

MIND OVER MATTER[®]

**DIVERSITY IN
WOMEN'S BRAIN
HEALTH RESEARCH**

**THE 2ND ANNUAL
WOMEN'S BRAIN
HEALTH DAY**

**HAS YOUR BRAIN HEALTH
SUFFERED DURING
COVID-19 ISOLATION?**

**CHALLENGE YOUR BRAIN
TO KEEP COGNITIVE
DECLINE AT BAY**

**COGNITIVE CONSEQUENCES
OF MIDLIFE STRESS**

**HOW HEALTHY ARE
MILLENNIALS?**

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

WE BELIEVE THE MORE RESEARCH WE DO INTO WOMEN'S BRAIN HEALTH THE BETTER IT IS FOR EVERYONE.

For over 20 years, Brain Canada has championed paradigm-changing research into the brain.

Now we are pushing innovation and connectivity with the scientific community even more by building a truly interdisciplinary commitment to brain research. We have to. Brain disorders are among the leading causes of disability in our country and are a huge public health burden. That's why we have to invest now.

We are proud of our partnership with Women's Brain Health Initiative as we dare to dream big with brave, bold science. We have invested over \$250 million in Canada's most visionary brain researchers and their generation-changing ideas.

Dr. Nathalie Bier is one of those researchers. She is currently working on voice-assisted kitchen technology for people with Alzheimer's disease. Her story - featured in this issue of Mind Over Matter® - is both hopeful and inspiring for anyone who has been touched by this tragic disease. You'll see why she is one of the rockstars of the neuroscience world.

Join us and help us help heroes like Dr. Bier and others realize their dreams and ours. Because what we do today will mean a far brighter future tomorrow. For all of us.



Fondation
Brain Canada
Foundation

Funding Brilliance Daily.



INSPIRING ENGAGED PHILANTHROPY

The Citrine Foundation of Canada focuses on supporting charities who work with “marginalized, at-risk, diverse communities across Canada,” and organizations concerned with disease, poverty, and promoting healthy lifestyle decisions. Its mission statement is to “enhance lives across Canada through inspired philanthropy.”

The work of Women’s Brain Health Initiative (WBHI) aligns with the foundation’s interests in many ways - so much so that Citrine has announced a remarkable \$1,000,000 donation to WBHI.

“WBHI is terrific, a fantastic organization and it just fits in exactly with our foundation’s mandate,” said Lon Hall, Chair of the Board of Directors of The Citrine Foundation of Canada.

Hall said that when the board met in early 2020, it reaffirmed its commitment to support organizations that are proactive in dealing with diseases, in educating diverse communities, and in supporting research and knowledge sharing. Citrine always conducts substantial due diligence to familiarize itself with any organization that it may fund, and has a keen interest in helping organizations to build capacity and to identify other potential funders - all with the goal of supporting their mission.

“All of the seismic events of the past few months emphasized to our board that we’ve made the right decision to support the charities in these sectors,” said Hall.

“Anything of this magnitude gives any responsible board the need to pause, to think about how to help out in the best possible way, and to consider all funding opportunities with an unclouded mind.”

Citrine’s deliberations brought it to WBHI, knowing that a central part of the charity’s mission is to support and promote healthy, diverse communities through research and education.

The foundation’s donation will go to supporting the core of WBHI’s mandate.

The donation will help the research of Dr. Gillian Einstein, who holds

the Wilfred and Joyce Posluns Chair in Women’s Brain Health and Aging at the University of Toronto. Through Citrine funding, Dr. Einstein’s studies will focus on women’s brain health and aging (the first research chair in the world with that particular mandate), and will launch a study of aging in transgender individuals, exploring the effects on cognition of long-term hormone therapy - areas where very little research is being conducted elsewhere.

The timing of The Citrine Foundation of Canada donation has enabled WBHI to pivot its education efforts seamlessly, allowing the charity to develop innovative brain health content through online and virtual communications, including a series of engaging Brain Buzz™ videos as highlighted on page 62 in this magazine.

The funding will also support several aspects of WBHI’s work, including its diversity and inclusion initiatives, such as the Engaging Millennial Minds® educational programs (which are generously supported by another Canadian philanthropic organization, RBC). Funds will also support the internationally distributed Mind Over Matter® magazine. Citrine is also excited to be a supporter of the second annual Women’s Brain Health Day (December 2nd) and the associated Stand Ahead® Challenge, raising more funds for women’s brain health research.

“The Citrine Foundation is proud to support and contribute to research and education that will help women, the centre of every family, to better protect their brain health as they age,” said Hall.

“We are thrilled and moved by this extraordinarily generous donation,” said WBHI Founder and President, Lynn Posluns. “The Citrine Foundation’s commitment to supporting diverse groups of people, including the marginalized, is an example for us all. This vote of confidence in the work of Women’s Brain Health Initiative inspires us to lift our mission to new heights.”

Citrine works with charities that are proactive with their own fund-raising and relationships, helping them to grow and reach their full potential, where their funds can help them leverage matching donations from others and entice new sponsors. Already, Citrine’s gift to WBHI is bearing fruit with matching significant donations from individuals and corporations. Citrine is delighted that it has been able to leverage its support for WBHI.

The foundation draws its name from a translucent, yellow variety of quartz. Citrine is said to encourage “fullness of life, fresh beginnings, and new pursuits” - appropriate sentiments for a \$1,000,000 donation to a charity that is the first advocate for women’s brain health, funding cutting-edge research and unique education programs to help individuals maintain their cognitive vitality.

the citrine
FOUNDATION OF CANADA

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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."



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 WBHI's Young Person's Cabinet, she encourages millennials to start taking care of their brain health and mental health.



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."



TRACI MELCHOR & ROSELLA LEONCE MELCHOR // ON THE COVER

Traci Melchor and her mother, Rosella, share common threads in their life experiences. Like her mother, Traci is a single parent raising two children and is very conscious of the importance of physical, mental, and brain health. Traci, Senior Correspondent on CTV's *Etalk*, is thrilled to share the cover of Mind Over Matter® with her mother: "She's given me a voice. It fills my heart with love. I'm so proud of her." And for Rosella, it's an unexpected treat: "It means a lot – an 81 year old cover girl!"



THIS EDITION OF MIND OVER MATTER® IS DEDICATED TO FOUNDING BOARD MEMBER AND OUR FRIEND KEN ABER

The gendered impact of the COVID-19 pandemic underscores society's dependence on women both on the frontline and, more importantly for most of us, at home.

What we are going through has impacted each of us in different ways, with women bearing the brunt of unpaid caregiving responsibilities, managing family needs, including child and elder care, and often supporting a spouse or partner. Women were (and are) also more likely than men to be frontline workers, undertaking high-contact, economically insecure, and unprotected work. And worse, isolating at home has resulted in an unprecedented increase in gender-based violence.

Coronavirus anxiety is placing significant demands on our brains. We know that heightened anxiety and stress impact our ability to make effective decisions. That is why we must work together and support each other now more than ever before.

Women and men do differ, though, in how they respond to anxiety and stress. Women's and men's brains both release oxytocin in response to stress, but women's brains release more. And while seeking support from (and socializing with) close female friends is one of the ways in which women's minds cope with stress, the requirement to physically distance has diminished this means to help us handle the strain.

The more we learn about how sex (biological factors) and gender (social factors) influence health, the more we can improve the health and wellbeing of both women and men, a cornerstone of Women's Brain Health Initiative's mandate.

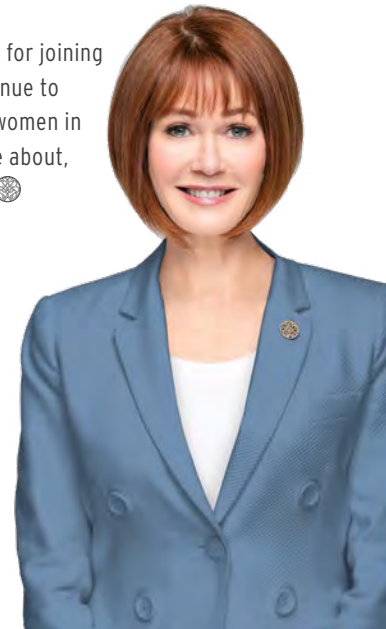
Thanks to our efforts, many now recognize the need to stand up against research bias. But there is much more to be done, especially if we want to guarantee that studies are more nuanced to be inclusive of all women, regardless of socioeconomic condition, race, or ethnicity.

That's why supporting Women's Brain Health Initiative is so important. If we understand how sex, gender, colour, culture, and other considerations influence brain health, then we can help improve and maintain the cognitive vitality of everyone.

The late Ken Aber - one of our founding board members, staunch supporter, and friend to so many - knew and advocated on our behalf for this, which is why we want to dedicate this edition of Mind Over Matter® to him in his memory.

Thank you Ken, and to all of you, for joining us on this journey that will continue to make a difference for all of the women in our lives, those we love and care about, and those we have yet to meet. 🧠

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



ON MY NERVES

COGNITIVE CONSEQUENCES OF MIDLIFE STRESS

Women are affected by Alzheimer's disease and other forms of dementia in much larger numbers than men. Approximately two-thirds of Canadians and Americans living with dementia are women.

Why are women disproportionately affected? Partly, it is because women tend to live longer than men, and age is the strongest-known risk factor for developing dementia. However, age alone does not account for the sex differences in dementia. One of the potential contributing factors that may help explain the disparity is sex differences in stress response.

Numerous animal and human studies have shown that both females and males are adversely affected by prolonged stress-induced release of hormones such as cortisol. When cortisol levels remain high for long periods of time (i.e. from "chronic" stress), parts of the brain shrink, overall brain weight decreases, and learning and memory are negatively impacted. Short-term or "acute" stress has also been shown to impair brain function.

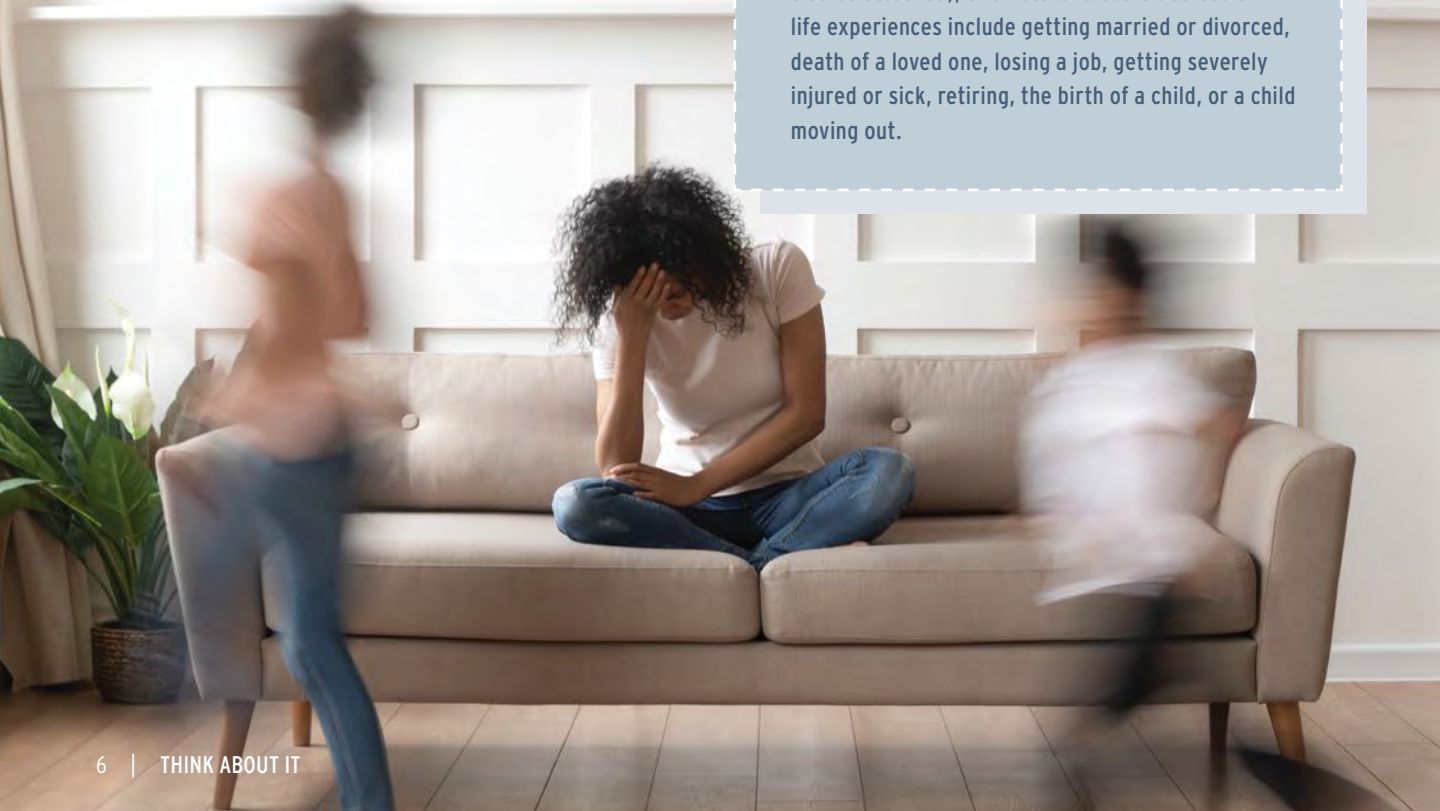
AGE PLAYS A ROLE IN PHYSIOLOGICAL STRESS RESPONSE FOR BOTH SEXES, BUT MORE SO FOR WOMEN.

A meta-analysis conducted by Dr. Christian Otte and colleagues compiled data from 45 studies and found that older participants (mean age 69 years) showed a larger cortisol response to challenge (i.e. a type of stressor) compared with younger participants (mean age 28 years). However, the effect of age on cortisol response was found to be significantly stronger in women - three times higher than in men. These findings were published in 2005 in *Psychoneuroendocrinology*.

STRESS ALSO APPEARS TO AFFECT MEMORY PERFORMANCE OF WOMEN AND MEN DIFFERENTLY AS THEY AGE.

One study - conducted by Dr. Mercedes Almela and colleagues, published in 2010 in *Stress* - examined the short-term effects of acute stress on memory in an experimental situation. Sixteen women and 16 men between the ages of 54 and 72 years were exposed to a social stress test and a control condition, followed by

Examples of traumatic events include combat, rape, being physically attacked (or watching someone else be attacked), or a natural disaster. Stressful life experiences include getting married or divorced, death of a loved one, losing a job, getting severely injured or sick, retiring, the birth of a child, or a child moving out.



memory testing. The researchers found that only the female participants experienced an acute negative impact on memory performance in response to stress.

Research conducted by Dr. Cynthia Munro and colleagues - published in 2019 in *International Journal of Geriatric Psychiatry* - suggests that there are also differences between the sexes when it comes to the impact of stressful life experiences and the long-term impact on memory. The researchers analyzed data from over 900 Baltimore adults who were participating in the U.S. National Institute of Mental Health's Epidemiologic Catchment Area Study. The participants met with the researchers four times: once when enrolling in the study in 1981, and then at follow-up assessments in 1982, between 1993 and 1996, and between 2003 and 2004.

During the third visit, the participants were asked if they had experienced a traumatic or stressful event recently (namely, in the past year) or in the more distant past (namely, between 1981 and one year ago, which the researchers referred to as "remote" stress/trauma). Participants also completed the Mini-Mental State Examination (MMSE) and a word-list memory test. At the fourth visit, they were tested again and the results from the third and fourth visits were compared.

The MMSE is a standardized questionnaire used widely to assess overall cognitive impairment. The word-list memory test involved having participants recall 20 words that had been spoken aloud, immediately after hearing them and then again 20 minutes later. Then, the participants were asked to identify those same 20 words from among 40 words on a written list.

There was no association found between changes in MMSE score and stressful or traumatic events occurring at any time in either sex. However, some interesting findings emerged from the word-list memory testing. A greater number of recent stressful life experiences reported at the third visit was linked with greater verbal memory decline by the fourth visit in women only. Earlier (remote) stressors were not linked to memory decline in women or men.



THESE FINDINGS SUGGEST THAT WOMEN ARE MORE COGNITIVELY VULNERABLE TO STRESSFUL LIFE EVENTS THAN MEN AS THEY AGE, AND THAT THE TIMING OF STRESSORS MAY BE IMPORTANT,

explained Dr. Munro, lead researcher on the study and Associate Professor of Psychiatry and Behavioral Sciences at Johns Hopkins University School of Medicine. "It looks like stressors that happen in midlife may be taking a bigger toll on women's cognition in later life than earlier stressors."

Interestingly, traumatic experiences were not associated with

cognitive decline in either women or men, suggesting that ongoing stress may have more of a negative effect on brain functioning than the occurrence of a traumatic event. This finding is perhaps not as surprising as it might at first seem. A healthy response to stress causes a brief increase in stress hormones, but then the levels return to normal quickly. Sometimes, though, a person's body gets stuck in "stress mode," and there is a sustained hormone response.

Not everyone who experiences a traumatic event gets stuck in stress mode. Other studies have found that individuals who develop post-traumatic stress disorder (PTSD) have a higher risk of developing dementia than those who experience trauma but do not develop PTSD, suggesting that it is one's response to stressful events that matters more than the occurrence of such events.

Another study - conducted by Dr. Lena Johansson and colleagues - also found that midlife stressors are linked with long-term negative cognitive impact on women. This research involved 800 women in Sweden who were studied over a 38-year period, from midlife to late life. This study revealed that the presence of common psychosocial stressors (such as divorce, widowhood, or work problems) at baseline was linked with higher incidence of dementia later in life. These findings, published in 2013 in *BMJ Open*, suggest that common stressors experienced in midlife may have severe and long-lasting physiological and psychological consequences for women.



