESSION, ANXIETY, OBSESSIVE-COMPULSIVE DISORDER, AND TOBACCO AND ALCOHOL-USE DISORDERS.

And, for a majority of the participants, the improvements lasted for several weeks or months, after just one to three treatment sessions. (These findings were published in 2020 in *Acta Psychiatrica Scandinavica*.)

PSYCHEDELICS & THE BRAIN

What is happening in the brain during a psychedelic experience that might explain why psychedelics appear to help individuals with varied psychiatric conditions?

An effect size is a measure of the strength of the relationship between two variables - in this case, between the intervention/treatment and the desired outcome (i.e., impact on depression).

Brain imaging has shown that when a full dose of psilocybin or other serotonergic psychedelic takes effect, it stimulates the serotonin 2A receptors in the brain, which leads to massive depolarization and rapid repeated firing of the neurons. This activity profoundly alters cortical signaling. Brain activity decreases primarily in one brain network, the default mode network (DMN), which usually plays a role like an orchestra conductor in the brain but goes “offline” during a psychedelic experience.

When DMN activity decreases, the brain “escapes” from its usual tightly constrained, predictable patterns and there is a dramatic increase in new connectivity. So, it is thought that psychedelics likely work by disrupting the brain systems that encode dysfunctional repetitive thoughts and behaviours. In essence, the brain “resets” and creates an opportunity to release long-entrenched patterns like those seen in depression and anxiety, and to develop new insights and habits.

PSYCHEDELICS & ALZHEIMER’S DISEASE

Given the research in humans that has shown classic psychedelics can help alleviate depression and boost the formation of new connections in the brain, as well as findings from animal studies suggesting psychedelics may help improve learning and memory processes, researchers wonder if these substances could help people with Alzheimer’s disease.

At the very least, psychedelics could help with the depression that often accompanies an Alzheimer’s diagnosis, or they could also improve quality of life, and boost cognitive performance or delay cognitive decline. Research is underway to examine these possibilities. In the academic world, for example, the Center for Psychedelics and Consciousness Research at Johns Hopkins is conducting a study on the impact of psilocybin on depression in individuals with mild cognitive impairment or early Alzheimer’s disease. The researchers are currently in the recruitment stage of the study (for more information, visit <https://hopkinspsychedelic.org/alzheimers>). →

Many psychiatric conditions have been linked with cognitive decline and/or risk of dementia. See past issues of *Mind Over Matter*® to learn about the association between brain health and depression, alcohol and drug misuse, and more. (<https://womensbrain-health.org/mind-over-matter-magazine>)

The term “psychedelic” means “mind-manifesting.” Some researchers prefer to use the term “entheogen” instead, which means “bringing forth the divine within,” because it emphasizes a sacred use of these substances.

The private sector is interested in the potential of psychedelics as a treatment for Alzheimer’s disease as well. For example, biotech company Eleusis is currently investigating the potential for low-dose LSD to target some of the main biomarkers of Alzheimer’s disease.

“Research on the potential of classic psychedelics to help people with Alzheimer’s disease is in the early stages,” explained Dr. Griffiths. “Given the devastating impact of the disease on individuals and society, we obviously hope that our current study will reveal positive findings that lead eventually to a treatment that helps in some way to alleviate the suffering experienced by those with the disease.”

MYSTICAL EXPERIENCE MIGHT BE KEY

When taking a full dose of a psychedelic substance, enough to invoke a hallucinogenic effect, people often have a mystical-type experience - meaning, they experience a profound shift in consciousness where they feel at one with God, the Universe, the Ground of Being (or whatever other term they might prefer to use based on culture or personal preference).

RESEARCH HAS FOUND THAT THE MYSTICAL-TYPE EXPERIENCE APPEARS TO BE AN IMPORTANT FACTOR IN THE LASTING BENEFITS OF PSYCHEDELICS.

“While not all experiences with classic psychedelics are of the mystical type, mystical experiences are highly probable when psychedelics are administered at the right dose, with the proper setting, preparation, and support,” said Dr. Griffiths. “And it looks like there is something about the mystical experience itself that is key to shifting one’s moods, attitudes, and behaviours long-term.”

MICRODOSING PSYCHEDELICS

While much research has focused on the effects of full doses of psychedelics, there is a different line of research that is examining the effects of small doses over time - often referred to as “microdosing.” There is no universally consistent definition of microdosing, but it can be broadly defined as the frequent use of very low doses of psychedelics (i.e., 10% to 20% of a typical full dose, taken one to three times per week, over a varying number of weeks).

Anecdotal evidence and some uncontrolled, observational studies suggest that microdosing may improve well-being, creativity, and cognition (but may also have unpleasant side effects like migraines, physical discomfort, trouble sleeping, and/or feelings of anxiety). Those findings were vulnerable to experimental biases because of the research methods used, and recent studies that were more robust in design have failed to find compelling evidence of the benefits of microdosing.

It is possible that people who microdose report having positive effects (and believe they actually had them) because that is what they were expecting. Laura Kaertner and colleagues recently conducted research to examine that possibility and found that positive expectancy scores at baseline did indeed predict subsequent reports of improvement in well-being, suggesting a significant placebo response among the more than 200 microdosers who took part in the study.

Although more research is needed before reaching firm conclusions, it appears that people’s positive expectations about microdosing are influencing the benefits they perceive. These findings were shared in 2021 in *Scientific Reports*.

Study design will be critical going forward so that researchers can determine the therapeutic effects of microdosing, if any. In the meantime, current findings highlight the need to be cautious about any claims made regarding the potential therapeutic value of microdosing until more is known.

DON'T SELF-MEDICATE WITH PSYCHEDELICS

As more people learn about the potential benefits of psychedelics, particularly for conditions that are not well-addressed with currently available treatments, there has been growing interest and demand for psychedelics. Along with this shift in cultural acceptance, there have been changes in laws and regulations that affect psychedelics, making it easier to get approval to conduct studies and allowing for expansion of the research at an accelerated pace.

However, there is still much more to learn about the therapeutic use of psychedelics, and in most places, psychedelics remain illegal. Experts in psychedelics routinely advise that individuals should not attempt to self-medicate.

“With all the hype around psychedelics right now, it’s not surprising that there is much enthusiasm and interest in them. However, there are risks associated with psychedelics, and they are not suitable for everyone. Furthermore, one does not know for certain what might be in substances that are obtained illegally,” said Dr. Griffiths. “Thankfully, research on psychedelics is progressing at a rapid pace and I anticipate that it won’t be long until psychedelics become available legally, outside of clinical trials.” 🌐

YOUR MONEY'S WORTH

MONEY MANAGEMENT GETS TOUGHER AS WE AGE

At the age of 88, Pattie Lovett-Reid's mother, Joyce Fraser, wants to know what is happening with her finances.