THE GOOD NEWS IS THAT THE NEGATIVE COGNITIVE CONSEQUENCES OF STRESSFUL EXPERIENCES MAY NOT BE INEVITABLE. YES, WOMEN APPEAR TO BE MORE VULNERABLE THAN MEN TO THE EFFECTS OF MIDLIFE STRESS ON THEIR BRAIN FUNCTION, BUT HOW THEY HANDLE STRESSORS MAY HELP TO DECREASE THE EFFECTS,

said Dr. Munro. "Of course, decreasing the amount of stress would be ideal, but is not always possible. However, everyone can practice stress-management techniques such as exercise, yoga, and meditation to help their bodies respond in a healthy way to unavoidable stressors, possibly decreasing their risk of cognitive decline with age." 🌍

MEN SHOULD LEARN STRESS-MANAGEMENT TECHNIQUES, TOO

As Dr. Munro observed, stress can negatively impact men's cognitive and physical health, too (even though it might be to a lesser degree than women). And, some men - those who have a heightened stress response - may be particularly vulnerable. "I like to emphasize that everyone can benefit from reducing their responses to stress," said Dr. Munro, "not just women."



SLEEP ON IT

FOR THE SAKE OF YOUR HEALTH

Sleep is essential for our overall health and wellbeing. This is perhaps not surprising if you think about how fantastic you feel getting up after a great night's sleep - one where you fell asleep with ease, slept soundly through the night without disruption for the ideal length of time, and woke up feeling refreshed and alert, filled with enough energy to get through the day without a nap (or significant amounts of caffeine and sugar). For many, a great night's sleep is one of life's greatest pleasures, but it can be elusive to experience consistently.

Far too often, we struggle to fall asleep, wake up frequently throughout the night (and have difficulty falling back asleep), wake up too early in the morning, and/or generally feel like our sleep quality is dissatisfactory.

POOR SLEEP IS VERY COMMON

A large proportion of individuals worldwide do not meet guidelines for optimal sleep duration. While some people sleep more than the recommended amount, vast numbers sleep less than they ideally should each night.

One study conducted by Dr. Earl Ford and colleagues, published in 2015 in *SLEEP*, looked at sleep duration among more than 250,000 U.S. adults aged 18 years and over, and found that 29.2% of the participants reported sleeping six hours or less on an average night. A Canadian survey of nearly 11,000 participants between the ages of 18 and 79 found that an even higher percentage of respondents reported inadequate sleep duration. The survey - conducted by Dr. Jean-Philippe Chaput and colleagues, and published in a Statistics Canada Health Report in September 2017 - revealed that approximately one-third of participants reported sleeping fewer hours than what is recommended for their age group.

Not only are thousands of people not getting enough sleep, many are also experiencing poor sleep quality for a variety of reasons.

ONE OF THE BEST INDICATORS OF WHETHER YOU ARE GETTING ENOUGH GOOD-QUALITY SLEEP IS HOW YOU FEEL IN THE MORNING.

The 2019 Sleep in America® poll found that only 47% of respondents reported feeling extremely or very well-rested on weekdays (54% on weekends).

RECOMMENDED SLEEP DURATION

The U.S. National Sleep Foundation recommends that individuals between the ages of 18 and 64 should get seven to nine hours of sleep each night, and those aged 65 and over should get seven to eight hours.

SLEEPING POORLY IS NOT JUST UNPLEASANT, IT IS HARMFUL FOR YOUR HEALTH

Inadequate sleep, whether due to short duration or poor quality, is associated with a range of negative health effects. For example, there is evidence indicating that long-term sleep deprivation and sleep disorders are linked to increased risk of cardiovascular disease, obesity, type 2 diabetes, injuries, psychiatric disorders (such as anxiety and depression), and even premature death.

POOR SLEEP CAN ALSO AFFECT YOUR COGNITIVE FUNCTION AND INCREASE THE RISK OF NEURODEGENERATIVE DISEASE, ESPECIALLY DEMENTIA.

Below are summaries of two recent studies that highlight the importance of good sleep for better brain health:

» Research conducted by Dr. Omonigho Bubu and colleagues, published in 2017 in *SLEEP*, examined the relationship between sleep, cognitive impairment, and Alzheimer's disease, studying the combined data from 27 studies involving 69,216 participants in a meta-analysis. The study revealed that individuals with sleep problems had a 1.68-times higher risk of experiencing cognitive impairment and/or Alzheimer's disease, compared to those without sleep problems.

"We found that altogether, sleep problems - including short and long sleep duration, poor sleep quality, circadian rhythm abnormality, insomnia, and obstructive sleep apnea - significantly increased risk of cognitive impairment or Alzheimer's disease," said Dr. Bubu, a Research Assistant Professor at NYU Grossman School of Medicine. "We estimate that approximately 15% of Alzheimer's disease cases may be attributed to sleep problems. That suggests that addressing sleep issues could play a large role in reducing dementia risk."

» Some results from the world's largest sleep study, published in 2018 in *SLEEP*, have shown that sleeping too little or too much can negatively impact cognitive performance. The study used the power of the Internet to investigate the relationship between self-reported amount of sleep and cognitive performance (measured using a set of 12 tests completed online).

"In our global sample of over 10,000 people, we found that cognitive performance was impaired - specifically on tasks that measured problem solving and verbal ability - in the participants who reported typically sleeping less, or more, than seven to eight hours each night - and that was about half of the participants," said Dr. Conor Wild, →

lead author of the paper and a Research Associate at The Owen Lab at Western University.



PEOPLE WHO ARE HIGHLY SLEEP DEPRIVED ARE AT PARTICULAR RISK. WE ESTIMATE THAT, IN TERMS OF OVERALL COGNITION, A TYPICAL SLEEP DURATION OF FOUR HOURS PER NIGHT IS EQUIVALENT TO AGING EIGHT YEARS.

WHAT TO DO (AND NOT DO) IF YOU ARE NOT SLEEPING WELL

There are various strategies that you can try on your own if you are experiencing trouble sleeping from time to time. For example, taking steps to manage your stress levels might help, and so might having positive sleep-supportive habits such as keeping your bedroom cool and dark, and avoiding use of devices with bright screens before bed. Below you will find some other scientifically supported strategies to consider.

AVOID SLEEP MEDICATION, EXCEPT FOR SHORT-TERM USE

Reaching for a sleeping pill, either prescribed or over-the-counter, might feel like the easiest solution to sleep problems, but researchers consistently conclude that sleep medications are not the best solution for long-term sleeping problems. All medications used to aid with sleep are meant to be used for the short term, typically seven to ten days at the most; however, numerous people are using these aids for much, much longer.

The side effects of long-term use vary depending on the drug, but can include constipation, confusion, dizziness, next-day drowsiness, addiction, and impaired cognitive function.

SOME SLEEP MEDICATIONS, WHEN USED OVER A LONG PERIOD OF TIME, HAVE ALSO BEEN ASSOCIATED WITH INCREASED RISK OF FALLS, ACCIDENTS, AND EVEN DEMENTIA.

EXERCISE REGULARLY

One strategy for better sleep is being physically active. An academic review, published in 2017 in *Journal of Evidence-Based Medicine*, looked at three previous meta-analyses involving 950 adult participants and concluded that exercise improves selected sleep outcomes in adults.

“More research is needed before any specific recommendations can be made directed solely at sleep outcomes, but enough is known now to recommend that people follow current guidelines for exercise in general,” said Dr. George Kelley, lead author of the study and a Professor at West Virginia University’s School of Public Health.



EXERCISE IS A GREAT STRATEGY FOR PEOPLE STRUGGLING WITH POOR SLEEP TO EXPLORE BECAUSE IT’S FREE OR LOW-COST, ACCESSIBLE TO MOST PEOPLE, DOESN’T HAVE SIDE EFFECTS, AND PROVIDES NUMEROUS HEALTH BENEFITS BEYOND THOSE FROM SLEEPING WELL.

TRY LIGHT THERAPY

Light plays an important role in sleep and wakefulness, and so it has been used as a therapy to treat sleep disorders. Bright light therapy is a natural, relatively low-cost treatment that involves using a specially-designed device that mimics outdoor light - commonly a light box, but also lamps or visors. These devices, available with different strengths of light, are used to provide exposure for varying lengths of time at differing times of day, depending on the sleep disorder being treated.

An academic review and meta-analysis conducted by Dr. Annette van Maanen and colleagues investigated the effects of light therapy on sleep disorders and concluded that light therapy was effective in the treatment of sleep problems in general, and for certain problems in particular - namely, circadian rhythm sleep disorders, insomnia, and sleep problems related to dementia. These findings were published in 2015 in *Sleep Medicine Reviews*.

Light therapy devices are available in stores and online, and the cost may be covered by health benefits or insurance in some cases. According to the U.S. National Sleep Foundation, it is best to use light therapy under the supervision of a health professional who will develop a specific treatment plan and determine the appropriate type of device to purchase and how/when to use it.

TRY ALTERNATIVE/COMPLEMENTARY THERAPIES

There are several alternative/complementary therapies being promoted to assist with sleep problems, many of which are supported by anecdotal evidence (i.e. individuals who personally claim the treatment worked for them). But, have any of the alternative/complementary therapies been proven to help with sleep problems in rigorous scientific studies?

One section of the “European guideline for the diagnosis and treatment of insomnia,” published in 2017 in the *Journal of Sleep Research*, examined the existing evidence for using a variety of “complementary and alternative medicine” approaches to help with insomnia in particular. The researchers concluded that while overall the available studies were methodologically poor, there was some evidence suggesting that acupuncture is effective, and that music therapy offers a potential positive effect, as does foot reflexology, moxibustion, and meditative movement therapies including yoga. They found no evidence supporting the efficacy of aromatherapy or homeopathy for treating insomnia.

If there is an alternative therapy that you would like to try, one that has no negative side effects and might perhaps even be pleasurable to use (like aromatherapy), you might choose to give it a try notwithstanding the absence of solid scientific proof.

TRY MINDFULNESS-BASED TREATMENTS OR HYPNOTHERAPY

The above-noted 2017 European guideline also reviewed the evidence for usefulness of mindfulness-based treatments and hypnotherapy on sleep. The researchers reported finding moderate to good effects of mindfulness-based treatments on sleep parameters.

Hypnotherapy was found to have a positive impact on sleep onset latency (i.e. the time it takes to fall asleep). However, the overall quality of the available studies was poor. You might nevertheless want to explore this treatment option, given these initial promising findings.

SEE YOUR DOCTOR

If you are experiencing chronic sleep problems, be sure to see your doctor.

THERE ARE MANY POTENTIAL UNDERLYING CAUSES FOR SLEEP DIFFICULTIES THAT YOUR DOCTOR CAN HELP YOU EXPLORE AND ADDRESS.

For example, urinary incontinence, nighttime pain, or menopause symptoms might be playing a role, or perhaps medications you take for other conditions are having a negative impact on your sleep. If there are no underlying factors in your case, your doctor may direct you to a sleep clinic or sleep specialist, or recommend other steps you should take.

Your treatment plan will vary depending on your unique situation. For example, if it is discovered that you have sleep apnea - a condition in which breathing stops and restarts repeatedly during sleep - you may be advised to use a continuous positive airway pressure (CPAP) device and/or lose weight if you are overweight or obese. For insomnia, Cognitive Behaviour Therapy for Insomnia (CBT-I) is the recommended first-line treatment.

CBT-I is a structured therapy that typically includes educational, behavioural, and cognitive components designed to change actions or thoughts that interfere with one's ability to sleep. It often incorporates techniques such as mindfulness to aid in relaxation as well. As part of CBT-I, a participant might set goals to control her or his sleep environment, restrict the amount of time spent in bed, reduce outside stimuli, relax through meditation or yoga, limit caffeine and alcohol consumption, and/or avoid daytime napping.

CBT-I is traditionally conducted face-to-face with a trained therapist in four to eight sessions. There is currently a shortage of professionals trained to deliver CBT-I so demand for the therapy outweighs availability, making it difficult to access CBT-I for many people. One way of reaching more people with the existing number

The 2017 European guideline reported on the effectiveness of Cognitive Behaviour Therapy Insomnia (CBT-I). After reviewing 15 published meta-analyses on the subject, the researchers reported that CBT-I demonstrated good efficacy on sleep-related outcome parameters, and those results were well-maintained at follow-up assessments.

of therapists is by offering CBT-I in a group format, rather than on an individual basis. Research has shown that group CBT-I is effective. There is also research supporting the effectiveness of brief versions of CBT-I (e.g. with two face-to-face sessions and two phone calls, or even just one session).

Yet another innovation to help more people access CBT-I is offering the treatment as a digital/virtual program.

RESEARCH SUGGESTS THAT DIGITAL CBT-I ALSO PROVIDES GOOD TREATMENT EFFICACY.

An academic review conducted by Dr. Annemarie Luik and colleagues, published in 2019 in *Current Psychiatry Report*, found that studies have consistently supported the use of digital CBT-I to treat insomnia.

In particular, the researchers found evidence of large effects in the short term, and smaller effects over the long term - up to 1.5 years after treatment. They concluded that the evidence in support of digital CBT-I is strong and suggested that it is suitable for more widespread use in standard healthcare. (Examples of digital CBT-I include <https://somryst.com/> and <https://www.sleepio.com/>.)

SLEEP IS NOT A LUXURY

The importance of sleep is often underestimated. Many people, from students to busy professionals, often boast about how little sleep they get, as if it is a badge of honour, indicative of how hard they work or their importance. With what is known about how critical sleep is for your health, boasting about inadequate sleep is like bragging about eating fast food or engaging in some other unhealthy behaviour every day.

IT IS A MISCONCEPTION TO THINK THAT SLEEPING LESS WILL MAKE YOU MORE PRODUCTIVE BY GIVING YOU MORE TIME; IT ACTUALLY TENDS TO MAKE YOU LESS PRODUCTIVE IN THE LONG RUN.

The bottom line is that everyone needs good sleep to function well each day and to stay both physically and mentally healthy over the long term. If you are struggling to get a good night's sleep, take action today to turn that around. Your body and brain will thank you, and you will feel so much better! 🌍



USE IT OR LOSE IT

CHALLENGE YOUR
BRAIN TO HELP
KEEP COGNITIVE
DECLINE AT BAY

There is an interesting phenomenon that dementia researchers have noticed. Some individuals who have extensive dementia-type damage in their brains experience little to no changes in cognitive function. People who experience this phenomenon are said to have high “cognitive reserve.”

What differentiates those with high cognitive reserve from those with low cognitive reserve - in other words, what makes some people more resistant to age-related brain decline or disease? Many factors are thought to be involved, but collectively these factors have one thing in common: mental stimulation.

INDIVIDUALS WITH HIGH COGNITIVE RESERVE ARE MORE LIKELY TO LEAD COGNITIVELY STIMULATING LIVES.

In particular, more time spent on education, greater occupational complexity, speaking more than one language, and engagement in mentally stimulating leisure activities are some of the factors that have been associated with reduced risk of dementia and slower rate of cognitive decline.

In a review published in April 2019 in *Neuroscience Bulletin*, Dr. Ai-Min Bao and colleagues summarized previous research on the relationship between various “environmental-stimulation” factors and cognitive reserve. Below is a summary of some of their main findings and conclusions:

EDUCATION is thought to be a key contributor to cognitive reserve. Most studies have found that participants with higher education have a lower risk of developing cognitive-decline symp-

oms. However, the findings about the association between educational attainment and cognitive reserve have not been consistent.

MENTALLY DEMANDING OCCUPATIONS may provide a protective effect for cognitive function. Complex, intellectual work has been linked with a reduced risk of Alzheimer’s disease (AD), while less complicated, manual labour has been associated with earlier development of AD. Interestingly, any cognitive protection provided by a complex occupation seems to disappear with retirement. **Retiring at an older age has been linked to a later age of AD diagnosis, suggesting that staying mentally active at work for longer might help stave off AD.** It is important to note, though, that research on the association between occupational complexity and cognitive reserve has not been consistent either.

BILINGUALISM has been found in multiple studies to play a role in improving cognitive reserve. In particular, research has found bilingualism to be linked to a delay in the onset of dementia by approximately four years, compared to monolingualism. Although there is some inconsistency in the findings, the researchers concluded that, overall, bilingualism appears to protect against the symptoms of dementia. And, recent data suggests that **multilingualism** may be linked to an even stronger protective effect on cognition than bilingualism.

LEISURE ACTIVITIES may also give cognitive reserve a boost, although research findings are again inconsistent. Many studies have found a protective cognitive effect from engaging in mentally stimulating and/or socially oriented leisure activities, while others did not find a significant effect. Despite the mixed findings about the relationship between leisure activities and cognitive reserve, the researchers concluded that leisure activities undertaken throughout the lifespan or in late life seems to be associated with a reduced risk of dementia.

WHICH LEISURE ACTIVITIES BENEFIT YOUR BRAIN MOST? AND, DOES QUANTITY OF ACTIVITY MATTER?

A wide variety of leisure activities have been associated with pro-cognitive effects, including reading, playing card and board games, solving puzzles, using a computer, and playing a musical instrument.

A recent U.S. study conducted by Dr. Janina Krell-Roesch and colleagues, published in 2019 in *Neurology*, investigated whether the timing, number, and frequency of mentally stimulating leisure activities in midlife and late life are associated with the risk of developing mild cognitive impairment (MCI). The study involved 2,000 participants with an average age of 78 who did not have MCI at baseline.

At the beginning of the study, the participants completed a questionnaire about how often they engaged in various types of mentally stimulating activities (namely, reading books, using the computer, participating in social activities, playing games, and doing craft activities) in midlife (between the ages of 50 and 65 years) and late life (ages 66 and over). Every 15 months thereafter, for an average of five years of follow up, participants performed thinking and memory tests.

“**OVERALL, WE FOUND THAT ENGAGING IN MENTALLY STIMULATING ACTIVITIES WAS ASSOCIATED WITH A REDUCED RISK OF DEVELOPING MCI,**

said Dr. Krell-Roesch, a researcher for the Mayo Clinic’s Translational Neuroscience and Aging Program.

More specifically, the researchers found that the risk of developing MCI was significantly reduced for participants who engaged in:

- computer use, regardless of timing (between 30% and 48% less risk);
- playing games in both midlife and late life combined (20% less risk);
- social activities in both midlife and late life combined (20% less risk); and
- craft activities in late life only (42% less risk).

“Furthermore, we found that the more activities people did in late

life, the less likely they were to develop MCI,” continued Dr. Krell-Roesch. “Compared to doing no activities at all, engaging in any two activities was associated with 28% lower risk of MCI, three activities with 45% lower risk, and four activities with 56% less risk.”

These findings support the notion that it is never too late to benefit from mentally stimulating leisure activities. Even though much cognitive reserve accumulates in childhood and early to mid-adulthood - through education and work, for example - it appears that one can continue to grow cognitive reserve throughout the lifespan, even late in life, by engaging in leisure pursuits that challenge the brain.