"She asks for quarterly statements. She still wants an element of control," said Lovett-Reid, the Chief Business Commentator at CTV News.

But Lovett-Reid's mother recognized several years ago that it was best to let others oversee the day-to-day management of her financial affairs. It is a difficult decision that many older adults and their families must face - a decision that balances a desire for independence with one's financial security.

It starts with the acknowledgment that our brains change as we age, bringing increased vulnerability. Dr. Jason Karlawish, Co-director of the Penn Memory Centre at the University of Pennsylvania, discusses the loss of "fluid intelligence," which includes the ability to learn new tasks and manage money. He explains that this makes older adults more susceptible to financial fraud or mismanagement - risks that are magnified for individuals who develop Alzheimer's disease and other types of dementia. →



A 2010 brief published by the Centre for Retirement Research at Boston College entitled “What is the Age of Reason?” noted that declines in fluid intelligence can be partly offset by age-related increases in “crystallized intelligence” (sometimes called experience or knowledge). However, research indicates that after peaking in middle age, the ability to make effective financial decisions declines.

According to David Laibson, a Professor of Economics at Harvard University and co-author of the brief,



OUR NATION'S WEALTH IS DISPROPORTIONATELY HELD BY OLDER ADULTS, AND THEY ARE EXACTLY THE GROUP, PARTICULARLY AS THEY REACH THEIR 80S AND 90S, THAT ARE MOST VULNERABLE. BUT OUR SYSTEM HAS THE FEWEST PROTECTIONS FOR THOSE PEOPLE.

Helping people prepare for retirement (and better protect themselves) is a key objective of Sandra Pierce's work in her role as Vice President and Portfolio Manager with RBC Dominion Securities.

As a senior executive with Canada's largest bank, Pierce already has an impressive title, but she has branded herself with an unforgettable one: The Bag Lady of Bay Street.

She was inspired by a 1995 article published by The New York Times on Sherry Lansing, who as the head of Paramount Pictures was one of the first women to rise to a position of power in Hollywood. Despite her substantial wealth, accomplishment, and influence, Lansing spoke about a recurring nightmare in which she was standing on the streets of Los Angeles as a “bag lady,” watching her ex-husband drive by in a convertible Rolls Royce.

Lansing went on to disclose that, based on the dream, she began to suffer from what she called the “bag lady syndrome.” Despite being worth tens of millions of dollars, Lansing nevertheless encountered acute anxiety whenever she considered her finances.

She worried, primarily, about whether she had accumulated sufficient assets to maintain the lifestyle to which she had become accustomed.

“It's an anxiety and it's a silly label, but it's one that we all deal with. Men have it too, but in a different context. We worry, will we have enough?” Pierce told Mind Over Matter®.



WHEN I TALK TO WOMEN'S GROUPS, I ALWAYS GET SO MANY NODDING HEADS. IT GOES TO THE FEAR OF WILL I HAVE ENOUGH MONEY. WE HAVE THIS BAG LADY SYNDROME IN OUR CLOSET.

Her observations, based on more than three decades as a financial

planner, are borne out in a 2018 poll by Leger involving 1000 Canadians aged 60 and older, which found that 50% of women between the ages of 60 and 69 have at least one financial concern, compared to 39% of men in the same age cohort. The most common concerns were “I will run out of money before I die” and “I will not be able to pay for long-term care.”

The best response, advises Pierce, is to build a plan with professional assistance. And the sooner you start, the better. She encourages her clients to initiate the process in their late 40s or early 50s, identifying their sources of retirement income (e.g., RSPs, CPP, or company pension plans) and setting monthly withdrawals. If they plan to travel more in their first ten years of retirement, then they should allocate sufficient funds accordingly, and thereafter adjust as circumstances change.

“By the time you've retired, you should be ready for it. You should have worked on the plan so that this is no big deal, although it is a big deal,” said Pierce.

Many older adults are now choosing to work past the traditional retirement age. The 2018 Leger poll found that among those surveyed who were still working, 69% were delaying their retirement, with 35% indicating that they cannot afford to retire and 32% indicating that they love their jobs.

Lovett-Reid suggests that people who choose to keep working should consider deferring the collection of Canada Pension Plan (CPP). She cites the work of Bonnie-Jeanne MacDonald of the National Institute on Ageing at Ryerson University, who has pointed out that holding off on CPP until the age of 70 will qualify you for 150% of the benefits that you would receive at the age of 65.

“There's a huge value in delaying,” said Lovett-Reid. “It's fascinating when you see the numbers.”

Whenever your working life winds down, she advises that you carefully calculate your basic living expenses and consider converting part of your Retirement Savings Plan (RSP) or other savings into an annuity, which offers the peace of mind of a predictable monthly income.

“You don't do it all, but I do think you could make sure that your fixed costs are covered off for life. I'm always planning to live to the age of 100. I'm erring on the side of caution. Maybe 105!”

It is axiomatic that a retired person's investments should be conservative in order to preserve their value, but Lovett-Reid believes that it is wise to include a small portion of growth elements in your nest egg as well.

“I do think you can err too much on the side of caution, because look at inflation. You don't want your purchasing power to erode entirely. It's about balance,” she said.

Lovett-Reid strongly recommends acting early on one of the most sensitive but crucial decisions about financial matters for older people: appointing a power of attorney or “POA” (i.e., the person who will make decisions on your behalf if you can no longer make them yourself).

“The best time to do it is long before you need it.”

APPOINTING A POWER OF ATTORNEY IS PARTICULARLY IMPORTANT GIVEN THE GROWTH IN FRAUD DIRECTED AGAINST SENIORS.

Lovett-Reid’s mother was almost caught by a telephone scam a few years ago. She gave out some banking information to fraudsters, but fortunately realized her mistake and quickly contacted the bank before her account could be drained. It was the catalyst to her appointment of a POA.

Pierce notes that the sophistication of the criminals, coupled with the vulnerability of seniors, makes fraud an ever-present risk. She reminds her clients that a bank will never call, e-mail, or text asking for personal information, and she advises them to consult with a trusted family member, friend, or their POA before agreeing to anything.

She told the story of a client – a single woman with no children – who was befriended by the new superintendent at her building. Pierce and her team were overseeing her accounts and noticed an increasingly suspicious amount of money being withdrawn.

“We asked what was going on and she said he’s so nice, we go for lunch. He was taking advantage of this elderly woman, sadly. We went over and confronted him and threatened to go to his employer if it didn’t stop.”

Having people who you can rely upon is key but choosing them is not always easy. “I’ve seen situations where adult children were not so trustworthy,” said Pierce.

Family disputes over POAs can be bitter, costly, and too frequently end up in court.

She recommends having the uncomfortable conversations with your family members early and making the difficult decisions about who to trust while you are of sound mind. Prudent planning can reduce risks, offer some peace of mind about your retirement finances, and in the process ease the fears of the bag lady syndrome. 🌐

EARLY WARNING SIGNS OF IMPAIRED FINANCIAL SKILLS IN OLDER ADULTS

WARNING SIGN 1:

Is the person taking longer to complete everyday financial tasks?

EXAMPLES:

- Slower preparing bills for mailing
- Slower completing cheque and cheque register

WARNING SIGN 2:

Is the person showing reduced visual attention to key details/facts in financial documents?

EXAMPLES:

- Cannot identify a bill that is overdue, which needs prompt attention
- Trouble identifying transactions in complex documents like a bank statement, such as gaps in cheque number sequence
- Difficulty completing payee section of cheque register

WARNING SIGN 3:

Is the person showing declines in everyday arithmetic skills related to his /her finances?

EXAMPLES:

- Calculating a return on a specific investment option
- Difficulty making correct change for a vending machine purchase

WARNING SIGN 4:

Is the person showing decreased understanding of financial concepts?

EXAMPLES:

- Difficulty understanding terms in a bank statement, such as a specific interest rate, minimum balance, and concept of caps in cheque sequence
- Difficulty understanding key investment risk

WARNING SIGN 5:

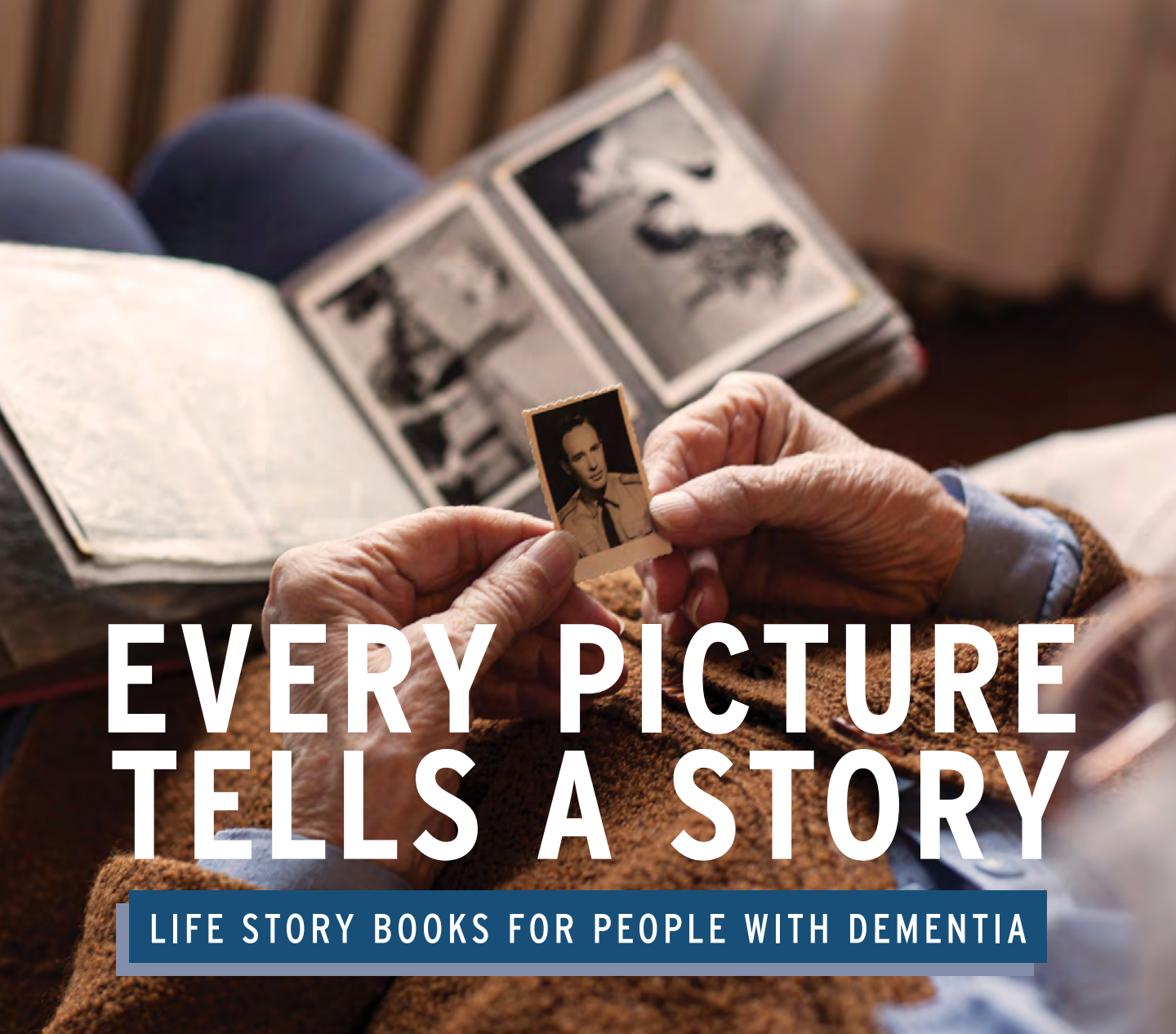
Is the person having new difficulty identifying risks in an investment opportunity?

EXAMPLES:

- Trouble identifying key risk in an investment scenario
- Overemphasizing investment returns while overlooking risks

* It is important to note that in order to qualify as warning signs of financial decline, the above problems should represent a change from the older person’s prior financial functioning.

Source: The National Endowment for Financial Education, based on research by Dr. Daniel Marson, University of Alabama at Birmingham



EVERY PICTURE TELLS A STORY

LIFE STORY BOOKS FOR PEOPLE WITH DEMENTIA

Everyone has a life story, consisting of their unique memories about events and experiences accumulated throughout their lifetime. For many people, the process of reminiscing about their life story, and capturing details in a life story book, is both enjoyable and therapeutic.