PLAYING A MUSICAL INSTRUMENT IS ANOTHER LEISURE ACTIVITY THAT HAS BEEN LINKED TO HIGHER COGNITIVE RESERVE.

A 2019 review and meta-analysis conducted by Dr. Sebastian Walsh and colleagues examined three studies of good methodological quality to find out if playing a musical instrument reduces the incidence of cognitive impairment and dementia. The researchers found that playing a musical instrument is associated with large protective effects.

“A study that we reviewed involving twins reported that musicians were 64% less likely to develop MCI or dementia than non-musicians. And, when we analyzed the pooled data from the other two studies we reviewed, we found a 59% reduction of dementia risk,” said Dr. Walsh, an Academic Clinical Fellow at University of Cambridge. “Our findings provide encouraging evidence in support of the brain-boosting power of playing an instrument; however, the results should be interpreted with caution. They are based on small sample sizes and only provide evidence of a link between playing music and MCI/dementia risk, not evidence of a causal relationship.”

PROTECTING YOUR COGNITIVE FUNCTION CAN BE FUN!

“There is still much to learn about the relationship between mentally stimulating activities of all types and the risk of dementia. Even though we don’t yet have definitive proof that engaging in mentally stimulating activities decreases the risk of dementia, research is pointing in that direction,” continued Dr. Walsh.

“The thing that appeals to me most about cognitive reserve is that, unlike almost all drug treatments, there are no side effects to mentally stimulating activities. Moreover, activities like learning a new language or playing a musical instrument are fun and add to your emotional wellbeing. It’s a fun, low-risk way to potentially boost your brain health. As we don’t yet have evidence of an age ‘cut-off point’ beyond which there’s no benefit, I would wholeheartedly recommend that people of all ages engage in as many mentally stimulating activities as they enjoy.” 🌍



THE THANKS I GET

HOW GRATITUDE IMPACTS YOUR BRAIN HEALTH

Do you notice and appreciate the positive aspects of your life? If you do, and often, then feeling grateful is a default “life orientation,” also known as “dispositional gratitude.” It is like a personality trait that shapes what you notice and how you feel about it, in a distinctly positive way.

This grateful personality has been associated with a variety of psychological benefits.

STUDIES HAVE FOUND THAT INDIVIDUALS WITH HIGHER LEVELS OF DISPOSITIONAL GRATITUDE HAVE GREATER LEVELS OF LIFE SATISFACTION, HAPPINESS, HOPE, AND POSITIVE AFFECT (I.E. MOOD).

They also tend to have lower levels of stress, disappointment, anger, depression, and anxiety.

Given the many benefits of dispositional gratitude, there has been significant interest in researching whether it is possible to achieve similar outcomes through activities that encourage people to feel more grateful (i.e. gratitude interventions).

GRATITUDE INTERVENTIONS LINKED TO POSITIVE OUTCOMES

Can an individual consciously experience more gratitude by engaging in certain practices? Examples of gratitude interventions that have been studied to date are set out below.

GRATITUDE LIST/JOURNALING.

This “classic” gratitude intervention involves writing out a list of things that one is grateful for on a regular basis, sometimes daily. This type of intervention - which has been called “three good things” or “counting blessings” - has been the most well-researched, although the exact instructions for the intervention have varied slightly from study to study.

GRATITUDE VISIT.

This intervention typically involves writing a letter to someone to express thanks for something that she or he did, and subsequently reading that letter aloud to the intended recipient face to face. Again, the exact instructions for the intervention may vary slightly; participants may write the letter and mail it to the recipient or write the letter and decide not to share its contents with anyone at all.

GRATITUDE MEDITATION.

This type of intervention may involve writing first about things one is grateful for and then spending time contemplating the list, or it may involve a more formal type of meditation in which one contemplates feelings of gratitude.

To assess the collective effects of gratitude interventions overall, Dr. Leah Dickens conducted a meta-analysis of 38 research papers published between 2003 and early 2016, involving over 5,000 participants. The included studies each used a gratitude intervention that was at least one week long, with some lasting up to 12 weeks.

In each study, the gratitude intervention was compared against one or more conditions. Most studies involved a “neutral” comparison such as writing about daily events in general or being put on a waitlist. Some studies, however, involved a “negative” comparison activity (such as listing aggravating things), while others used a “positive” psychology activity for comparison (such as performing random acts of kindness). Dr. Dickens found that gratitude interventions are indeed linked to a wide range of positive outcomes. Generally, gratitude interventions were found to help boost outcomes such as wellbeing, happiness, life satisfaction, and grateful mood.



THE NICE THING ABOUT GRATITUDE INTERVENTIONS IS THAT THEY ARE NO-COST, EASY ACTIVITIES A PERSON CAN DO ON HER OR HIS OWN, WITHOUT ANY FORMAL TRAINING OR THERAPIST REQUIRED. THEY SHOW PRETTY RELIABLE BENEFITS FOR MANY INDIVIDUALS OVER NEARLY TWO DECADES OF RESEARCH, EVEN IF THE GAINS ARE SMALL,

said Dr. Dickens, an Assistant Professor at Kenyon College.

“Of course, they might not be for everyone, but they’re a great way to try to increase one’s own awareness of gratitude and appreciation in everyday life. Becoming more conscious of gratitude, and seeing the world with more grateful eyes, often leads to other positive changes, too.” These findings were shared in *Basic and Applied Social Psychology* in 2017. →

Much of the research conducted on gratitude interventions to date has been conducted with mentally healthy participants. Dr. Joel Wong and colleagues were curious about whether a gratitude intervention could help improve the mental health of individuals who were experiencing some level of distress and were engaged in psychotherapy, as an additional activity to complement the therapy sessions.

The researchers conducted a study involving 293 adults who were randomly assigned to one of three groups:

- » the first group (the control group) received psychotherapy only;
- » the second group received psychotherapy and wrote one letter of gratitude to another person each week for three weeks; and
- » the third group received psychotherapy and wrote about their deepest thoughts and feelings about negative life experiences.

Compared with the participants who only received psychotherapy or who wrote about negative life experiences, those who wrote gratitude letters reported significantly better mental health when measured at both four weeks and 12 weeks after the writing intervention was completed.

Interestingly, the researchers found that the mental health benefits of writing gratitude letters were not entirely dependent on communicating that gratitude to another person. Only 23% of the participants who wrote gratitude letters actually delivered them to their intended recipients.

“GRATITUDE WRITING SEEMS TO PROVIDE AN INCREMENTAL BOOST TO MENTAL HEALTH FOR PSYCHOTHERAPY CLIENTS, WHILE EXPRESSIVE WRITING ABOUT STRESSFUL EXPERIENCES DOES NOT,

said Dr. Wong, a Department Chair and Professor at Indiana University Bloomington. “Based on our findings, we encourage therapists to consider suggesting gratitude letter writing as a low-cost intervention clients can do at home to complement psychotherapy. While not all clients would find the intervention meaningful, some may find it quite beneficial.”

THE DARKER SIDE OF GRATITUDE

Some research has uncovered what has been referred to as the “dark side of gratitude”: certain situations where gratitude interventions may not be helpful and may actually be detrimental. Examples of situations where consciously trying to be more grateful may not be associated with positive benefits include:

- » one study of survivors of dating violence found that survivors with higher dispositional gratitude may work harder to maintain a relationship even while being abused than someone with lower dispositional gratitude - in other words, more grateful individuals may stay in unhealthy relationships longer; and
- » another study found that individuals with disabilities who rely on others for informal support can feel burdened by gratitude. The participants reported feeling forced to express gratitude to secure the help that they require and described feelings of shame and frustration about depending on someone in a “one-sided” relationship. In contrast, those with disabilities who paid for formal support felt more comfortable and in control of their lives.

“EVEN THOUGH GRATITUDE IS OFTEN PROMOTED AS UNIVERSALLY POSITIVE AND MORALLY GOOD, IN SITUATIONS OF HARM, INEQUITY, AND INJUSTICE, A LACK OF GRATITUDE MAY BE A MORE MORAL RESPONSE,

explained Dr. Liz Jackson, an Associate Professor at the University of Hong Kong, whose academic paper entitled “Why should I be grateful? The morality of gratitude in contexts marked by injustice” was published in 2016 in *Journal of Moral Education*.

“Promoting gratitude in such situations can lead to denial of challenges faced or an unhealthy minimization of problems,” Dr. Jackson continued. “So, it’s important to keep in mind that, despite all of the hype about the power of gratitude, it is simply not the best strategy in all circumstances. While everyone can find some things to be thankful for, even if those things are very simple, not all situations are worthy of being grateful about.”

OVERALL, GRATITUDE CAN BE BENEFICIAL FOR YOUR BRAIN HEALTH

In many situations it can be beneficial to be grateful. Even if you are in a place in your life where you feel like things are difficult and there is nothing to be thankful for, there are often still simple things that you might feel grateful about - such as hearing the birds sing or feeling the sun or a breeze on your face. It is encouraging to know that gratitude is a malleable trait, one that can be developed even if you were not born with a predisposition towards it.

So, if it appeals to you, pull out a pen and paper or open up your laptop, and send some thank you letters - you may make someone else's day brighter while doing the same for yourself. Alternatively, consider taking up journaling and making it a habit to list what you are thankful for each day or week.


But remember, infusing your life with more gratitude does not have to be complicated, time-consuming, or even a formal practice like letter writing or journaling. It might simply be just a shift in perspective - watching out for little things to be thankful for throughout each day - paired with brief internal pauses to acknowledge your gratitude. 🌿

HIGH DISPOSITIONAL GRATITUDE HELPS DEMENTIA CAREGIVERS COPE BETTER

A study of 101 familial caregivers of persons with dementia in Hong Kong examined the role that dispositional gratitude plays in various psychological aspects of caregiving. The researchers found higher levels of gratitude in the caregivers were related to greater use of emotion-focused coping (e.g. positive reframing, acceptance, and humour) and psychological resources (e.g. caregiving competence), as well as with lower levels of caregiver psychological distress (e.g. depressive symptoms and perception of caregiving burden).

"Our findings suggest that gratitude plays a beneficial role in helping dementia caregivers cope with their responsibilities," said Dr. Bobo Hi-Po Lau, lead author of the study and an Assistant Professor at Hong Kong Shue Yan University. "Caregiving for a person with dementia can be very demanding, and is often associated with negative emotions like disappointment, anger, and frustration. It looks like having a more grateful attitude may help offset those feelings, and infuse the situation with more positivity, lowering the level of caregiver distress."





THE GREAT DIVIDE

SEX & GENDER SCIENCE

The Djavad Mowafaghian Centre for Brain Health - the largest integrated brain centre in Canada - was an ideal setting for the launch of a new organization with an ambitious vision in the emerging field of sex and gender science. In early January, a cross section of accomplished individuals from various disciplines gathered for the inaugural meeting of the Canadian Organization for Gender and Sex Research (COGS).

THE ORGANIZATION ASPIRES TO “CREATE NEW UNDERSTANDINGS AND KNOWLEDGES THAT IMPROVE THE HEALTH, WELLNESS, AND EQUITY OF ALL.”

COGS was founded by Dr. Gillian Einstein, an international leader in sex and gender research, who currently holds the Wilfred and Joyce Posluns Chair in Women's Brain Health and Aging at the University of Toronto.

It was an endeavour that Dr. Einstein had been considering for years and was thrilled when it ultimately came to fruition. “It was a fantastic meeting,” she told Mind Over Matter®. “Those of us who study sex and those who study gender should be talking to each other.”

There were not only scientific researchers in attendance, but also people from the social sciences and the humanities, along with a funder and a former deputy minister from Health Canada. The Founder and President of Women's Brain Health Initiative (WBHI), Lynn Posluns, gave a speech in which she spoke about the many ways that WBHI shares the latest brain health scientific findings with the general public.

“Dr. Einstein has been such an important leader in this field, and it was inspirational to see her bring so many brilliant people together to talk about the way forward,” said Posluns.

Many of the attendees have been campaigning for years to change mindsets in the research community, where projects traditionally have focused on males and neglected to consider the differences between the sexes. Fortunately, progress is being made on several fronts and now Dr. Einstein wishes to deepen the conversation and increase collaboration among individuals from a wide variety of disciplines. As Dr. Einstein explained,



COGS RIGHT NOW IS FOR SHARING INFORMATION, NETWORKING, AND STARTING CONVERSATIONS. THE IDEA IS TO HAVE PEOPLE WORKING ACROSS ALL DISCIPLINES TO DEVELOP A UNIFIED THEORY AND SOME PARADIGM SHIFTS AS WE THINK ABOUT PEOPLE IN THE CONTEXT OF THEIR LIVES.

The meeting quickly produced a potential collaboration between a

neuroscientist and a social scientist to study the impact of stigma on stress in the LGBTQ+ community - a collaboration that might not have happened if they had not been brought together to discuss how their respective specialties could complement each other.

“I’d like to see more of that,” said Dr. Einstein. “We want to give students a home. There are a lot of students being trained now in sex and gender, but they are still working in silos that don’t really recognize that. And they’re really asking for a place to be recognized and a place that sees things the way they do and where they can learn.”

WHILE THE WORDS “SEX” AND “GENDER” ARE OFTEN USED INTERCHANGEABLY, THE TWO TERMS HAVE DISTINCT MEANINGS.

The Canadian Institutes of Health Research notes that sex refers to a set of biological attributes in humans and animals and is primarily associated with physical and physiological features (including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy). Gender, by contrast, refers to the socially constructed roles, behaviours, expressions, and identities of girls, women, boys, men, and gender-diverse individuals.

Dr. Einstein felt that it was important to use both terms in the name of the organization.

“It’s a reciprocal relationship that needs to be thought about in all domains, not just health, but also in economics, industrial design, and politics,” she noted.

As COGS was springing to life, a major research project was launched by the Canadian Institutes of Health Research (CIHR). CIHR announced that it was funding 15 “Sex and Gender Science Chairs.” Researchers from across the country were each awarded \$700,000 over a four-year period.

“The Sex and Gender Science Chairs represent a cadre of groundbreaking, world-leading scientists,” said Dr. Cara Tannenbaum, Scientific Director of the Institute of Gender and Health, the arm of CIHR that is leading the project. “I’m excited to see how this new, emerging science area evolves. Canada will be the hotspot to watch in sex and gender science.”

CIHR’s official announcement summarized a primary goal of sex and gender science: to advance the development of personalized treatments, interventions, policies, and programs that respond to the unique needs of all individuals - across sex, gender, and other intersecting-identity factors.

Because it is an emerging field, there is a need to develop and refine research methods. →

IMPORTANTLY, SCIENTISTS ARE NOW RECOGNIZING THAT SEX AND GENDER NO LONGER MEANS SIMPLY FEMALES AND MALES; INDIVIDUALS WHO IDENTIFY AS TRANSGENDER, NON-BINARY, OR TWO SPIRIT MUST ALSO BE CONSIDERED – ALL OF WHICH ADDS NEW COMPLEXITIES AND SENSITIVITIES TO RESEARCH PROJECTS.

Dr. Tannenbaum said that a significant portion of the funding is directed towards sharing lessons on how to most effectively study sex and gender. “The goal is not only to grow the science, but also to promote best practices. And that’s a unique combination that we rarely see,” she said.

Dr. Tannenbaum further noted that CIHR is preparing to announce a related funding initiative for research projects on sex and age. “This shows the interest and excitement in every area in science.”

CIHR is also partnering with the Gendered Innovations project, an important international initiative based out of Stanford University in

California. Gendered Innovations was launched in 2009 by Stanford Professor Londa Schiebinger with the goal of “provid[ing] scientists and engineers with practical methods for sex and gender analysis.”

“The issue here is how we do good research,” said Schiebinger in an interview with Mind Over Matter® from her home in California. She is a historian of science and can speak at length about the many and varied ways that women have been excluded as scientists and neglected by researchers for centuries. She remembers well her graduate school days at Harvard University where there were no female professors.



THE FAILURE TO CONSIDER THE DIFFERENCES BETWEEN WOMEN AND MEN HAS NOT ONLY LED TO IMPERFECT SCIENCE, BUT ALSO LETHAL CONSEQUENCES, AS WHEN DRUGS DEVELOPED WITH ONLY MEN IN MIND HAD LIFE-THREATENING IMPACTS ON WOMEN. DOING RESEARCH WRONG COSTS LIVES AND MONEY.

TRANSGENDER is an umbrella term for individuals whose gender identity and/or gender expression differs from what is typically associated with the sex they were assigned at birth.

NON-BINARY is a term used by some individuals who experience their gender identity and/or gender expression as falling outside the categories of “woman” and “man.” They may define their gender as falling somewhere between woman and man, or they may define it as wholly different from these terms.

TWO SPIRIT is a term found in some North American Indigenous cultures and refers to a person who identifies as having both a masculine and feminine spirit and is used by some Indigenous individuals to describe their sexual, gender, and/or spiritual identity.

For a summary of the work being conducted by each of the Sex and Gender Science Chairs, please see page 22.



Gendered Innovations produces peer-reviewed case studies, demonstrating how researchers can find new, deeper understandings if they explore sex differences. The first study centred on heart disease, which has been chronically under- and misdiagnosed among women. It highlighted, amongst other things, how women and men suffering heart attacks can present differently and called for additional research to better understand the differences.

Studies being released this year cover a wide range of issues. One focuses on the necessity to explore sex differences when developing new drugs, another discusses the ways in which facial-recognition technologies can discriminate based on gender and/or race, and a third points out that

studies of species affected by climate change frequently neglect to consider sex differences.

“Scientists and engineers were never trained in sex and gender analysis. I wanted to develop measures that made sense to them,” said Schiebinger. Since founding Gendered Innovations, there has been tremendous progress in the U.S., with the National Institutes of Health (NIH) now requiring that researchers seeking funding consider the biological differences between women and men. However, she observed that medical education still needs to catch up and do a better job of teaching the next generation of doctors the significance of sex differences.

“This is very important and that’s why I’ve devoted my life to it.” 🌍



SPLITTING HAIRS?

CANADA'S SEX & GENDER SCIENCE CHAIRS



The Canadian Institutes of Health Research (CIHR) established the “Sex and Gender Science Chairs” in order to deepen our understanding of how biological and social influences interact to affect health and disease, as well as to position Canada as a leader in discipline-specific sex and gender science. Each Chair is awarded up to \$175,000 a year for four years (for a total of \$700,000 per Chair).

This article highlights the area of study of each of these trailblazing researchers.



**DR. ROBERT-PAUL JUSTER,
ASSISTANT RESEARCH
PROFESSOR, UNIVERSITÉ DE
MONTRÉAL**

Dr. Robert-Paul Juster has already broken new ground as a researcher through his analysis of the effects of stress on LGBTQ+ individuals. For his PhD, Dr. Juster found that individuals who came out to family and friends had lower levels of the stress hormone cortisol than those who did not. He also found that those individuals had fewer mental health issues such as depression and burnout.

Now, as an Assistant Research Professor at Université de Montréal, Dr. Juster is using his CIHR Chair funding to expand upon this work, and to examine stress on a biological level, in order to better understand how environmental and social structures can affect health.

Dr. Juster will be taking blood samples from a study group of approximately 480 people, looking at cortisol, blood sugar levels, and inflammation, and making comparisons between individuals who identify as LGBTQ+ with those who are heterosexual.

“For me [the CIHR funding] changes everything. It gives us a real vote of confidence for an area of research that 40 years ago would not be possible,” he said.



**DR. NEELOFFER MOOKHERJEE,
ASSISTANT PROFESSOR,
UNIVERSITY OF MANITOBA,
DEPARTMENTS OF INTERNAL
MEDICINE AND IMMUNOLOGY**

Nearly four million Canadians suffer from asthma. While there are various treatments available, this chronic disease remains costly both in human and economic terms. Like Alzheimer’s disease, the prevalence of asthma differs between females and males. Prior to puberty, asthma is more common among boys than girls, but thereafter women are approximately twice as likely to develop asthma, and their attacks are often more severe than men. Additionally, women are more likely to develop resistance to steroidal treatments.

This sex divide is what interests University of Manitoba immunologist Dr. Neeloffer Mookherjee. She noted that the differences between the sexes have largely been ignored in the development of drug therapies for asthma.

“It’s a big problem,” she told Mind Over Matter®. “Our immune

systems are wired differently, and we need to understand how.”

With her CIHR Chair funding, Dr. Mookherjee will be exploring therapies based on molecules called “host defence peptides,” which are part of the human immune system. She will be studying the differences in how these peptides work in females and males. Her goal is a deeper understanding of asthma, which could ultimately lead to new therapies based on synthetic peptides, which could both fight infection and control airway inflammation.



**DR. JENNIFER BAUMBUSCH,
ASSOCIATE PROFESSOR,
THE UNIVERSITY OF BRITISH
COLUMBIA SCHOOL OF NURSING**

We know that women develop dementia far more frequently than men and that most caregivers are also women. Emerging research indicates that the gender divide might be even broader, and that women and men dealing with dementia might not receive the same levels of care and support in the community.

Dr. Jennifer Baumbusch, Associate Professor at the University of British Columbia School of Nursing, believes that those differences should be more deeply explored.

“We need to address the implicit bias in the system so that people have more equitable access to services and supports in the community,” she said.

Dr. Baumbusch noted that there is evidence that male caregivers access community support services earlier than their female counterparts, and that there is a perception that women might be in need of more assistance, growing out of an ingrained attitude that women are more “natural” caregivers.

For her project, Dr. Baumbusch is recruiting study participants in pairs: individuals with dementia and their caregivers. They will be interviewed over several years to better capture their lived experiences. Coupled with her analysis of broader databases of people who have sought community support services and care, she hopes that her findings can help develop policies that better meet the needs of all.



**DR. JEFFREY MOGIL, E.P.
TAYLOR PROFESSOR OF PAIN
STUDIES, MCGILL UNIVERSITY**

Dr. Jeffrey Mogil’s studies of sex differences traces back to the beginning of his —→

research career to a project where he discovered a difference in the way a drug interacted with the sex of his subjects. When he pointed this out to the post-doctoral fellow leading the project, he recalls the response was “Oh great, now you’ve taken a simple thing and made it complicated. Forget about the sex difference. We’re here to study a drug.”

Fortunately, Dr. Mogil did not listen to this advice and has been studying sex differences in pain ever since. Now, the E.P. Taylor Professor of Pain Studies at McGill University is currently leading a study into the differences in how chronic pain and fatigue affect female and male lab mice. As with so many other scientific fields, the research has traditionally tended to focus on males, which has led to treatments that sometimes did not work on females.

While the way women and men feel pain may be similar, Dr. Mogil says that it is processed differently, arriving at the brain through different biological circuits. Accordingly, treatments to block pain must take into account the differences between the sexes in order to be effective.

“It’s critically important,” Dr. Mogil noted. “It’s really nice to see that the scientific establishment, the funders, have caught up to admitting and rewarding the importance of this sort of thing.”



**DR. SHANNON DUNN, SCIENTIST,
UNITY HEALTH TORONTO, ST.
MICHAEL’S HOSPITAL**

It is a scientific detective story: trying to uncover why women develop certain diseases far more than men. With lupus, it is a nine-to-one ratio, for multiple sclerosis (MS), it is a three-to-one ratio. For immunologist Dr. Shannon Dunn, there is a personal motivation in the search for answers. Her mother had MS and she knows intimately its devastating impact. Canada has the highest rates of MS in the world, and there is currently no cure for this chronic disease.

Dr. Dunn, an immunologist based at Toronto’s St. Michael’s Hospital, is studying mice, whose immune systems are similar to humans. She is searching for clues within the animals’ immune systems, trying to get to the source of the differences between the sexes.

“The hope is that studying the biology of MS risk we can better understand how the disease gets started and if so, then we can talk more about prevention,” she explained.



**DR. VIKKI HO, ASSISTANT
PROFESSOR IN THE SCHOOL OF
PUBLIC HEALTH, DEPARTMENT
OF SOCIAL AND PREVENTATIVE
MEDICINE AT UNIVERSITÉ DE
MONTRÉAL**

Dr. Vikki Ho made a career choice with a clear mission.

“I’m a cancer epidemiologist because I want to prevent cancer from occurring in the first place,” said the Assistant Professor at the Université de Montréal’s School of Public Health.

Studying sex differences is a pathway towards that goal. We know that men develop colon cancer more frequently than women. Additionally, there is evidence to suggest that post-menopausal women who undergo hormone replacement therapy may be protected from developing colon cancer. This has led Dr. Ho to explore the role of hormones and, more specifically, whether workplace exposures to chemicals that disrupt the hormonal system might help to explain the disparity between the sexes.

Ideally, she hopes to identify risk factors that can inform and improve workplace regulations.

“Theoretically, everything that we’re exposed to in the workplace should be preventable. People shouldn’t be going to work to then subsequently get cancer.”



**DR. PADMA KAUL, PROFESSOR
IN DEPARTMENT OF MEDICINE,
UNIVERSITY OF ALBERTA**

While heart disease is the leading cause of death for both sexes, the prevalence is much higher in men. However, when a woman develops type 2 diabetes, her so-called “natural advantage” disappears and she is just as likely to develop heart disease as a man.

What is less well known is whether there is a disparity between females and males in screening rates for diabetes. Dr. Padma Kaul hopes to answer that question as part of her CIHR-funded project. The Professor in the University of Alberta’s Department of Medicine is creating a vast database called “REDISCOVER,” which will track residents of Alberta (more than four million people) over a ten-year period starting in 2008.

Using those numbers, Dr. Kaul plans to explore the issue from three perspectives. First, she hopes to determine whether there is a disparity in screening rates for diabetes between females

and males. Second, she will examine the relative levels of A1C (the common diagnostic test for diabetes) to see what they reveal about the risks for heart disease. And lastly, she will study the differences in the prescription of new diabetes drugs in women and men and their impact on heart disease outcomes.

“These kinds of research studies can help develop a learning health system, where health data are analyzed to generate new knowledge, and which, when applied back into the system, can improve the patient experience and health outcomes,” said Dr. Kaul. “By promoting these kinds of research studies, I think we can improve the patient experience and make sure that the system is not systematically biased.”



**DR. MENG-CHUAN LAI,
CLINICIAN SCIENTIST AT THE
CENTRE FOR ADDICTION AND
MENTAL HEALTH**

One of the many mysteries about autism spectrum disorder (ASD) is the disparity between the sexes, with males three to four times more likely to develop ASD than females.

“There must be several factors contributing to the disparity. The tricky point is that we still don’t know what they are,” said Dr. Meng-Chuan Lai, a Clinician Scientist at the Centre for Addiction and Mental Health.

He suspects that there may be an under-recognition of autism and other neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD) in women. Dr. Lai noted that even women and girls presenting similar characteristics are less likely to be diagnosed with autism than men. That is why he is taking a hard look at the diagnostic process.

Adding to the complexity of the subject is increasing evidence that transgender or gender-diverse individuals have higher rates of autism, although little is currently known about neurodevelopmental disorders in this cohort.

Dr. Lai hopes to recruit 300 individuals in his study over the next four years - a group that is balanced across sex and gender identities. The participants will undergo behaviour assessments and neuroimaging scans, with the goal of achieving what he describes as a better sensitivity and recognition of neurodevelopmental disorders across different sexes and genders.

“The goal is to achieve more equitable assessments, more inclusive

care, and a better understanding of how to recognize and support people with neurodevelopmental conditions across sexes and genders.”



**DR. ANNE KLASSEN,
PROFESSOR IN DEPARTMENT
OF PEDIATRICS, MCMASTER
UNIVERSITY**

The medical profession has increasingly come around to the idea that patients need to be asked how they feel about the outcome of the care provided. But the questions that are asked matter, and there must be an appropriate system of measurement in order to be effective.

Dr. Anne Klassen, a Professor in McMaster University’s Department of Pediatrics, specializes in developing such studies as part of her research in health outcomes. She has worked on projects surveying patients who have undergone reconstruction or plastic surgery: women with breast cancer and children with cleft palates.

For her CIHR-funded project, Dr. Klassen is focusing on an under-explored area: children undergoing gender-affirming health care. She has already started a similar project for patients over the age of 16. Now, she is turning her attention to those between the ages of 8 and 16. Healthcare providers have been asking for outcome measurements for this cohort, given an increasing demand for treatment.

She and her team plan to conduct in-depth interviews with approximately 50 patients, half in Canada and half in the U.S., with specific questions relating to this type of care.

“Healthcare providers who use these kinds of instruments are able to improve their care,” explained Dr. Klassen. “This is an area that’s important and growing and can make a difference. It incorporates the patient’s perspective.”



**DR. WENDY ROBINSON,
PROFESSOR IN THE
DEPARTMENT OF MEDICAL
GENETICS, UNIVERSITY OF
BRITISH COLUMBIA**

Dr. Wendy Robinson is going where few researchers have gone before in exploring differences between the sexes: to the period before birth. —>

“Not much is known because it hasn’t been studied a lot,” she said.

The Professor in the University of British Columbia’s Department of Medical Genetics is interested in the placenta and how it affects the growth and development of the fetus. We already know its importance, given that it delivers nourishment and protects from infection. We also know that male fetuses are at greater risk of complications, such as a pre-term birth. Dr. Robinson will largely use existing data to study why males are more susceptible while in utero.

She hopes the results could ultimately lead to new treatments or better predictions of long-term health outcomes, but she says a better understanding is important in and of itself.

“The role of sex on disease risk has been ignored and I want to bring attention to the fact that males and females are different from the point of conception. If we can understand what causes greater risks in utero, then we can gain greater insight into these processes.”



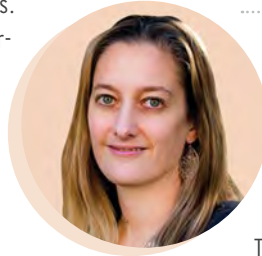
**DR. KARINE BERTRAND,
PROFESSOR IN THE
COMMUNITY HEALTH SCIENCE
DEPARTMENT, UNIVERSITÉ DE
SHERBROOKE**

In her experience helping individuals dealing with drug addiction, psychologist Dr. Karine Bertrand has noticed differences between the sexes. Women are less likely to seek professional treatment, partly because of stigmatization, partly because of guilt - particularly if they are pregnant or a parent. The Professor in the Community Health Science Department at the Université de Sherbrooke wants to break down the barriers and help craft programs that meet the specialized needs of women.

“We want to find better ways of reaching women so they’ll seek treatment,” she said.

Dr. Bertrand and her colleagues hope to conduct intensive interviews with approximately 130 people in the province of Québec, as well as in France and Belgium, which will include individuals dealing with addictions and service providers. Her team is also making a point of speaking to individuals who identify as trans or other genders. Part of the project is to create a team of experts to advise on how to improve services.

“The ultimate goal is to transform practices in order to reduce inequities among women and gender minorities and to transform services.”



**DR. KATE SHANNON,
PROFESSOR OF MEDICINE,
UNIVERSITY OF BRITISH
COLUMBIA**

The crisis that we are currently experiencing with the COVID-19 pandemic has exposed serious gaps in the health system. Dr. Kate Shannon, a Professor of Medicine at the University of British Columbia and Executive Director of the Centre for Gender and Sexual Health Equity, is exploring one of those gaps: access to gender-transformative and equitable sexual health care for youth and young women. Dr. Shannon noted that there are many social and structural barriers to accessing safe, non-judgemental sexual health services, including contraception, sexual violence prevention, and sexually transmitted infection (STI) care. The cost can be prohibitive. For youth in more rural and remote communities, even with access, confidentiality can be a major barrier. Our current understanding of intersecting barriers for diverse youth across gender, race, sexuality, and socio-economic factors remains limited and critical to building more equitable and youth-centred sexual health care models.

Drawing on feminist participatory-action research, in partnership with youth co-researchers and community and academic partners, Dr. Shannon’s team proposes to interview over 300 cisgender and transgender youth, as well as young women and non-binary youth between the ages of 15 and 29 years over the next five years, in order to document their lived experiences and to inform youth-centred and equitable sexual health care models.

“The ability to bring diverse youth and young women’s voices to the development of sexual health care guidelines is critical to meeting the goals of gender-transformative care models and urgently needed as we continue to see gaps in equitable youth sexual health,” she said.



**DR. ELIZABETH RIDEOUT,
ASSISTANT PROFESSOR IN THE
DEPARTMENT OF CELLULAR
AND PHYSIOLOGICAL SCIENCES,
UNIVERSITY OF BRITISH
COLUMBIA**

At first glance, it may seem that human beings have little in

common with a flying insect that reaches its full growth at about two millimetres in length. But the breed of fruit flies known as drosophila are astonishingly similar to individuals in one key area: the genes that control insulin production. Dr. Elizabeth Rideout is using that commonality to learn more about how insulin is produced and how it acts in our bodies.

Dr. Rideout, an Assistant Professor in the University of British Columbia's Department of Cellular and Physiological Sciences, is particularly interested in the differences between females and males. Men are more prone to diabetes, the disease caused by abnormal production of insulin. Through the dissection of tiny fruit flies, she is able to study the genes that control insulin production.

"Ultimately my goal would be to study some of these genes in humans, but it's a step-by-step process," she said. "Flies can help us take the first steps in understanding why men and women differ in the risk of developing diabetes. Also, we may find some new genes that affect insulin production, potentially leading to new therapies."



DR. GRETA BAUER, PROFESSOR OF EPIDEMIOLOGY AND BIOSTATISTICS, WESTERN UNIVERSITY

The COVID-19 pandemic has already provided several potential lines of study for sex and gender researchers. There are outstanding questions as to why men seem to be suffering more serious effects from the virus while at the same time the outbreak has shown that women are at a greater risk of exposure, given that they dominate the ranks of long-term care workers, nurses, and other frontline health care staff.

Dr. Greta Bauer's CIHR-funded project is aimed at helping researchers do their jobs better when exploring these types of issues.

"What I'm trying to do is to create tools for researchers to use in their work and to make their lives easier," she said.

The Professor of Epidemiology and Biostatistics at Western University hopes to improve the methodology in an approach entitled "Sex and Gender Based Analysis Plus" or "SGBA+." This involves helping researchers better measure the dimensions of sex and gender differences as a first step towards understanding why those differences are happening. The "plus" in SGBA+ means that scientists should not only

analyze the differences between women and men, but also go deeper and study how and why the numbers may vary among different groups in society.

"It's really important to push this area in terms of the science so we can figure out what's driving health differences," said Dr. Bauer.



DR. MARIA NATASHA RAJAH, PROFESSOR IN THE DEPARTMENT OF PSYCHIATRY, FACULTY OF MEDICINE, MCGILL UNIVERSITY

Memory loss associated with Alzheimer's disease is devastating for both women and men, but the path to get there may differ between the sexes. Their brains may decline in different ways and may use different mechanisms to cope with the loss.

Dr. Maria Natasha Rajah of McGill University and the Douglas Research Centre will be scanning the brains of more than 400 study participants in search of those differences. The Professor in the Department of Psychiatry noted that this research could provide important clues as to why more women than men are diagnosed with late-onset Alzheimer's disease (AD).

The participants will undergo magnetic resonance imaging (MRI) brain scans to measure brain structure and brain activity, both at rest and during task performance. Dr. Rajah and her team will also take blood measurements to examine endocrine functions and will also, through genotyping, determine whether individuals have the protein APOEε4, which is the strongest genetic risk factor for AD.

Using novel machine learning and connectivity methods, the researchers will look for sex and gender differences in the effect of age on memory-related brain structures and their function. They will then examine whether these effects interact with endocrine function and differ by AD genetic risk.

"Memories are a complex process. There are a lot of reasons people show memory decline with age and so we want to tease out if it's the same reason in women and men, so we could do more targeted prevention for the two sexes," said Dr. Rajah. 🌐



THE NEXT STEP

DIVERSITY IN WOMEN'S BRAIN HEALTH RESEARCH



When researchers visited First Nations on Manitoulin Island to learn about Indigenous perceptions towards dementia, they discovered a fundamental challenge: the Anishinaabe language has no single word for dementia. The study, led by Dr. Kristen Jacklin in 2013, also noted that cognitive tests used for non-Indigenous people did not work very well in First Nations. For instance, one questionnaire asked a participant to name all of the words that he could remember that start with the letter “F.” Dr. Jennifer Walker, an Associate Professor and Chair in Indigenous Health at Laurentian University, chuckles as she tells the story.