For individuals with dementia in particular, life story books provide a wide range of benefits, with the process of initially creating the book being just as valuable as incorporating the book into their day-to-day activities thereafter. As a result, life story books are now a popular

Psychosocial interventions are nonpharmacologic (i.e., non-drug treatments or activities). They emphasize psychological, behavioural, and/or social factors (rather than biological factors).

psychosocial intervention in the dementia-care field, particularly in the U.K.

WHAT IS A LIFE STORY BOOK?

A life story book is a type of reminiscence therapy that can take many different forms and can be created using a variety of approaches. Who is involved in its creation, what information is collected, and how, as well as the format of the end product and its contents, varies depending on the intended purpose of the book. Is the life story book being created for personal reasons (e.g., to preserve memories and share with family and friends) or to help paid caregivers and health professionals get to know the person so that they can better tailor care to individual needs, or perhaps a combination of both?

The end product might be a printed book that includes photographs and text, or a digital book that can incorporate audio and video as well. The contents might be thorough and shared chronologically or

Reminiscence therapy is the discussion of past experiences and events, usually with the help of prompts such as photographs, music, and/or objects (e.g., toys or candies from childhood, or antique household objects like a washboard), which help engage the senses to evoke memories and stimulate conversation.

might be a collection of select memories in no particular order.

A LIFE STORY BOOK TYPICALLY SHARES STORIES ABOUT THE PAST BUT MAY ALSO INCLUDE INFORMATION ABOUT THE PRESENT (I.E., INTERESTS AND PREFERENCES) AND THE FUTURE (I.E., HOPES AND WISHES).

The book can be long or short, or any length in between. The process can be extensive and complex, with information collected over time through structured or unstructured interviews, or it can be quick and simple, using a short set of questions from a standard template. The information can be collected on a one-on-one basis or in small groups - by family or friends, caregiving staff, a trained volunteer, or a professional therapist or researcher - with or without direct input from the person with dementia.

BENEFITS OF LIFE STORY BOOKS FOR PEOPLE WITH DEMENTIA

To understand the collective findings across numerous studies, Teuntje Elfrink and colleagues conducted a review of life story book interventions for people with mild cognitive impairment (MCI) or dementia, conducted between 2013 and 2017. In total, they reviewed 14 studies involving varied types of life story books and shared their findings in 2018 in *International Psychogeriatrics*.

MUSIC THERAPY

In addition to providing pleasure, music is also known to be an especially powerful memory trigger, even for people in the late stages of dementia. For more about music therapy for individuals with dementia, check out "If Music Be the Food of Life, Play On" beginning on page 31 in the second issue of *Mind Over Matter*® (available online at https://womensbrainhealth.org/mom/mind_over_matter_magazine_2016/).

Their review revealed many benefits of life story books for the individuals with dementia, as well as their formal and informal caregivers. For example, life story books were found to help:

- trigger memories and mostly positive emotions;
- improve autobiographical memory, mood, depression, and quality of life (compared with care as usual or no treatment); and
- improve relationships between individuals with dementia and their caregivers.

Significant improvements were also observed in staff attitude and knowledge. Importantly, the researchers noted that no negative effects were reported in any of the studies reviewed. According to Ms. Elfrink, a researcher and lecturer at University of Twente in the Netherlands,



OUR FINDINGS CONFIRM THAT LIFE STORY BOOKS ARE A PROMISING INTERVENTION FOR PEOPLE WITH MCI OR DEMENTIA, PROVIDING NUMEROUS IMPORTANT BENEFITS.

More research is needed to confirm the benefits and determine what types of life story book interventions work best for whom. However, the existing evidence (while limited) is quite positive.

BENEFITS OF REMINISCENCE THERAPY FOR PEOPLE WITH DEMENTIA

A different group of researchers - Dr. Bob Woods and colleagues - looked at the broader concept of reminiscence therapy and its impacts on people with dementia, conducting a review and meta-analysis of research studies on the subject published up to April 2017. They reviewed 22 studies involving a total of 1,972 people with dementia and looked at the combined data from 16 of those studies in the meta-analysis.

Overall, the researchers concluded that there is some evidence that reminiscence therapy can help improve a person with dementia's quality of life, cognition, communication, and possibly mood, with no evidence of any harmful effects. These findings were published in 2018 in the *Cochrane Database of Systematic Reviews*.

"We found that the effects of reminiscence therapy on people with dementia varied depending on the process used and the setting where it was undertaken," explained Dr. Woods, Emeritus Professor →

at Bangor University in the U.K. “Although more research needs to be done to further build the evidence base, reminiscence therapy shows great promise overall as an intervention for people with dementia.”

TAKING LIFE STORY BOOKS DIGITAL

With the ever-expanding development of technology, life story interventions that involve the creation of digital books are becoming increasingly popular. Digital life story books allow the inclusion of audio and video content, in addition to the usual text and photographs that can be found in a conventional paper book. It is easy to imagine how engaging it can be for those with dementia to hear their favourite music, listen to their stories being read by a narrator, watch clips from their favourite movies or news footage about significant historical events, and hear personal messages from loved ones.

Although many older adults enjoy life story books in paper format, several studies have found that digital approaches to reminiscence therapy are preferred by individuals with dementia and their caregivers compared to conventional approaches.

Another study conducted by Dr. Bob Woods and colleagues - published in 2020 in *The International Journal of Reminiscence and Life Review* - specifically looked at digital life story work for people with dementia, examining three different contexts for creating digital life story books. Six people with dementia (each paired with a family caregiver), as well as four care staff, took part in the study.

Each participant with dementia created a life story book over a six-week period using an online application (or "app") developed by a Welsh social enterprise, Book of You. The participants were drawn from three different groups who had prepared their books either: (1) as part of a community group; (2) in one-on-one sessions completed at home; or (3) in one-on-one sessions completed in a care home.

All participants in the study reported that they enjoyed the intervention, found it useful, and valued the ability to include multimedia elements in their books, regardless of their particular study group.

CREATING AND USING A DIGITAL LIFE STORY BOOK HELPED THE PARTICIPANTS WITH DEMENTIA RECONNECT WITH THEIR PAST BY EVOKING FORGOTTEN MEMORIES, AS WELL AS HELPED CARE STAFF DEVELOP AND STRENGTHEN THEIR RELATIONSHIPS WITH RESIDENTS AND THEIR RELATIVES.

“Although enjoyment was similar across the various contexts, we did discover some interesting differences between the study groups. For example, when the books were created one-on-one, more weight was placed on the value of the reminiscing aspect, whereas when working in a community group setting, more emphasis was placed on the socializing benefits of the experience.

Also, it appears that one-on-one sessions may be more effective than group sessions for learning the technical aspects of creating a digital book,” said Dr. Woods.