“English was their second language and there’s no sound for “F” in their language, so they couldn’t for the life of them come up with a word that starts with the letter “F”... except for one, which wasn’t appropriate to say,” said Dr. Walker.

FIRST NATIONS HAVE REGULARLY BEEN THE SUBJECT OF RESEARCH PROJECTS THAT FLOUNDERED BECAUSE OF A FAILURE TO CONSIDER CULTURAL DIFFERENCES.

Dr. Walker, a member of the Haudenosaunee First Nations, is working to improve the methodology, to ensure that the voices of elders and community members are heard, respected, and incorporated.

She is currently leading the Indigenous Team and Cross-Cutting Program within the Canadian Consortium on Neurodegeneration in Aging (CCNA) and is working on a project that aims to get a better understanding of the prevalence of dementia in First Nations. She suspects that Indigenous people as a group have been underdiagnosed, because they do not have access to services, and that those who do get tested may be overdiagnosed because participants responded poorly in tests that were culturally biased.

“It’s important for researchers to work in service to the community. When there’s no community level consent, then it violates the sovereignty of those nations. It’s so central that we develop those projects in collaboration with the community,” said Dr. Walker.

It speaks to a broader conversation that is emerging within the scientific community - the importance for research projects to recognize the vast diversity of human beings. There has been a growing awareness that scientists investigating conditions such as dementia must explore the differences between female and male brains to try to understand why women develop diseases like Alzheimer’s more frequently than men. Considering diversity means going further, and investigating differences among various cultural groups and even differences within those groups.



DIVERSITY IS WHAT’S NORMAL. IT’S NOT JUST A MATTER OF CULTURAL SENSITIVITY, IT’S UNDERSTANDING THAT THIS IS A DIFFERENT BODY THAT MIGHT REQUIRE DIFFERENT TREATMENTS, —>

said Dr. Gillian Einstein, who holds the Wilfred and Joyce Posluns Chair in Women's Brain Health and Aging at the University of Toronto.

"There's no such thing as a generalizable body. There are always variations."

In a project supported by Women's Brain Health Initiative, Dr. Einstein and her team have focused on a particular issue for a very specific group of people: the effect of genital cutting on women who have immigrated from Somalia to Toronto and, in particular, the impact on the nervous system.

Through her team's work, it has been established for the first time that these women have a chronic pain condition, one that is unique to their life experience.

"Because you're cutting nerve and muscle, I reasoned that it affects the nervous system up to the brain, up to the cerebral cortex. And it's not just the immediate pain of the procedure, which is horribly painful. It transforms over life into a whole-body condition."

Although many people may suffer from a condition such as chronic pain, the nature, source, and experience of pain depends very much on the cultural background of the individual.

For Inez Jabalpurwala, Global Director of the Viral Neuro Exploration (VINEx) and the founding CEO of the Brain Canada Foundation, some of the most critical scientific research is being conducted around diversity.

"Providing the best healthcare to all is a diversity issue; differences in culture, sex, gender, and one's socio-economic status, as well as where one lives and the climate, are some of the potential impacts on the incidence and prevalence of diseases, how we respond to treatment, and how often we seek care. And we have intersecting identities and realities, which makes it important to design research studies and trials that are inclusive and sensitive to these differences. The more you understand that, the more rigorous your research will be, and the better likelihood that it will lead to discoveries that will be beneficial to a broader lens than just one segment of the population," she said.

Jabalpurwala said that if we look to the current example of COVID-19, while many have stated that "we are all in this together," the reality is that the impacts are being felt differently on different segments of society.



THERE ARE DIFFERENT REALITIES AND OUR RESEARCH MUST MAKE SURE WE DON'T LEAVE ANYONE BEHIND.

Dr. Maria Natasha Rajah, a Professor in McGill University's Department of Psychiatry and Canadian Institutes of Health Research Sex and Gender Chair in Neuroscience, Mental Health and Addiction, suspects that research studies that explore major issues such as dementia might be

missing the overarching perspective because they fail to recruit a sufficiently diverse group of participants. Recruitment is an endless challenge for researchers. They have tended to rely on university alumni to find participants and typically required relatively high levels of education.

"If very rigidly applied, these criteria might unknowingly bias your sample. We might be minimizing problems because we're targeting an elite group of individuals. That's why we need the diversity - we're not really getting the full picture on aging with who we're testing now," said Dr. Rajah.

In her study on sex differences, Dr. Rajah and her colleagues eased the education requirements. Instead of relying on advertisements in traditional newspapers, they posted calls for study volunteers in community centres and, as a result, recruited a more diverse population, including more immigrants. The project has been delayed by the pandemic, but she hopes that when it resumes it will deliver results that are more nuanced and more reflective of the complex realities of the population.



WE NEED TO UNDERSTAND A MYRIAD OF WOMEN'S HISTORIES AND HOW THAT RELATES TO HEALTH.

The diversity conversation encompasses not only the research subjects, but also the faces in the laboratory, with suggestions that scientists should reflect the communities they are studying.


"It's not just in who you research, but who does the research," said Dr. Rajah.


Empowering different voices can lead to projects that otherwise might never have been contemplated. In Dr. Gillian Einstein's laboratory, the researchers are launching a study of aging in transgender women, exploring the effects on cognition of long-term estrogen therapy, a project supported by Women's Brain Health Initiative.

Dr. Einstein noted that the idea stemmed from someone with a personal stake in the issue.

"We decided to do it because a trans woman kept coming to our office saying, 'you're studying women, why aren't you studying us?' And that study will be carried out by a trans woman."

It goes further even within broad cultural groups. Although Dr. Jennifer Walker's background is Indigenous, she is acutely aware that her experience coming from southern Ontario may be vastly different from someone born in a First Nation in the far north.

"It's honouring what a person is and where that person comes from. And really trying to think about a person's context when we engage them in research. I think it's really important and I'm glad people are thinking about it." 



TAKE A BREAK

THE BRAIN BENEFITS OF DOWNTIME

Do you feel overwhelmed or too busy to stop and give your brain a short break? Think again because you are not doing yourself any favours. It is critical to both your physical and mental health to give your brain the downtime that it needs. Not doing so can lead to long-term health risks and potentially fatal conditions such as burnout, chronic stress, and even heart disease.

“Our brains are like sponges. They can only soak up so much information before they’re saturated, then they have to dry out a bit,” said Psychologist Scott Bea, PsyD, who works out of the Cleveland Clinic. “Your brain needs a rest now and then. —>

Research has found that taking breaks can improve your mood, boost your performance, and increase your ability to concentrate and pay attention.”

WHAT COUNTS AS DOWNTIME?

What many consider “free time” (e.g. time away from children, work, and homework) is not necessarily “downtime.” So, how do you tell the difference between the two, especially when you are trying to maximize the brain-boosting effects of downtime?

IF YOU ARE PROCESSING INFORMATION, THEN YOUR BRAIN IS WORKING (AS OPPOSED TO RESTING).

Interestingly enough, taking a vacation is not necessarily considered downtime. Vacations do not always make you feel more relaxed, particularly for those that continue to check their emails, book themselves on nonstop excursions, or bring numerous materials to read. What can make you feel more relaxed are those experiences that do not require travel or that can be done closer to home - the new “staycation.”

Downtime does not necessarily mean simply unplugging from digital devices either (although it can certainly help).

DOWNTIME INVOLVES MAKING SOME VALUABLE CHANGES IN YOUR DAILY ROUTINES AND A CONCERTED EFFORT TO MAP OUT PERSONAL BOUNDARIES – ON YOUR TIME (PARTICULARLY IN THE EVENING AND ON WEEKENDS) AND WITH FAMILY AND FRIENDS.

It is interesting to note that daydreaming not only lights up your brain areas that handle routine daily activities, but also activates the executive network of your brain, where complex problem solving happens. Giving your brain a much-needed break allows these higher-function areas to rest and work on more weighty tasks at a later time.

UNPLUGGING

Now more than ever, people seem to be tied to their smartphones. The increased demands for remote work environments have made digital dependency a significant challenge. It is no longer just the younger generations who are incapable of unplugging.

DOWNTIME CAN BE BEST ACHIEVED BY ENGAGING IN “MINDLESS” TASKS THAT REQUIRE YOUR BRAIN TO DO LESS, INCLUDING THE FOLLOWING:

- ✓ DAYDREAMING
- ✓ MEDITATING
- ✓ NAPPING
- ✓ MOWING THE LAWN, WEEDING, PLANTING, AND OTHER YARD-WORK ACTIVITIES
- ✓ RUNNING, WALKING, CYCLING, SWIMMING, AND OTHER INDEPENDENT EXERCISES
- ✓ CLEANING, VACUUMING, AND DUSTING

THE FOLLOWING ACTIVITIES REQUIRE THE PROCESSING OF INFORMATION:

- ✗ VISITING FRIENDS
- ✗ TALKING ON THE PHONE
- ✗ DOING PUZZLES AND CROSSWORDS
- ✗ READING BOOKS AND/OR MAGAZINES
- ✗ SCROLLING THROUGH EMAILS AND/OR SOCIAL MEDIA ON YOUR SMARTPHONE OR COMPUTER

Whether you are on your smartphone casually on the couch or while lying in bed, or sitting at your desk looking at your laptop, staring at a light-radiating device serves as stimulus to your brain, in addition to processing information.

According to Dr. Shimi Kang, a Vancouver-based psychiatrist, evidence suggests that when people do not have their smartphones on (as opposed to simply having them in their pockets), they engage in deeper, more meaningful conversations. Even when individuals are not actively checking their smartphones, merely knowing that they are in close proximity leads to distracted, lower-quality interactions.



IF YOU'RE EVEN WONDERING ABOUT WHAT MIGHT BE HAPPENING ON YOUR PHONE - EVEN IF YOU DON'T LOOK - YOUR BRAIN IS MULTI-TASKING. THE REASON WHY WE HAVE BETTER CONVERSATIONS WHEN THE PHONE IS TURNED OFF IS THAT WE ARE MOST EFFICIENT WHEN WE ARE FOCUSED ON ONE THING AT A TIME.

One of the added values of downtime is that it can increase productivity. As Dr. Kang explains, it is in a state of "relaxed wakefulness" (i.e. when we are awake, but not engaged in any particular task) that our best thinking occurs. "That's why for many people the 'a-ha!' moment comes when they're taking a stroll, staring out the window of a moving vehicle, or having a bath. Downtime is often when we perform our finest problem solving, come up with the best ideas, and reflect about our interactions and relationships with other people."

NAPS AS A FORM OF DOWNTIME

Some companies are such strong supporters of the benefits of downtime for one's brain health that they have designated areas for naps and daydreaming in the workplace. Some even offer incentives for employees promoting practices such as meditation and mental wellbeing to encourage brain downtime.

The most notable and early adopters of this practice was Google, which created "sleep pods" in the workplace for its employees - private high-tech beds encased in darkness with built-in sound systems for those that prefer soft music while they relax.

Google is not the only business to invest in a better-rested workforce. Nike's headquarters in Portland, Oregon also offer naps for downtime, and Ben & Jerry's has had a nap room at its headquarters for more than a decade.

Dr. Rita Aouad, a Psychiatrist and Sleep Specialist at Ohio State University, noted that research has shown that



A NAP OF ABOUT 20 MINUTES IN THE AFTERNOON HAS A POSITIVE EFFECT ON ATTENTION, VIGILANCE, MOOD AND ALERTNESS.

A 2008 study published in *Behavioural Brain Research* found that napping (compared with caffeine) improves verbal memory, motor skills, and perceptual learning. →



SLOW DOWN TO SPEED UP (ESPECIALLY IN A PANDEMIC)

Our relationship with time (and, particularly, downtime) as a result of the Coronavirus pandemic has been a growing concern. As the early days of self-quarantine melded into each other, it was easy to forget what day of the week it actually was, because it often did not really matter. For many, it seemed as if we had nothing but downtime on our hands.

Now, with a better understanding of what qualifies as “downtime” (i.e. when our brains are not processing information), we can admit that our experiences during the pandemic were anything but that. In many cases, the time during the pandemic has been overwhelmingly filled with stressful moments (at varying degrees) and a significant amount of information processing. In essence, our brains never stopped working.

More often than not, one can work through short-term stressful situations, but over time constant stress can have a significant debilitating impact. Stress creeps up on us through gradual bad habits like not eating properly, not exercising, not going outside, watching too much television, and not getting enough sleep. This can make it difficult to recognize when we are actually relaxed. While we might think that we are getting downtime, our brains are still processing and in a constant “go mode,” and we cannot perform at our best in a constant state of stress - which is what the day-to-day global pandemic brought with it for many, identifying the need for brain downtime even more.

Toronto-based Scientist and Performance Physiologist Dr. Greg Wells has built a career as a researcher, scientist, coach, and high-performance physiologist studying how the human body

works. “I have dedicated my life to using science as a tool to help us understand the complexity of the human body and find simple changes that people can make in their lives to create dramatic health and performance improvements.”

BASED ON HIS RESEARCH AND EXPERIENCE, DR. WELLS RECOMMENDS THAT WE NEED TO "SLOW DOWN TO SPEED UP."

Dr. Wells is also the CEO and founder of Wells Performance, a global consulting firm that seeks to help organizations and their employees get healthy, perform optimally, and reach their potential. Dr. Wells works with high-performing individuals, including Olympic athletes and global corporate executives.

“Sure, there are times when driving hard is key. But those moments can’t happen without rest and relaxation,” said Dr. Wells. “What’s more, knowing how to step back will enable you to achieve peak performance when a big moment comes along. It also fosters optimal health and longevity.”

His research translates complex science about brain waves, activation pathways, and mind-body connections into usable techniques. Some of his key findings include:

- Slow down to speed up, because your brain was not designed to be in constant go mode;
- Constantly driving yourself undermines your performance and health;
- Rest and relaxation are critical for peak performance and optimal health; and
- There are five different brain states, each with a distinct function: recovery, learning and strategic thinking, focused execution, creativity, and peak performance. By intentionally triggering these brain states, you can achieve your potential. 🧠



SERENITY NOW

HELPFUL WAYS TO DESTRESS

STRESS IS AN INEVITABLE PART OF LIFE BUT CAN BE DETRIMENTAL TO YOUR HEALTH WHEN IT IS AT CHRONIC LEVELS FOR LONG PERIODS OF TIME. GIVEN THE SERIOUS CONSEQUENCES OF PROLONGED STRESS ON YOUR BODY AND ON YOUR BRAIN, BOTH WOMEN AND MEN NEED TO SEEK OUT HEALTHY WAYS TO DESTRESS. WHILE NOT AN EXHAUSTIVE LIST, THE FOLLOWING ARE SOME OF THE BEST WAYS TO HELP ALLEVIATE YOUR STRESS.



MINDFULNESS MEDITATION

Find your zen with mindfulness, even if it is just for a few minutes a day. Mindfulness is simply a form of meditation that involves bringing your attention to the present moment and noticing sensations and thoughts as they arise, alleviating both anxiety and stress.

DEEP BREATHING

Deep breathing helps to slow yourself down and regain your composure. Taking controlled inhales, and then slow, steady exhales, is physically relaxing and helps to release feelings of anger and fear.

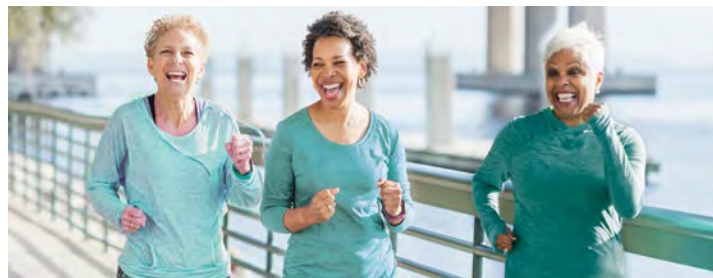


JOURNALING

Writing down your feelings is a great way to analyze emotions rationally and objectively. It clears your mind and helps you process complex issues. Mindful writing can help you track your mood and energy level and helps to reduce your anxiety.

EXERCISE

You do not need to run for miles to enjoy the stress-busting benefits of exercise. Moderate-paced walking can reduce tension and anxiety, in addition to providing a number of other health benefits.





LISTENING TO OR PLAYING MUSIC

Music can be medicine for your mind, with benefits ranging from memory improvement to stress relief. Research suggests that listening to music reduces anxiety, blood pressure, and pain, as well as improves sleep quality, mood, mental alertness, and memory.

CREATIVITY

Pick up a pen or a paintbrush, start small, and let your creative power run wild. Creative activities are therapy for the mind, relieve stress, renew brain function, and improve our mood.



HOBBIES

The next time that you feel bored or stressed, skip spending time in front of a computer or television screen and pick up a hobby such as gardening, photography, cooking, or volunteering to make some significant improvements to your wellbeing.

PETS

Pets calm us down, boost our immunity, improve our heart health, keep us moving, and enhance our social life. Being present and engaged with your pet helps to take your mind off of the issues that are troubling you.



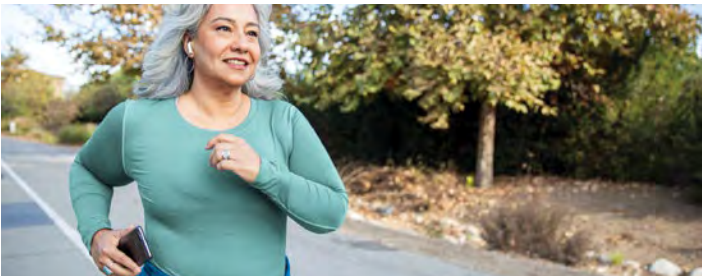
NATURE

Exposure to nature is not only enjoyable, but can also help us improve our focus and ability to concentrate, all while reducing our stress. If you do not have time to get outdoors, houseplants and flowers are a great way to bring nature indoors.

RELAXING YOUR TONGUE

People often hold tension in their tongue without being aware of it, and when we are stressed, many of us manifest this tension by pressing our tongue against the roof of our mouth. Relaxing your tongue helps release stress, and also can help you fall asleep faster.