“Although this was a small study, it provides valuable insights into the usefulness of digital life story work with people with dementia, and how the benefits might vary depending on the context.”

TIPS FOR ENGAGING IN LIFE STORY WORK WITH PEOPLE WITH DEMENTIA

1. UNDERSTAND THAT LIFE STORY WORK IS NOT FOR EVERYONE.

As fun and helpful as creating a life story book can be for many individuals with dementia, not everyone wants to try this intervention. Some people are simply not interested, while others may feel distressed at the thought of sharing their memories. So, extend an invitation to participate, and respect the person's feelings about whether to proceed or not; do not try to pressure anyone into taking part.

2. CONSIDER YOUR GOALS AND AVAILABLE RESOURCES.

Why is the life story book being created, who is available to help with the process, what are the skills and interests of those involved, and how much time do they have available to work on the project? Answers to these questions will guide the approach you take, the tools you use, and the end product that you ultimately create.

For example, if time is scarce and the intended end use of the life story book is to help care staff provide person-centred care, then perhaps you should use a template of standard questions to collect some key information and capture it in a short summary (i.e., one to two pages). At the other end of the spectrum, if the goal is to create a book to help improve a person with dementia's memory, mood, and/or quality of life, you will probably take more time to collect stories and create a longer book, either in paper or digital format. Alternatively, you may wish to create two different versions of the book: namely, a short summary for care staff and a longer book for the person with dementia to enjoy.

3. INVOLVE THE PERSON WITH DEMENTIA AS MUCH AS POSSIBLE IN THE PROCESS OF CREATING THEIR LIFE STORY BOOK.

To the extent possible given the stage of dementia, tailor the experience to the goals and preferences of the person with dementia. Let her or him decide the content of the book, how it will be used, and by whom - even if this means that not everything contained in the book will be accurate.

Remember that all individuals, whether they have dementia or not, have unique perspectives on every experience, and the retelling of stories based on those experiences is prone to selective recall and potentially a distorted view of the truth. It is important to keep in mind that the goal is to help people tell whichever stories are most important to them, in whatever way is best for them.

Getting started on life story work early in the dementia journey is ideal, in order to allow those with dementia the maximum opportunity to be involved in creating their own book. However, it is never too late to use life story work to benefit a person with dementia; the process just unfolds differently if the person with dementia is no longer able to recall and share stories (in which case, a close family member or friend can provide content for the book).

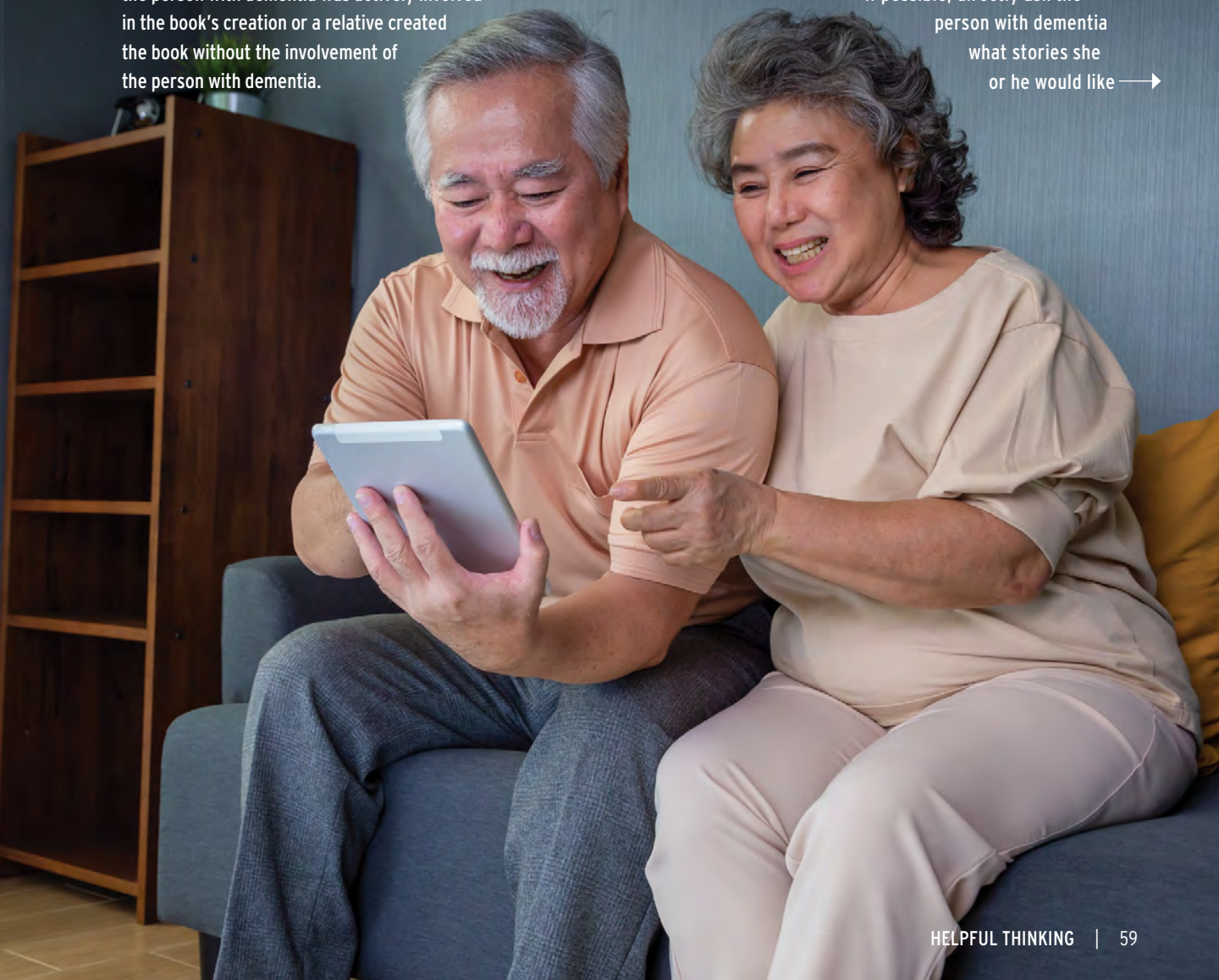
An earlier study conducted by Dr. Bob Woods and colleagues – published in 2014 in *Aging & Mental Health* – found that there were benefits for the person with dementia, their relatives, and care home staff from creating life story books, whether the person with dementia was actively involved in the book’s creation or a relative created the book without the involvement of the person with dementia.

“While it is ideal to involve the person with dementia in creating their life story book, sometimes it’s just not possible,” said Dr. Woods. “We were pleased to find that in situations where a life story book is created 100% by a relative, the person with dementia still experienced improved quality of life and autobiographical memory from using that book after it was done. And, the relatives benefitted too, enjoying a sense of accomplishment from doing something meaningful for their loved one.”

4. KEEP POTENTIAL PRIVACY ISSUES IN MIND.

Everything that the person with dementia shares during the story collection phase of the process does not need to be captured in the life story book. Consider who will have access to the book and what information the person with dementia would be comfortable with those individuals knowing, and perhaps what she or he would prefer to keep private. If the book will be accessible widely, then it would be wise to include only information that the person with dementia would be comfortable sharing with others.

If possible, directly ask the person with dementia what stories she or he would like →



included, explaining how the book will be used and by whom. If the person with dementia is no longer capable of making those kinds of decisions, then family members and/or friends who know the person well can use their best judgement to decide on the person's behalf.

5. BE AWARE THAT UPSETTING MEMORIES AND NEGATIVE EMOTIONS MAY SURFACE.

Everyone's life consists of rich and varied experiences, some positive and some challenging, so it makes sense that when a person recalls her or his life stories, a mix of positive and negative memories and corresponding emotions may arise. Studies looking at the responses of people with dementia to reminiscence therapy have found that negative responses are relatively rare compared to positive ones, and even in instances where negative memories and emotions did surface, the overall experience of the reminiscence activity was typically considered positive.

If you are trained to help individuals work through challenging emotions, you can provide the necessary support to help the person with dementia work through negative feelings if and when they arise. However, if you lack such training, avoid sensitive subjects and aim to keep questions focused on eliciting positive memories.

6. USE THE LIFE STORY BOOK REGULARLY BUT DO NOT OVERDO IT.

Make sure that you do not just create a life story book and then simply leave it on a shelf collecting dust. Use the book often as a tool to engage the person with dementia in conversation. Do not be insistent about using it, though. Be sensitive to the person with dementia's interest, mood, and energy at any given time, reading her or his cues about whether it seems like a good time for going through the book or not.

Put the book away for another time if the person seems agitated or overwhelmed in response to the book. You might find that over time, the person with dementia's response to different parts of the book changes. If possible, update the book itself to remove any content that becomes upsetting or simply skip past those parts when reading if you are unable to make changes to the book. You might also add new information and stories if you can, because a person's story is ever evolving.

7. THE SOONER YOU START, THE BETTER

There can be a tendency to put off doing life story work, thinking you will get to it later. However, as dementia progresses, it becomes increasingly difficult for individuals to recall important life events and experiences. And the course of dementia can be quite unpredictable. Encourage people with dementia to begin capturing their life stories as soon

as possible after diagnosis. According to Dr. Majse Lind, a postdoctoral researcher in the Life Story Lab at the University of Florida, "life story work can be beneficial for anyone, even those without dementia. And since none of us knows how much lifetime we have left, now is actually a great time for everybody to get started. You don't need to wait until you've been diagnosed with something." 🧠

USING THE PHONE TO COLLECT STORIES

In a study that is currently underway, researchers at the University of Florida are using an innovative approach to work with 60 people with dementia and their informal caregivers to create and use life story books. Dr. Susan Bluck and Dr. Majse Lind are using an older technology (the phone) to collect stories, combined with modern internet-based design technology to create digital life story books for people with dementia. The study is looking at the potential effects on the person with dementia's identity and general well-being.

"Life story work is often done face-to-face, but phone-based interviews were the obvious choice as the tool for conducting life story interviews safely during the COVID-19 pandemic," explained Dr. Lind. "We have found that sharing stories over the phone is working very well in our study. Using the phone to reach a person with dementia at home is ideal in many ways, allowing them to be in a familiar space with minimal disruption to their usual routine. Of course, we might have tried using a more modern type of technology for connecting with someone at home, like Zoom, but phones are a simple technology that pretty much everyone is familiar and comfortable with, and that's especially important for a person with dementia."

REACH OUT AND CALL SOMEONE

With phones being an effective tool for sharing stories, that means anyone anywhere can work with a loved one who has dementia on developing a life story book, or just have enjoyable conversations about the past without creating any end product at all. Perhaps you live across the country from a family member or friend who has dementia and have been wondering about how you could help with her or his caregiving. Engaging in life story work might be an ideal way for you to be involved, keeping you connected with your loved one in a meaningful way.



NO FOOD FOR THOUGHT

FASTING & YOUR BRAIN HEALTH

The key to good brain health is not only about choosing the right diet (one that is rich in fruits, vegetables, whole grains, lean proteins, healthy fats, and nutrients), but also determining when to eat and how often. The practice of eating at specifically designated periods of time is referred to as “intermittent fasting” and is growing in popularity. →

According to a survey conducted by the International Food Information Council Foundation (IFICF), intermittent fasting was the most popular way of eating in 2020, edging out gluten-free and low-carb regimens.

INTERMITTENT FASTING SHOULD NOT BE THOUGHT OF AS A FAD DIET PROGRAM NOR SHOULD IT BE CONFUSED WITH DEPRIVING YOURSELF OF FOOD. RATHER, FASTING REQUIRES THE ACTIVE INTAKE OF NUTRITIONAL CALORIES OVER SPECIFIC, RECURRING PERIODS OF TIME.

This practice has been recognized by many cultures and religions for centuries. While the duration and reasons differ across the globe, the appreciation of cleansing, sacrifice, and rejuvenation are common. Fasting has also been recognized by the scientific and research community, with various studies finding significant links between fasting, aging, brain health, and cognitive function.

IMPACT OF FASTING ON THE BODY

Fasting triggers a shift in the resources that our body uses for energy. As a result, fasting activates metabolic changes in the body from using glucose to ketones for energy. This back-and-forth activity throughout the fasting process is referred to as “metabolic switching” and scientists believe that the process may not only build the brain’s resilience and productivity, but also boost its support system.

Neurologist Dr. Matthew Phillips of Waikato Hospital in New Zealand is one of many doctors using this “metabolic strategy” as part of his treatment plan for patients to help with brain cell generation, building resilience to neurological conditions, and increasing cognitive and psychological benefits. As he explained, “it is thought cells go into a survival and repair mode during the fasts, followed by growth and regeneration during the refeeding phase.”