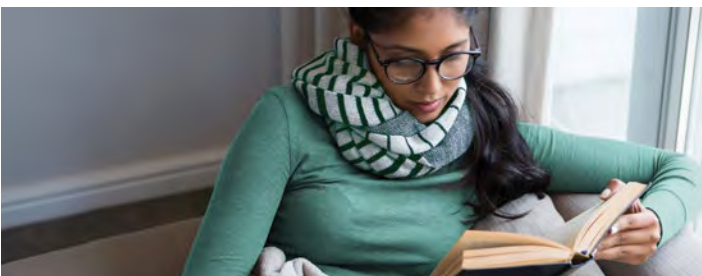


RHYTHMIC ACTIVITIES

Walking, running, or rowing are great rhythmic activities. These repetitive movements readjust your focus and relieve stress. You can also drum on a table with your hands or a couple of pencils.

PROGRESSIVE MUSCLE RELAXATION

Practice tensing and then releasing each of your muscle groups such as your neck or shoulders to release tension. If your body is physiologically relaxed, then it is more difficult for you to be stressed.



READING

Reading can actively engage the imagination, providing an escape from life's everyday stresses, at least temporarily. It really does not matter what you read - one study found that if you read six minutes a day, you might lower your stress by as much as 68%!

MASSAGE

A good massage may boost your brain by triggering the relaxation response, slowing the breath, and causing a dip in blood pressure, heart rate, and the hormones that can cause stress. Massage can also modulate serotonin to combat anxiety and depression.



AROMATHERAPY

Aromatherapy is the use of naturally extracted aromatic essential plant oils to promote physical, mental, and spiritual health. Scents can lift your mood and help you feel calmer and more energized.

BATH OR SAUNA

The warmth of a bath or sauna stimulates blood circulation, which helps total relaxation of the body and the mind. Ensure that you drink at least one full glass of water before and after taking a hot bath or using a sauna in order to avoid dehydration.



IN THE CARDS

THE 2020 STAND AHEAD® CHALLENGE



In the early days of the pandemic lockdown, Laura Tramontozzi (like many of us) found herself with extra time on her hands. An optometrist from Bolton,

Ontario, her office was closed for months, and she and her friends would play endless games of cards to help pass the hours. The experience unexpectedly inspired this year's Stand Ahead® Challenge in celebration of the second annual Women's Brain Health Day.

Tramontozzi already knew about Women's Brain Health Initiative (WBHI), but it was her fiancé's sister who told her that there was a call for new ideas for this year's Stand Ahead® Challenge. The inaugural challenge in 2019 asked participants to do a headstand (if they could do so safely), make a charitable contribution, and to post a message on social media about brain health. It was both a fund-raising and awareness-building initiative, as well as a huge success.

This year, WBHI reached out to the public for suggestions on a new challenge, a challenge that would inspire a wider audience to donate to support the work of WBHI.

"My fiancé's sister said we should come up with a challenge," said Tramontozzi. "We were sitting down, playing cards, trying to think of everything under the sun."

While playing several rounds of the Italian card game *scala quaranta* (similar to rummy), they began to brainstorm ideas related to memory when Tramontozzi had a thought: what about trying to remember a series of cards after being shown them for a few seconds?

After experimenting with a few variations (some more difficult than others), Tramontozzi came up with the concept of examining seven cards for ten seconds, and then turning them over and trying to guess the cards that they saw. Participants do not need to recall the suit of the card, but instead must try to remember the number or face card. They chose seven cards because approximately 70% of Alzheimer's patients are women.

"We did it a few times and realized it's not easy and that it would be a good challenge," she said.

Tramontozzi submitted her idea to WBHI, dubbing it the "Memory Challenge," and it was selected as one of the three finalists. Demonstration videos were posted on the StandAhead.org website and supporters were asked to vote for the winner.

Her two competitors were the "Balance Challenge," which challenged participants to balance an apple on their head and walk for three metres without dropping it (submitted by Donna Maroulis from Squamish, British Columbia), and the "On My Mind Challenge,"



which challenged participants to hold a picture of a woman they love or admire above their head, and to share a few words about that person (submitted by Barbara Audet from San Antonio, Texas).

When Tramontozzi performed the challenge for her demonstration video, she was only able to guess five out of seven cards correctly, which earned her some good-natured teasing from friends and family, some of whom had already made donations to WBHI.

The night before the voting closed, Tramontozzi was sure that she would not win. So she was both amazed and excited to learn that the Memory Challenge was named as this year's official Stand Ahead® Challenge. "I was shocked! I never normally win these kinds of things," she said.

The inaugural Stand Ahead® Challenge was a sensation, with thousands of participants from across North America and Europe standing on their heads, bringing a new level of awareness to the cause of brain health, along with substantial donations to WBHI.

Brain Canada, a national charitable organization that enables and supports innovative, paradigm-changing brain research in Canada, generously offered to match all donations for women's brain health research up to \$250,000 - an amount that was quickly achieved (meaning that half a million dollars was raised!)

Earlier this year, Brain Canada announced that it will once again be matching up to \$250,000 of the funds raised through the Stand Ahead® Challenge.

"Brain Canada is committed to educating Canadians on the importance of brain health through initiatives like our partnership with Women's Brain Health Initiative," said Dr. Viviane Poupon, President and CEO of Brain Canada.

"We deeply value the important role we play as a leader in standing up for women's brain health and in enabling research focused on gender differences in brain disorders. This year's Stand Ahead® Memory Challenge is a meaningful way to highlight the need for innovative research on neurodegenerative diseases like Alzheimer's."

"Brain Canada is a valued and crucial partner in our work, including their incredible support for the Mind Over Matter® magazine. We are deeply grateful for their generosity," said WBHI Founder and President Lynn Posluns.

"It was so encouraging to see so many innovative submissions from across North America. Laura Tramontozzi's Memory Challenge will be a fun test for us all."

As we approach Women's Brain Health Day on December 2nd, WBHI is calling upon supporters - both old and new - to try the Memory Challenge, post a message on social media with the hashtag #StandAhead, challenge a friend to do the same, and make a donation to WBHI. Several philanthropists have already stepped up for 2020, including The Citrine Foundation of Canada.

On Women's Brain Health Day, WBHI will be livestreaming an event from 8:00 p.m. to 9:30 p.m. ET, co-hosted by CTV News' Chief Financial Commentator, Pattie Lovett-Reid. The event will feature some of WBHI's new series of Brain Buzz™ videos, which contain practical advice for maintaining your cognitive vitality.

It is a subject that was already close to the heart of Laura Tramontozzi, given that a close family member was diagnosed with a brain tumour. She also has witnessed many female patients at her optometry practice struggle with dementia.

"They have no control. The biggest thing to get across to their families is to work on your brain health: for example, by eating healthier foods and exercising regularly. I'm explaining it more and more to my patients and it's made me think about myself as well." 🌍

For more information about the 2020 Stand Ahead® Challenge and about events surrounding Women's Brain Health Day, check out StandAhead.org.



THE SHAPE I'M IN

JUST HOW HEALTHY ARE MILLENNIALS?



Millennials are sometimes referred to as the “wellness generation” because of their intense interest in (and spending on) wellness. With their purchases of products and services such as yoga classes, water bottles, athleisure wear, gym memberships, and health supplements, they are a major contributor to the global wellness market, which is estimated by the Global Wellness Institute to be worth US\$4.5 trillion.

Given all of their spending in the pursuit of wellness, you might expect millennials to be exceptionally healthy. However, recent research conducted by the Blue Cross Blue Shield Association on 55 million millennial Americans revealed that millennials are not as healthy as they might first appear.

The study (entitled “The Health of Millennials,” published on April 24, 2019) found that, collectively, millennials had an average Health Index score of 95.1, meaning that they were at approximately 95% of their optimal health. But a deeper dive into the data found that:

»» One-third of the millennials studied have health conditions that negatively impact their quality of life and life expectancy. The top ten conditions affecting millennials are major depression, substance use disorder, alcohol use disorder, hypertension, hyperactivity, psychotic conditions, Crohn’s disease/ulcerative colitis, high cholesterol, tobacco use disorder, and type 2 diabetes. Six of these conditions are behavioural, affecting mental health and wellbeing, while four are physical health conditions.

»» Between 2014 and 2017, millennials experienced double-digit increases in eight of the top ten conditions. The highest increases were found for major depression (31%), hyperactivity (29%), and type 2 diabetes (22%). →

MILLENNIALS, collectively referred to as “Generation Y,” are individuals who were born between 1981 and 1996.

GENERATION X is the group of individuals born after the baby boomers and before the millennials (i.e. roughly from the early 1960s to the late 1970s, with the exact years varying somewhat between researchers). For the Blue Cross Blue Shield Association study, “Generation Xers” were defined as those born between 1965 and 1980.

» Millennials are less healthy than Generation Xers were at the same age. Specifically, older millennials (those aged 34 to 36) were found to have higher prevalence rates for eight of the top ten conditions than Generation Xers did when they were that age (all except for alcohol use disorder and psychotic conditions).

» Millennials are experiencing health challenges at an earlier age than the previous generation, with the major decline in millennials' overall health starting, on average, at age 27.

» Female millennials were found to be 20% less healthy than their male counterparts, with the health difference being driven primarily by more cases of major depression, type 2 diabetes, and endocrine conditions. For example, the prevalence of major depression was 6.7 women per 100 versus 3.2 men per 100, a difference of 108%. The difference for type 2 diabetes was 138%, and for other endocrine conditions, it was 162%.

THIS STUDY PROVIDES IMPORTANT INFORMATION ABOUT TRENDS IN MILLENNIAL HEALTH, HIGHLIGHTING THAT MILLENNIALS, AS A COLLECTIVE, ARE NOT AS HEALTHY AS THEY MIGHT THINK THEY ARE, AND THEY SHOULD TAKE SERIOUS ACTION TO MAINTAIN THEIR HEALTH AND WELLBEING.

FITTER YOUNG ADULTS HAVE FITTER BRAINS

One of the best tools for maintaining good health is physical activity. This is true for individuals of all ages. A recent study examined the brain health benefits of exercise for young adults, in particular, and discovered that fitter young adults have fitter brains. The findings were published in the September 2019 issue of *Scientific Reports*.

The study involved 1,206 millennials, with an average age of 28.8 years at the time of the research. The participants' physical fitness was assessed using a "two-minute walking test," where each person would walk as fast as possible for two minutes and then the distance was measured (with longer distance being associated with higher level of physical fitness). Cognitive function was assessed using a series of cognitive tests that measured, amongst other things, memory, sharpness, judgement, and reasoning. Additionally, participants' brain structure was examined using magnetic resonance imaging (MRI) brain scans.

The researchers found higher levels of physical fitness were associated with better brain structure and higher cognitive function. In other words, individuals who walked farther during the two-minute

walking test tended to have more white matter in their brains and perform better on the cognitive tests. (Healthy white matter helps improve the speed and quality of nerve connections in the brain.)

Although the research design prevented the researchers from drawing conclusions about cause and effect, and only demonstrated an association between the variables, the findings still suggest that increasing your fitness level may lead to optimal brain structure and improved cognitive function.

"This research emphasizes the importance of physical activity during all stages of life," explained Dr. Nils Opel, Junior Group Leader in the Department of Psychiatry at University of Münster in Germany, and one of the researchers involved in the study.



EVEN YOUNG PEOPLE, WHO WOULD TYPICALLY STILL BE IN GOOD HEALTH OVERALL, MAY EXPERIENCE NEGATIVE IMPACTS ON BRAIN HEALTH AND COGNITIVE FUNCTION FROM LOW PHYSICAL FITNESS LEVELS.

So, it is important for millennials to take steps to improve their physical fitness levels.

COVID-19 CRISIS IS SHIFTING YOUNG PEOPLE'S HEALTH BEHAVIOURS FOR THE BETTER

A recent survey by VICE Media Group entitled "Youth in Pandemic: Hopes and Fears for an Uncertain Future" asked 9,360 participants between the ages of 16 and 39 from 30 countries about their health and wellness feelings and behaviours during the COVID-19 crisis. Their findings revealed that:

27% of respondents reporting an improved sleeping routine;

26% reporting starting a new exercise routine;

24% implementing a new self-care routine;

18% reporting taking new steps to balance work and home life; and

12% adding or increasing a meditation practice.

"Our findings revealed all areas of health are becoming more important to young people," said Julie Arbit, VICE's Global SVP of Insights. "With so much uncertainty in the world, they are turning inward to what they can control, their mental and physical health. They are beginning new wellness routines and the roots of behavioural change are starting to form. The way we take care of our health will be one of the most lasting, and hopefully positive, societal shifts we see coming out of the pandemic." 🌍



SECOND TO NONE

HAS YOUR BRAIN HEALTH SUFFERED DURING COVID-19 ISOLATION?

Staying socially connected is extremely important for our overall health, including our brain health. A 2019 review article published in the *Journal of Alzheimer's Disease* found that various aspects of social isolation, including low levels of social activity and poor social networks, are significantly associated with poor cognitive function in later life. The review, which looked at several longitudinal studies, found that a variety of different activities qualified as social, including participating in social groups, visiting family or friends, and engaging in cultural or leisure activities. →

In one study published in 2018 in *The Journals of Gerontology: Series B*,

THE RESEARCHERS FOUND THAT LONELINESS WAS ASSOCIATED WITH A 40% INCREASED RISK OF DEVELOPING DEMENTIA.

The study had a large sample size of over 12,000 participants, and results were adjusted for other contributing factors, such as genetics and behaviour. Additionally, the association was similar across gender, race, ethnicity, education, and genetic risk. In the study, loneliness (i.e. the subjective experience of being alone) was differentiated from social isolation (i.e. a lack of social connections).

Previous research has found that the risk associated with loneliness is independent of the number of social connections and social contact. Even among individuals who have relatively frequent social interactions and are otherwise socially connected, subjective feelings of isolation still increase one's risk of developing incident dementia.

A different study - published in *The Journals of Gerontology: Series B* in 2019 - used data from the English Longitudinal Study of Aging, which has been tracking the information of British adults biennially since 2002. The researchers found that memory levels decreased as social isolation increased. Because correlation does not imply causation (in other words, just because two things are occurring simultaneously does not necessarily mean that they are connected), it has been difficult for researchers to determine which comes first - the social isolation or the cognitive impairment.

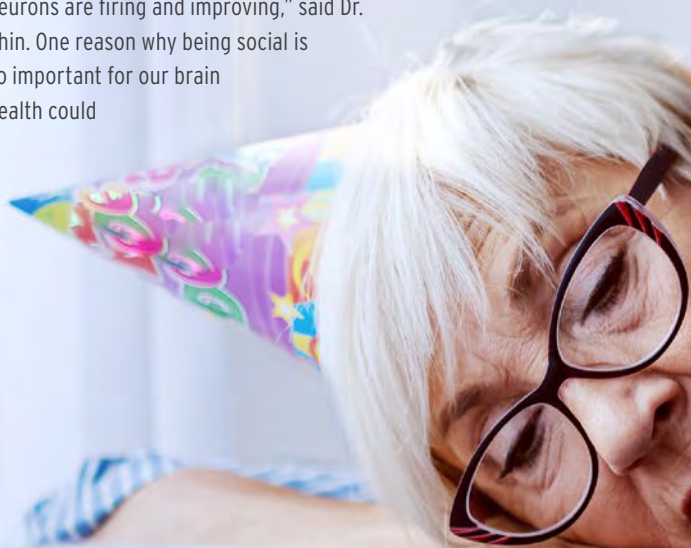
This study's key finding suggested that social isolation is what is leading to memory decline, rather than the other way around (namely, poor memory leading individuals to become isolated). Isolation, then, may be one of the instigators of cognitive decline.

WHY IS SOCIAL CONNECTION SO IMPORTANT FOR OUR BRAIN HEALTH?

"We are fearful of what the consequences are for isolation," said Dr. Nathaniel Chin, Director of Medical Services for the Wisconsin Alzheimer's Disease Research Center.

IF PEOPLE ARE ISOLATED AT HOME, THEN THEY ARE NOT ENGAGING WITH FAMILY AND FRIENDS OR PARTICIPATING IN OTHER SOCIAL OR LEISURE ACTIVITIES, AND MAY BE MORE LIKELY TO DEVELOP LONELINESS, DEPRESSION, ANXIETY, RESTLESSNESS, AND BOREDOM. THESE CONDITIONS ARE ALL RISK FACTORS FOR COGNITIVE DECLINE.

Although the science is nascent on this front, we do know that when we are engaged with others, our brains are stimulated. "We're hitting the language department of our brains. Our attention, our executive function, and the connections between neurons are firing and improving," said Dr. Chin. One reason why being social is so important for our brain health could



be evolutionary, according to Dr. Michelle C. Carlson, Professor in the Johns Hopkins Bloomberg School of Public Health in the Epidemiology of Aging Division, and one of the issue specialists on the Global Council on Brain Health's "Brain and Social Connectedness" report published in 2017.

"In order to exist at the group level, to work and to live in civilizations in large numbers like we do, we had to figure out how to cooperate and work together to get our needs met. From an evolutionary standpoint, we figured out early that working together would allow for the likelihood of success and the success of our progeny," said Dr. Carlson.

Aligning with others, getting needs met, and picking up on nonverbal cues all required (and still require) a significant amount of "brain power." Humans are built for social connection, Dr. Carlson noted, in both a large-scale sense and on a micro scale (for instance, when a baby ideally bonds with her or his parents, which occurs hormonally through oxytocin).

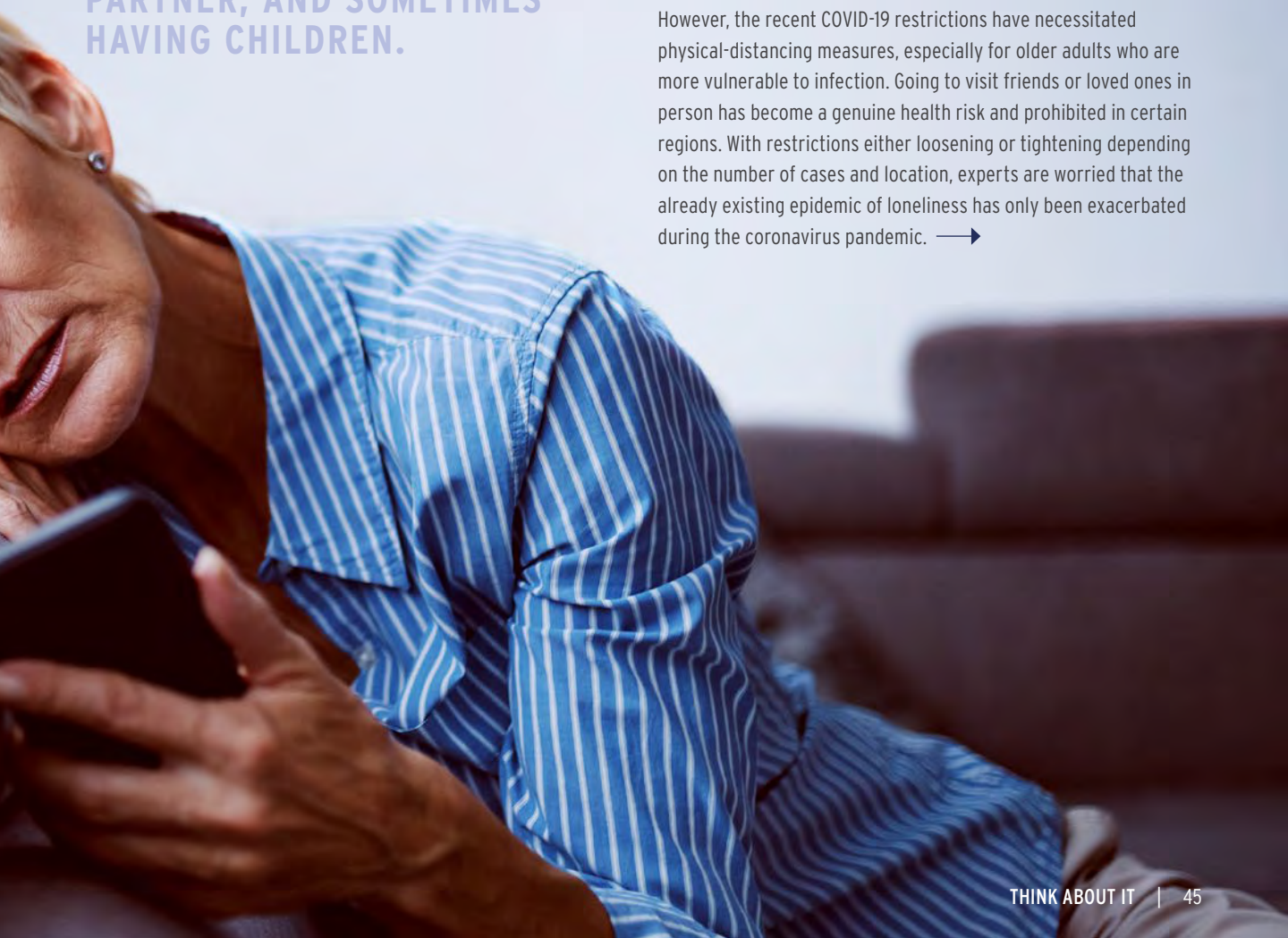
WE CONTINUE FORGING CONNECTIONS THROUGHOUT THE LIFESPAN THROUGH FRIENDSHIPS, FINDING A PARTNER, AND SOMETIMES HAVING CHILDREN.

Many of these milestones happen when we are younger, but as the influential developmental psychologist Dr. Erik Erikson has argued, the need to connect does not end in early adulthood. In the later years, age 40 to 65 and beyond, being social is "still related to getting needs met, and related to purpose in life," said Dr. Carlson.

One study conducted by Dr. Carlson and her colleagues, published in 2015 in *Alzheimer's and Dementia: The Journal of the Alzheimer's Association*, suggests that being social with a purpose is the most impactful for brain health in one's older adulthood. For example, her participants involved in Experience Corps - a program where older adults volunteer and share knowledge with underserved elementary school children - halted and in some cases reversed declines in brain regions vulnerable to dementia.

The 2017 "Brain and Social Connectedness" report offers many suggestions for developing and enhancing the quality of your social activities, including maintaining connections with younger people and teaching them a new skill, attending a cooking class, and having a weekly routine of talking to a confidant. Many of the report's suggestions, though not all, require face-to-face and in-person contact, which is considered optimal.

However, the recent COVID-19 restrictions have necessitated physical-distancing measures, especially for older adults who are more vulnerable to infection. Going to visit friends or loved ones in person has become a genuine health risk and prohibited in certain regions. With restrictions either loosening or tightening depending on the number of cases and location, experts are worried that the already existing epidemic of loneliness has only been exacerbated during the coronavirus pandemic. →



At the beginning of the pandemic, the term “social distancing” was widely used, but this phraseology was problematic because it suggested that individuals should not connect with their family and friends whatsoever (irrespective of whether or not they were doing so in safe ways). The term “physical distancing” was later introduced to address this concern, explained Margaret Eaton, National CEO of the Canadian Mental Health Association (CMHA).

“We worry about isolation even for a short while with COVID-19, that it will bring out previously undiagnosed health conditions, be that depression, anxiety, or loneliness. We also worry that it brings out persistent negative thinking. A recent study found that people who have persistent negative thoughts actually had more of the proteins [associated with] Alzheimer’s disease than others,” said Dr. Chin. Therefore, compounding a situation that promotes more negative thinking is particularly worrisome. Dr. Carlson noted that



THE ENFORCED ISOLATION OF COVID-19 IS SHOWING US HOW IMPORTANT SOCIAL INTERACTION IS – WE’RE LEARNING HOW CRUCIAL IT IS TO US WHEN WE DON’T HAVE IT.

To date, research studies have not been able to test specifically for not being social. One of the reasons it is so difficult to create randomized, scientific studies around sociality and brain health is that it is unethical to have a group of people who are required to not be social for the purposes of a study. Some researchers are jumping on the in-built example of COVID-19 social isolation for their work, so future studies may yet emerge. For example, University of Florida neuroscientists are embarking on a new study (led by Dr. Adam J. Woods) to understand the impact of COVID-19 on the cognitive, mental, and brain health of older adults, as well as the impact of social isolation.

New numbers are materializing through a national survey completed by the CMHA and University of British Columbia researchers, which found that 38% of Canadians say that their mental health has deteriorated since COVID-19, 14% are having trouble coping, and more Canadians are thinking about suicide during the pandemic than the previous pre-coronavirus survey. Those with existing mental health problems, Indigenous peoples, individuals with disability, women, low-income individuals, parents with children at home, and other vulnerable groups are particularly struggling.

“People are definitely feeling a lot more stress and anxiety because of having to be indoors,” said Eaton. Particular risk groups include older adults, children, and teenagers.

FAMILIES HAVE ALSO FELT THE PRESSURE, BECAUSE IN ADDITION TO THE PHYSICAL-DISTANCING STRESS, THERE ARE THE FINANCIAL AND JOB-RELATED CONCERNS.

“For older people or those who live alone, the distancing has been particularly hard, because we’re missing that connection with family and friends, our support groups, the people who make us feel better,” said Eaton, and it is especially problematic if individuals were already dealing with anxiety or depression. Loneliness had already been on the rise before COVID-19, with the decline of organized social groups and a noted “pandemic of loneliness.”

So, what do experts suggest you do to keep socially connected while physically distancing during these challenging times? You have probably already been Zooming, Skyping, and talking on the phone, and that is really important when you cannot go out to social groups or spend time with certain individuals in person. Dr. Chin cautions against relying too heavily on “one-directional” social platforms such as Facebook or Twitter, because they do not offer real-time engagement with another person.

Actually seeing someone on the computer screen in a Zoom or Skype call may even be better than a simple phone call (although that is beneficial as well). “There’s something about seeing and interacting with the other person that is more than the phone, and more than email,” said Dr. Chin, and he is encouraging that kind of interaction as much as possible during physical-distancing measures.

Depending on where you are and what local authorities are encouraging, you might be able to safely do physically distanced meetings with friends and/or family members outside of your bubble. For example, “find a socially acceptable and safe way to walk outdoors together,” recommended Dr. Carlson. While maintaining physical-distancing protocols, it is important for people “to engage socially as much as possible because we know that’s one of the things that creates resilience,” said Eaton. Human beings’ resilience is one of our best qualities as a species, but it does need to be nurtured for it to thrive. At some point, there will be a post-pandemic life, and, until then, help bridge the gap with being as social as possible in safe ways to see you through. Your brain will thank you. 🌐



SHARING HER STORY

DAWNA FRIESEN'S CAREGIVING EXPERIENCE

Imagine you are at the top of your field in a job that you love. You have travelled the world, seen fascinating places, and met incredible people in the public eye. You have won several awards and are viewed by hundreds of thousands of people on televisions from coast to coast every evening.

Now imagine having to give it all up to move back to your home province in order to care for your aging parents whose minds are being devastated by dementia.

That was the scenario being considered by Dawna Friesen, anchor and executive editor of Global National. Friesen had already made one career sacrifice for her parents, leaving another job that she loved - London correspondent for NBC News - to return home to Canada to be closer to their Manitoba home, stationing herself two time zones away in Vancouver rather than six in the U.K.

But as both of her parents' health deteriorated and they were placed in a long-term care facility, Friesen was faced with a difficult decision. In a telephone conversation with Mind Over Matter® from her Vancouver home, Friesen remarked, **"I think there's pressure on the daughters of parents with dementia to do a lot of caregiving. They put pressure on themselves to do it."**

In fact, Statistics Canada estimates that approximately one in four Canadians aged 15 and older (or 7.8 million people) are caring for a family member or friend with a long-term health condition, a physical or mental disability, or problems related to aging. Almost half of all caregivers (47%) reported caring primarily for their parents or parents-in-law in 2018.

Caring for parents was the most common form of caregiving reported in Canada and was particularly common among caregivers aged 45 to 64 (61%). **Many caregivers make extraordinary sacrifices - both personal and professional - and are overwhelmingly female.** Unfortunately, Dawna Friesen's story is not unique.

Friesen's parents, Henry and Vivian, were proud, hard-working

farmers from rural Manitoba, who raised three children, grew their own food, and enjoyed good health for most of their lives. Everything changed, though, following a brutally cold winter day in 2014 when Henry went out for a walk and got lost. He was found near death, horribly frostbitten, with hypothermia and had suffered a heart attack. Henry miraculously survived but was left profoundly different. He never lived at home again.

Henry's new reality brought the first heartbreaking challenge for Friesen and her siblings. Neither parent ever wanted to leave the farm, let alone move into long-term care, but there was no alternative. Because spaces were limited, and the hospital wanted to discharge him, Henry was sent to the first-available facility in Winnipeg, an institution that had a disconcerting reputation.

Henry was now nearly blind, suffering from dementia, and prone to wandering. One evening, he had accidentally wandered into another resident's room and was badly beaten. **The pain can be heard in Friesen's voice as she recounts the story.**

"It was a very difficult time for him and for us. But we had no choice; there was literally no other bed."

After another stint in the hospital, Henry had to return to that same facility for a few weeks before the Friesens managed to place him in their first-choice, long-term care home, where he lived out his final years.

Meanwhile, Vivian's memory was also deteriorating. Friesen bought a home in Vancouver with a separate suite, with the intention that her mother could live with her. However, when her mother came to visit, the extent of her decline became evident: she could not find the washroom, got lost on a walk, and resisted the concept of having homecare workers assist.

"I thought maybe she'd come around to the idea. But she was really unhappy."

That was when Friesen considered quitting her job in order to focus —→

on taking care of her parents. A trusted cousin advised Friesen to think of her own situation, a single mother of a nine-year-old son who had his own needs. In one of those wrenching decisions often faced by caregivers, she ultimately decided to stay put.

The family moved Vivian into a Winnipeg retirement home and, after some initial reluctance, she made friends and thrived for a short time. However, her condition had progressively worsened and because the home was not geared for a higher level of support, she too had to enter long-term care: the same place as her husband; the same place where her father had passed away at the age of 100; and the same place that Vivian and Henry had always told their children they never wanted to live.

They both would have hated to know that's how they'd end up.

The building was institutional, with cinder block walls and locked wards for residents at risk of wandering. But Friesen has nothing but praise for the staff.

"The carers are like angels and do exhausting work that is both physically and emotionally draining. They deserve better pay, more respect, and the patient/resident ratio needs to change radically. I don't think we place enough value on the people who do the caring for the elderly. And we're all going to end up there so we should make it a priority."

Friesen would visit her parents regularly, but it was draining, particularly as their minds and memories slipped away.

Henry was in one of the locked wards, which in and of itself was heartbreaking. "Every time that we'd visit, he'd beg me to let him out, to the point where I didn't want to leave because I didn't want him to beg. I'd get a staff member to distract him when it was time to go."

Friesen shared her parents' story in a moving documentary entitled "The Unspooling Mind," which aired on Global in 2014. Viewers could see Friesen stroking the hands of her mother and father and trying to make conversation even though there was little response. She was in tears throughout.

Although a large part of her parents was gone, Friesen said that they each retained a sense of humour and at times could be quite funny. She would play music from their youth and ask them questions.

"I found there's a process you go through, a little bit of a mourning process when you realize what's happening to your parents. The relationship changes, the dynamics change. You become more the parent, and they become the child. And you realize you can't look to them for advice or getting to know their grandchildren. Those things change and you have to kind of realize those things are never coming back."

She came to a new understanding that helped to ease the pain.

"It was more just trying to maintain some joy in the moment. It can be the start of a different kind of relationship and you have to just set aside your sadness. I think I refer to it as grieving while they're still alive. It's almost as if the person you know is gone. You grieve that and live with the person who is there."

Friesen said that guilt was a significant issue for her - never feeling as if she was doing enough to make her parents happy. She eventually learned to cope when she was able to recognize that it was not her fault that they had dementia and instead focused her energies on becoming an advocate for them to ensure they were receiving the best possible care. **Her advice to others encountering similar challenges is to be present in the moment when visiting, listen to what your loved ones are saying, and go with it - no matter how disjointed their thoughts may seem.**

"It doesn't matter that they don't get all the details right. It matters that you are with them, and in that moment, you are present and attentive. Find ways to laugh. Once you stop pushing back against the memory loss and once you stop looking for that parent you remember from your childhood, you can relax a little into what is an inevitable journey and go with them on it."

Friesen also found comfort in spending time with her son, who was only five years old when the journey with her parents began, and through the support of her close friends.

Henry passed away in October 2014 at the age of 94, and Vivian passed away in September 2016 at the age of 91.

Given the carnage the COVID-19 pandemic has wrought in Canada's long-term care homes, Friesen frequently reflects on her own parents' experiences and society's ongoing failures in caring for older individuals. She is thankful that she never had to deal with what families are currently facing now: vulnerable loved ones who are isolated for months in care homes because of pandemic lockdowns.

"We, as a society, need to have a mature conversation about how much we are prepared to invest in caring for our elders. The pandemic has laid bare the huge cracks in our system," Friesen observed.

"The conversation must be led by experts in the field, not politicians, who are captive to their four-year election cycle and can't muster the fortitude to make long-term structural changes. It needs to be as bold in thinking as was required when universal health care was conceived of in Canada." 🌍





FLOWER POWER

THE BENEFITS OF GARDENS FOR THOSE WITH DEMENTIA

Gardens have a long history of use as a tool to benefit human health and wellbeing. Horticulture - the practice of garden cultivation and management - was used to calm the senses as far back as 2000 BC in Mesopotamia. The earliest hospitals in Europe were located in monasteries, many of which had gardens that were used to provide relief to the sick.

In the U.S., in the late 19th century, some hospitals maintained greenhouses for patients to use, or encouraged other gardening and farming activities. The curative power of working with plants was instinctively understood back then, even if extensive research had not been conducted to prove its benefits.

There now exists a large body of evidence about the benefits of gardening (i.e. active interaction with plants), or even just being in a garden or looking at one through a window (i.e. passive connection). —>

INDIVIDUALS OF ALL AGES, WHETHER HEALTHY OR EXPERIENCING VARIOUS HEALTH CONDITIONS, HAVE BEEN SHOWN TO BENEFIT FROM ACTIVE AND PASSIVE HORTICULTURE ACTIVITIES.

This article will focus on the benefits enjoyed by people with dementia, in particular.

An academic review and meta-analysis published in *American Journal of Alzheimer's Disease & Other Dementias* in 2019 investigated the psychological health benefits of horticulture interventions for individuals with dementia. Twenty-three studies published up to August 2017 were included in the review, and involved a variety of interventions, including different types of garden activities, green care farms, green spaces, and therapeutic horticulture offered in care facilities. The researchers found that the studies reported a wide range of positive benefits, including lower agitation levels, improved wellbeing, less stress, increased physical and social engagement, and reduced accident frequency.

Agitation is a common behavioural and psychological symptom experienced by individuals with dementia, and it is something that can be especially challenging for caregivers to handle.

BY LOWERING AGITATION LEVELS, HORTICULTURE ACTIVITIES CAN HELP MAKE WORK EASIER FOR CAREGIVERS, WHILE SIMULTANEOUSLY MAKING LIFE MORE ENJOYABLE FOR THE PERSON WITH DEMENTIA.

In one of the studies, 82.2% of the participants agreed that being in a natural environment helped them to relax, feel joyful, and relieve emotional tension. Horticulture interventions are enjoyed by most people with dementia because the activities invite the person to watch, touch, and be close to the natural world, providing a multisensory experience that can impart a sense of responsibility and achievement.

More recently, another group of researchers examined the effectiveness of horticultural therapy in people with dementia, sharing their findings in February 2020 in *Journal of Clinical Nursing*. The researchers included 14 studies involving a total of 411 participants with dementia in their review and meta-analysis. Their review

revealed that participatory horticultural therapy was linked to improved cognitive function scores, reduced agitation levels, and higher levels of positive emotion and engagement.

The researchers noted that additional high-quality research is needed in the future to be able to draw more robust conclusions. However, the existing evidence supports the effectiveness of participatory horticultural therapy to help those with dementia experience cognitive, psychological, emotional, behavioural, and social benefits.

A group of researchers in the U.S. conducted an interesting experiment involving nursing home residents with dementia, to assess the effects of outdoor versus indoor horticulture activities on both behaviour and sleep. The researchers hypothesized that behaviour would improve in both the indoor and outdoor groups, while improvements in sleep would be found in just the outdoor group (because exposure to sufficient bright natural light is known to help with circadian rhythms and to potentially improve sleep).

The participants were assigned randomly to either the indoor or outdoor group. Sleep and behaviour were assessed during a ten-day baseline period, as well as during the intervention period. The indoor and outdoor activity programs offered similar, structured activity for one hour each day for ten days over a two-week period.