BENEFITS OF FASTING

- » INCREASES STRESS RESISTANCE
- » PROMOTES HEALTHY AGING
- » INCREASES LONGEVITY
- » ASSISTS WITH WEIGHT MANAGEMENT
- » REDUCES INFLAMMATION
- » LOWERS BLOOD SUGAR AND REDUCES INSULIN LEVELS
- » IMPROVES CARDIOVASCULAR HEALTH (BLOOD PRESSURE AND RESTING HEART RATE)
- » DECREASES RISK OR INCIDENCE OF DISEASES, INCLUDING CANCER, DIABETES, AND OBESITY

When glucose and insulin levels decrease in this metabolic process, it also causes autophagy - meaning that the body is detoxifying itself of old damaged cells and increasing the regeneration of newer, healthier cells.

THE RESULT IS ONE OF THE GREATEST ADVANTAGES OF INTERMITTENT FASTING ON THE BRAIN: INCREASING BRAIN HEALTH AND COGNITIVE FUNCTION.

Unfortunately, since most people consume three meals and multiple snacks every day, their bodies never experience (nor reap the benefits of) these metabolic changes.

FASTING & INFLAMMATION

Several studies have also indicated that intermittent fasting can cause a decrease in inflammation (including, for example, a 2012 study published in *Nutrition Research*, which explored the ways in which intermittent fasting and caloric restriction practiced during the month of Ramadan positively affected the inflammatory state of the participants).

The connection between fasting and inflammation is critical because chronic inflammation is one of the links to many brain disorders, including Alzheimer’s disease and other types of dementia, as well as Parkinson’s disease. It can also greatly impact individuals with heart disease, diabetes, cancer, and multiple sclerosis.

According to Dr. Stefan Jordan, a postdoctoral fellow in the Department of Oncological Sciences at the Icahn School of Medicine at Mount Sinai in New York City,



CONSIDERING THE BROAD SPECTRUM OF DISEASES THAT ARE CAUSED BY CHRONIC INFLAMMATION AND THE INCREASING NUMBER OF PATIENTS AFFECTED BY THESE DISEASES, THERE IS AN ENORMOUS POTENTIAL IN INVESTIGATING THE ANTI-INFLAMMATORY EFFECTS OF FASTING.

Dr. Jordan’s research team not only found that fasting reduces inflammation and improves chronic inflammatory diseases, but also that the process can occur without affecting the immune system’s response to acute infections.

FASTING & THE BRAIN

Other studies have focused on how fasting affects the mind and body with significant changes to cognitive functioning. In one study (published in the April 2007 issue of *Neurobiology of Disease*),

TYPES OF INTERMITTENT FASTING

8/6

Eating during a six-hour period and fasting for 18 hours

16/8

Eating during an eight-hour period and fasting for the rest of the day

12-6 PLAN

Eating only between the hours of 12:00 p.m. and 6:00 p.m.

mice that had been altered to have Alzheimer's-related genes were put on an intermittent fasting schedule. As the mice aged, they exhibited less cognitive decline and damage, and performed better than the other mice following a free-eating regime. The researchers concluded that their findings provide direct evidence that intermittent fasting can ameliorate age-related impairments in learning and memory tasks.

Director of the Longevity Institute at the University of Southern California (USC) Leonard Davis School of Gerontology, Dr. Valter Longo, who earned his doctorate in philosophy in biochemistry, is often referred to as "the fasting evangelist." Dr. Longo's research efforts have focused on how fasting-like diets extend life and help treat and prevent disease.

Dr. Longo and his colleagues have clinically demonstrated that short durations of periodic fasting can have several benefits on aging and risk factors for cancer, diabetes, heart disease, and other age-related disorders in mice and in humans. More recent studies have also shown promise for treating multiple sclerosis and Crohn's disease.

His early research revealed that yeast cells that were starved of nutrients tended to live longer and were more resistant to stress. "If you starve them, they become very protected, so I started thinking, what would this be useful for? And the first idea was chemotherapy." With that in mind, Dr. Longo set out to conduct a study that has helped change some of the thinking of cancer treatments.

He discovered that fasting for two days protected healthy cells against the toxicity of chemotherapy, while the cancer cells stayed sensitive. The results of the study also led to the creation of the first fasting-mimicking diet, which Dr. Longo developed to put patients with cancer, or mice in the laboratory, in a fasting state while still allowing them to eat.

Critical when evaluating if fasting is right for you is to consider why you are doing it. Registered dietician Cary Kreutzer, Director of the Master of Science in Nutrition, Healthspan and Longevity Program at the USC Leonard Davis School of Gerontology, gives advice for those considering forgoing food, even for a short time.



FASTING IS FOR LIVING LONGER, NOT FOR LOSING WEIGHT. FASTING GETS RID OF WEAK CELLS IN THE BODY, LETTING THEM DIE OFF BY BRIEFLY NOT GIVING THEM ENERGY. THIS GIVES ROOM FOR STRONGER CELLS TO GROW AND THRIVE AFTER THE PROCESS, POSSIBLY IMPROVING THE CHANCES OF LIVING A LONGER LIFE. FASTING IS NOT INTENDED FOR WEIGHT LOSS. HAVING THIS INTENTION MIGHT LEAD TO UNHEALTHY FORMS OF FASTING.

A recent study out of the University of Toronto reported that 220 healthy adults who participated in intermittent fasting and maintained a restricted caloric diet for two years showed signs of improved memory and performed well on cognitive tests. The researchers noted that although more research needs to be conducted to prove any effects of intermittent fasting on learning and memory, fasting (or a pharmaceutical equivalent that mimics it) may be an intervention that can stave off neurodegeneration and dementia.

Although consuming fewer calories can likely contribute to overall weight loss, fasting should not be used as a means of dieting, but rather as a measure to help to optimize your overall health and well-being. Research conducted to date suggests that fasting offers a wide array of health benefits, including improving cognition and stalling age-related cognitive decline.

As a strategy for achieving and maintaining optimal brain health, the practice of fasting is self-managed and cost-free, making it an easy addition to your integrated health and wellness plan, provided you do the necessary research and consultative work. Fasting could be worth the wait! 🧘

DANGERS OF FASTING

EMOTIONAL IMBALANCE

Too much too soon can be challenging on your body - causing mood swings and cravings.

UNREALISTIC EXPECTATIONS

It takes time for the process to work. Be patient. Both your brain and your body need to adjust to the practice of fasting.

MODERATION

Fasting, no matter what the form, should not be used to permanently diet. It is best to gradually increase the duration and the frequency of the fasting periods, but in moderation.

CONFLICTING MEDICAL CONDITIONS

Most importantly, speak with your doctor before engaging in any kind of program, especially if you have particular medical conditions that may respond negatively to the effects of fasting.

Pumpkin Scones with Maple Cinnamon Glaze

🍴 SERVES 8

INGREDIENTS

PUMPKIN SCONES

- + 2 cups all-purpose flour
- + 1/2 cup granulated sugar
- + 2 tsp baking powder
- + 1 tsp cinnamon
- + 1/2 tsp ground ginger
- + 1/2 tsp nutmeg
- + 1/2 tsp sea salt
- + 1/4 tsp baking soda
- + 3/4 cup cold unsalted butter (1 1/2 sticks)
- + 1/2 cup raw pecans, chopped
- + 1 egg
- + 1/2 cup + 1 tbsp canned pure pumpkin purée
- + 1/2 cup cold buttermilk, well shaken
- + 1 1/2 tsp pure vanilla extract
- + 1/2 cup cold whipping (35%) cream
- + 2 tbsp turbinado sugar

MAPLE CINNAMON GLAZE

- + 2 cups icing sugar
- + 1 tbsp cinnamon
- + 1/2 tsp sea salt
- + 1/2 cup pure maple syrup
- + 2 tbsp unsalted butter, melted
- + 1 tsp pure vanilla extract
- + 1/2 cup raw pepitas, toasted

INSTRUCTIONS

1. Line a baking sheet with parchment paper.
2. To make the pumpkin scones: In a large bowl, sift together the flour, granulated sugar, baking powder, cinnamon, ginger, nutmeg, salt, and baking soda. Using the large holes of a box grater, grate the butter over the flour mixture. Gently toss the butter into the flour mixture to evenly distribute it. Stir in the chopped pecans.
3. In another large bowl, whisk together the egg, pumpkin purée, buttermilk, and vanilla.
4. Pour the buttermilk mixture into the flour mixture and stir with a wooden spoon until just combined. Be careful not to overmix. The dough will look slightly crumbly.
5. Transfer the dough to a lightly floured work surface. Shape into a disc 1 1/2 inches (4 cm) thick. Using a sharp floured knife or bench scraper, cut the disc into 8 wedges. Transfer the scones

to the prepared baking sheet and freeze for 30 minutes, until firm.

6. Meanwhile, position a rack in the middle of the oven. Preheat the oven to 400°F (200°C).
7. Remove the scones from the freezer, brush the tops with the cream, and sprinkle with the turbinado sugar. Bake until golden brown, 25 to 28 minutes. Transfer to a rack to cool for 10 minutes.
8. Meanwhile, make the maple cinnamon glaze: In a medium bowl, whisk together the icing sugar, cinnamon, and salt. Pour in the maple syrup, melted butter, and vanilla. Whisk together until the glaze is completely smooth.
9. Once the scones have cooled for 10 minutes, spread 2 tablespoons (30 mL) of the glaze on top of each scone. Sprinkle with toasted pepitas. The scones are best the day they are made, but can be stored in a covered container at room temperature for up to 2 days or in the freezer (without the glaze and toasted pepitas) for up to 1 month.

Pumpkin

Orange foods contain carotenoids, potent anti-oxidant & anti-inflammatory agents to support brain health.

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Dominican Shrimp and Rice Stew

 SERVES 8

INSTRUCTIONS

1. In a large bowl, cover the salt cod with the water. Cover and let sit overnight in the fridge. The next morning, discard the water. Add fresh water and cover. Let sit in the fridge for 1 hour. Remove from the fridge, discard the water again. Add fresh water, cover, and let sit in the fridge for another hour.
2. Preheat the oven to 375°F (190°C). Line a baking sheet with parchment paper.
3. Place the tomatoes and the 2 whole garlic cloves on the prepared baking sheet. Drizzle with 2 tablespoons of the olive oil and sprinkle with 1/2 teaspoon of the salt. Roast for 15 minutes, or until the tomatoes are slightly browned. Set aside.
4. In a large pot, heat the remaining 2 tablespoons olive oil with 1 teaspoon of the salt over medium heat. Add the sliced garlic and Spanish onion and cook, stirring occasionally, until the onion is soft and translucent, about 5 minutes.
5. Add the green onions and cook, stirring constantly, for 30 seconds. Add the tomato paste and continue to cook, stirring, for 1 minute. Stir in 1 cup of the cilantro. Transfer the onion mixture to the tomato mixture and set aside.
6. In the same pot (no need to wipe clean), combine the vegetable stock, remaining 1 tablespoon salt, and the reserved shrimp shells. Bring to a boil over medium heat. Reduce the heat, cover with a lid, and simmer for 5 minutes. Remove from the heat and discard the shrimp shells.
7. Drain the salt cod and break into large pieces.
8. In a high-speed blender, combine the salt cod, tomato and onion mixture, and half of the shrimp stock. Blend on high speed until smooth.
9. Pour the blended mixture into the remaining shrimp stock and bring to a slow boil. Stir in the rice. Reduce the heat to low, cover with a lid, and cook for 20 minutes, stirring every 5 minutes.
10. Add the shrimp, the remaining 1/2 cup cilantro, and pepper. Stir for a few seconds. Cover with a lid and cook for 5 minutes.
11. Serve in bowls and enjoy hot with a few dashes of hot sauce. Garnish with avocado slices on top.

INGREDIENTS

- | | |
|---|--|
| + 1/3 lb boneless salt cod | + 1 1/2 cups tightly packed chopped fresh cilantro leaves, divided |
| + 4 cups water | + 8 cups vegetable stock |
| + 8 Roma tomatoes, cut in half | + 1 1/2 lb large shrimp, peeled and deveined (shells reserved) |
| + 2 whole cloves garlic + 4 thinly sliced cloves garlic, divided | + 1 1/4 cups rice (I use jasmine) |
| + 4 tbsp extra-virgin olive oil, divided 1 1/2 tsp + 1 tbsp sea salt, divided | + 1 tsp freshly cracked pepper |
| + 1 large Spanish onion, coarsely chopped | |
| + 2 green onions (white and light green parts only), chopped | FOR SERVING |
| + 1 tbsp + 1/2 tsp tomato paste | + Hot sauce |
| | + 2 avocados, pitted, peeled, and thinly sliced |

MEMORY MORSELS®

— A WOMEN'S BRAIN HEALTH INITIATIVE —

This edition's recipes are courtesy of Diala Canelo, cookbook author, food photographer, and the voice behind the food and travel blog "Diala's Kitchen".

For more recipes and the latest from our Featured Foodie, Diala Canelo, visit memorymorsels.org.



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