The study revealed that the outdoor group's sleep improved, as predicted. Their average maximum sleep periods improved during the intervention by over an hour, and their total minutes of sleep improved by approximately 50 minutes, compared to baseline. Unexpectedly, total minutes of sleep also improved in the indoor group.

THERAPEUTIC HORTICULTURE (TH) is a term used to describe the process by which someone may enhance health and well-being through the use of plants.

HORTICULTURE THERAPY (HT) is a more formal process that involves an actual trained therapist using plants as a tool to work with people who are aiming to achieve certain goals they have set (for example, to improve certain aspects of social, cognitive, physical, and/or psychological health and wellbeing).

Both TH and HT can be active or passive (i.e. participatory or ornamental, respectively), meaning that they can involve interacting with or simply observing/being around plants.

HORTICULTURE ACTIVITY ITSELF MAY HAVE HAD A POSITIVE EFFECT ON SLEEP, AND THAT IT IS NOT ONLY BEING EXPOSED TO BRIGHT LIGHT OUTDOORS THAT CAN HELP WITH SLEEP.

In terms of changes in behaviour, the researchers only found a significant improvement in verbal agitation in the outdoor group. However, the participants showed low rates of behaviour disturbance at baseline, which left limited room for improvement as a result of the intervention. It is also important to note that the sample was small, consisting of just 20 participants (19 of whom were male). Additional research is needed with larger samples and balanced representation of women and men. These findings were shared in 2007 in *Outdoor Environments for People with Dementia*.

Horticulture activities need to be adapted as a person progresses through the stages of dementia. What is appropriate for someone with mild symptoms is quite different from what is appropriate for a person in the late stage experiencing extensive cognitive decline and behavioural and psychological symptoms.

SINCE NEEDS AND ABILITIES WILL VARY WIDELY, AND CHANGE OVER TIME, THERE IS NO "ONE-SIZE-FITS-ALL" HORTICULTURE INTERVENTION FOR DEMENTIA.

Instead, activities need to be designed in a way to encourage as much independence as possible, while minimizing risk of failure and maximizing chances for success.

Gardening activities for early-stage dementia might look very similar to what a person would have done prior to diagnosis, perhaps with a bit of assistance. Later, as symptoms progress, the activities might shift to caring for a houseplant, interacting with a "sensory garden tub" for indoor simulation of gardening activities, or walking/wheeling through an outdoor "wander garden" designed specifically to be safe and inviting for people with dementia - at first independently and then later with assistance.

As awareness of the power of plants to help alleviate symptoms of dementia becomes increasingly widespread, more and more care homes are including outdoor spaces in their design. Hopefully, at a minimum, access to dementia-safe garden space will become a norm in all dementia-care facilities with support staff trained and available to assist in maximizing use of that space. And, ideally, horticulture interventions will expand beyond that to include innovations like care farms worldwide. 🌱

CARE FARMS: AN INNOVATIVE WAY TO CONNECT PEOPLE WITH DEMENTIA TO THE NATURAL WORLD

Norway and the Netherlands are leading the way with an innovative care approach known as "care farms," which offers ample opportunity for people with dementia to connect with nature. Starting in the 1990s, these two countries have supported and encouraged farm owners to expand beyond agricultural activities and incorporate health and social care services offered to different care groups, including people with learning disabilities, people with mental health conditions, troubled youth, and people with dementia. Care farms are beginning to emerge in other countries as well, including Germany, Austria, the U.K., Japan, South Korea, and the U.S.

Care farms serving people with dementia may provide adult day services, respite care, and/or 24-hour nursing care on a permanent residential basis. There are a wide range of health-promoting activities that a person with dementia can engage in at a care farm, depending on the particular type of farm - for example, assist with gardening (planting, weeding, harvesting, and storing), feed or visit with the animals, collect eggs, and help with meal preparation.

The environment provides a home-like setting, daily life stimuli, and chances to participate in meaningful tasks. In addition to the farmers, trained staff and volunteers are on hand and conditions are set up for safety and success - and no serious accidents have been reported to date on care farms.

"Studies suggest that care farms are very beneficial in many ways for people in all stages of dementia," said Dr. Simone de Bruin, a senior researcher at the Dutch National Institute for Public Health and the Environment and lead author of "Care Farming for People with Dementia; What Can Healthcare Leaders Learn from This Innovative Care Concept?" published in 2020 in *Journal of Healthcare Leadership*.

"Care farms provide a unique environment that supports contact with nature and animals, encourages time spent outdoors engaged in enjoyable activities, increases physical activity, promotes social interactions and healthy eating, and provides a sense of meaning in life. The non-institutional setting feels less stigmatizing; instead, a person with dementia often feels like a volunteer or employee, not a patient. This leaves them feeling recognized, understood and seen as an individual who can still make a meaningful contribution."

NOW YOU'RE COOKING!

TECHNOLOGY HELPS
INDIVIDUALS WITH
COGNITIVE IMPAIRMENTS
PREPARE THEIR OWN
FOOD SAFELY



Eating is an essential activity that provides not only nourishment, but also pleasure and an opportunity for social interaction. Most of us eat three (or more) times each day. Sometimes we dine out at restaurants, but much food preparation and consumption take place at home. The ability to plan and prepare meals is something that we may take for granted when we are young and healthy, but it can be an especially daunting undertaking for older adults who are experiencing cognitive decline.

Although it may seem at first glance that making meals is a simple endeavour, it actually requires complex cognitive capacities to handle the many steps involved - for example, thinking about what you will make, checking to see if you have the correct ingredients on hand (and perhaps making a grocery list if you need to get additional items), going to the grocery store, making sure that you have enough money to pay for those items you want to purchase, measuring ingredients, using a knife, stove, and other kitchen tools safely, cooking for the appropriate amount of time, and cleaning the kitchen.

For individuals struggling with cognitive decline, there are many potential challenges throughout the meal planning and preparation process. Some of the mistakes that might be made along the way are frustrating, but harmless (e.g. forgetting to buy the ideal spice or overcooking a dish). However, many potential mistakes can result in serious harm to the individual and/or damage to the home (e.g. walking away from the kitchen while something is cooking on the stove and possibly starting a fire, or leaving water running in a plugged sink and potentially causing a flood).

Often, when an older adult begins to struggle with any of the steps of meal planning and preparation, the "solution" is to stop her or

him from cooking altogether and have prepared meals brought to the home. While this approach does address the safety concerns around meal preparation, it dramatically reduces the person's independence, completely denying her or him access to a valuable activity that can provide cognitive stimulation, enjoyment, and a sense of accomplishment.

With some assistance, individuals with cognitive difficulties can often continue participating in meal preparation. Unfortunately, many older adults live on their own and do not have access to help every time that they need to prepare food. It is often not financially feasible or practical for caregivers or health professionals to be present multiple times each day to oversee the process, but it is possible that technology may be able to provide the frequent help that is required.

There is currently technology available to help with safety in the kitchen in simple ways, such as devices that can automatically shut off a tap that has been left running, or a stove that has been left on too long. More complex technology is in development, too.

With nearly \$200,000 in funding support from Brain Canada in partnership with the Alzheimer's Association, Dr. Nathalie Bier and colleagues have been working on a technology tool they call "COOK" (Cognitive Orthosis for Cooking) to help people with cognitive impairment plan and prepare meals independently and safely.

A national non-profit organization headquartered in Montreal, Brain Canada enables and supports innovative brain research across the country. Since 2011, it has had a major partnership with the Government of Canada, through Health Canada, which has provided \$160 million to match donations from Brain Canada's private and

non-federal partners, such as the Alzheimer's Association.

This commitment by the federal government empowers Canada to excel as a global leader in the quest to understand the brain and brain disorders.

COOK is just the latest example of how innovative research can have real world applications, even in the short term. The technology offers support on a touch-screen device that is typically placed next to the stove, providing guidance through the various tasks required to prepare a meal, while watching for and correcting any risky behaviours.

COOK uses two systems: a cognitive assistance system and a security system. The cognitive assistance system supports complex meal preparation with explicit guidance, as well as simple meal preparation without specific guidance. Complementary tools such as meal planning, grocery-list preparation, and matching spices to several types of foods are also provided. The security system collects information from sensors that monitor a variety of factors, including the temperature of the stove top, the presence of the person near the stove, and the opening of the oven door. If the system detects a critical error or dangerous situation, it can automatically turn off the stove and call for assistance.

"COOK is unique in that it provides support in two ways, helping with the cognitive aspects of cooking, as well as safety," said Dr. Bier, an Associate Professor at Université de Montréal. COOK was originally designed with (and for) people with traumatic brain injury living in a group residential setting. Since the system worked so well for them, the researchers wondered if the tool might also help other individuals who struggle with independent food preparation, like older adults.

BRAIN CANADA POWERS THE NEXT PHASE OF COOK

Dr. Bier and her colleagues began studying cognitively healthy older adults and discovered that they, too, could benefit from COOK. They then turned their attention to older adults experiencing cognitive decline. Findings to date suggest that COOK is a promising technology for older adults with mild cognitive impairment (MCI) and dementia.

The researchers first examined whether older adults experiencing cognitive difficulties could learn to use a tablet and cell phone applications and found that they could. Although this was not a direct study of the COOK technology, this research demonstrated that even with the presence of a cognitive deficit, older adults can effectively use touch-screen technology.

Next, the researchers conducted focus groups with 24 occupational therapists (OTs) to gather their opinions about COOK's potential to help older adults with MCI and dementia. In these focus groups, COOK was described to the OTs and accompanied by a video that demonstrated the technology in action. Overall, the OTs thought that COOK

had great potential to support the independence and safety of older adults experiencing cognitive decline when preparing meals. They suggested, though, that it would be a more appropriate tool for individuals with MCI (as opposed to those with Alzheimer's disease), because those with MCI have better learning abilities.

More recently, Dr. Bier and her team have begun conducting a usability study in the laboratory, which is set up like an apartment with an operating kitchen that has COOK installed. There, individuals actually prepare (or simulate preparing) a meal using the COOK technology. So far, over ten OTs have participated, and they expressed more excitement about COOK after using the technology than they did in the focus groups.

The researchers plan to have five individuals with MCI and five individuals with Alzheimer's disease, as well as six caregivers, try COOK in the laboratory as well. To further assist with finetuning COOK for adults with cognitive deficits, the researchers also conducted real-world observations of 24 such individuals in their homes and community (for example, during their trips to the grocery store). Valuable new insights were gained by evaluating the difficulties encountered during meal preparation in a residential environment, providing the researchers with greater guidance about the type of assistance required.

Once this component of the research has been completed, the technology will be further modified based on participant feedback. "The research we've completed so far suggests that COOK has strong potential to help older adults with MCI and dementia prepare meals safely in their own homes," said Dr. Bier. "Meal preparation is critical to independence, which is something that's of great importance to people as they age. Most people want to live in their own home and take care of their own needs independently for as long as possible. COOK can help with that."

COOK is still in development, but there is a good chance that the technology could be available for real-world use in the next few years. Exactly how long it will take for COOK to be widely available depends on factors beyond the researchers' control. "Our focus as researchers is on developing assistive technologies, not marketing and selling what we create," explained Dr. Bier. "We work with a not-for-profit start-up that focuses on taking technology developed by researchers and figuring out how to get it into the marketplace. How long that will take depends in part on funding. How much will the technology tool cost, and who will pay for the tool and the occupational therapist time that will be needed to teach clients how to use it? These are questions that still need to be answered." 🌐

To learn more about Dr. Bier's work, visit

https://braincanada.ca/funded_grants/assistive-technology-for-cognition-to-increase-safety-at-home/

** The views expressed herein do not necessarily represent the views of the Minister of Health or the Government of Canada.*



HEAVY ON MY MIND

OBESITY, BODY MASS INDEX, & DEMENTIA RISK

Is obesity linked to increased risk of dementia? While much research suggests yes, the answer is not entirely clear. The research findings about the relationship between obesity and dementia have been inconsistent. It appears that the answer might depend on a variety of factors such as how obesity is defined and measured, and when obesity is assessed relative to the time of dementia diagnosis.

Body mass index (BMI) is a commonly used measurement of obesity. BMI is a ratio of weight to height, calculated by dividing a person's weight in kilograms by her or his height in square metres. The resulting number is used to categorize a person as underweight, normal weight, overweight, or obese - with a high BMI number (i.e. 30 and over) representing the obese end of the spectrum.

Some research has shown that high BMI is linked with increased risk of dementia, while other research has revealed the opposite - namely, that high BMI is associated with lower dementia risk or low BMI is associated with increased dementia risk (all compared with normal BMI). Yet, other research has suggested that high BMI and dementia risk may have no association at all.

EXPLAINING THE INCONSISTENCIES IN PAST FINDINGS

One large meta-analysis, which pooled and analyzed data from 39 different studies, provides a potential explanation for the inconsistencies in past findings. In that meta-analysis, published in May 2018 in *Alzheimer's & Dementia*, BMI was assessed at baseline, at which time all participants were dementia-free. Out of the nearly 1,350,000 participants, 6,894 received a dementia diagnosis at some point during a lengthy follow-up period.

The researchers found that the association between BMI and dementia risk varied depending on how much time passed between BMI assessment and dementia diagnosis. Higher BMI was linked to increased dementia risk when BMI was measured more than 20 years before dementia diagnosis, yet the association was reversed when BMI was assessed closer to dementia diagnosis (less than ten years prior).

The researchers suggest that their findings provide new evidence for the hypothesis that the association between BMI and dementia is likely affected by two distinct processes: (1) an adverse effect of excess body fat on dementia risk; and (2) weight loss due to preclinical dementia.

"People who develop dementia may have high BMI 20-plus years before dementia onset, but then closer to the time of diagnosis may begin losing weight - a common occurrence for people with dementia that begins in the early, non-symptomatic phase - lowering their BMI, and shifting the BMI-dementia risk associa-

tion," explained Dr. Mika Kivimäki, lead author of the study and a Professor of Social Epidemiology at University College London.



OUR FINDINGS CONFIRM THE ADVERSE EFFECT OF OBESITY ON DEMENTIA RISK WHILE ALSO PROVIDING A POTENTIAL EXPLANATION FOR WHY SOME RESEARCHERS HAVE FOUND LOW BMI TO BE LINKED TO HIGHER DEMENTIA RISK.

ABDOMINAL FAT MAY PLAY A ROLE IN DEMENTIA RISK

Obesity is defined as having excessive body fat, and while BMI is a measure often used to classify people as obese, it is not the most accurate way to quantify body fat. When using BMI as the measure, people who have a significant amount of muscle mass can be incorrectly classified as obese when their amount of body fat may in fact be healthy, or even low.

Also, BMI provides an assessment of overall obesity, and does not provide an indication about where any excess fat is being stored in the body, a distinction that some research indicates is key.

ABDOMINAL FAT IS OF PARTICULAR CONCERN AS IT APPEARS TO INCREASE THE RISK OF VARIOUS DISEASES, INCLUDING CARDIOVASCULAR DISEASE AND DIABETES (BEYOND THE RISK OF TOTAL BODY OBESITY).

One study examined the relationship between dementia risk and two different measures of obesity: BMI and sagittal abdominal diameter (a measure of central obesity or "belly fat"). The findings - shared in 2008 in *Neurology* - suggest that when it comes to dementia, it does make a difference where body fat is stored. The study involved 6,583 participants in northern California aged 40 to 45 who had their BMI and sagittal abdominal diameter (SAD) measured sometime between 1964 and 1973. An average of 36 years later, 1,049 participants (16%) had been diagnosed with dementia.

Analysis of the data revealed that individuals who had both high BMI and high SAD were at greatest risk for developing dementia; their risk of dementia was 3.6 times higher than individuals with normal BMI and low SAD (i.e. the "reference group").

Those participants who had high BMI and low SAD (i.e. were considered obese according to BMI classification, but did not have a high amount of abdominal fat) were 1.81 times more likely to develop dementia than the reference group. Although this is a considerable increased risk compared to individuals with normal BMI and low SAD, it is quite a bit lower risk than was observed in the high BMI and high SAD group, indicating that the presence of abdominal fat is playing a role in dementia risk. →

Interestingly, there were also a small number of participants who had normal BMI and high SAD - in other words, were considered a healthy weight but had a high amount of abdominal fat. They, too, were at increased risk of dementia compared to the reference group (1.89 times the risk). These findings contribute to the evidence that having a larger abdomen is of particular concern when it comes to dementia risk.



OUR RESEARCH SUGGESTS MIDLIFE ABDOMINAL OBESITY IS AN IMPORTANT FACTOR TO CONSIDER WHEN ESTIMATING LATER LIFE DEMENTIA RISK,

said Dr. Rachel Whitmer, lead author of the study and an Adjunct Investigator with Kaiser Permanente and Professor at UC Davis School of Medicine. "Given that the prevalence of abdominal obesity among U.S. adults is estimated to be more than 58%, our findings point to a sizeable amount of preventable risk."

More recently, another group of researchers looked at the ways in which dementia is related to obesity using two different measures: BMI and waist circumference. The researchers studied 6,582 participants aged 50 and over from the English Longitudinal Study of Ageing who were all dementia-free at baseline. Over an average follow-up period of 11 years, 453 participants (6.9%) developed dementia.

The findings, published in June 2020 in *International Journal of Epidemiology*, demonstrated that being overweight or obese (defined by BMI) at baseline was associated with subsequent higher risk of dementia; this was true whether waist circumference was high or normal. Participants with high BMI (i.e. in the obese category) at baseline had a 31% increased risk of dementia compared to those with normal BMI.

When it comes to the relationship between dementia risk and abdominal obesity, the researchers found a significant difference between women and men.

WOMEN WITH HIGH AMOUNTS OF ABDOMINAL FAT AT BASELINE HAD A 39% INCREASED RISK OF DEVELOPING DEMENTIA COMPARED TO THOSE WITH NORMAL WAIST CIRCUMFERENCE.

Yet, for the male participants, having a large waist measurement at baseline was associated with a small decrease in dementia risk.

"Our findings provide new evidence that obesity is an important factor to consider in terms of dementia risk and that both BMI and waist circumference are valuable measurements that should be monitored," said Dr. Dorina Cadar, senior author of the study and a Senior Research Fellow at University College London. "Knowing that

overall body weight and abdominal fat, in particular, are associated with increased dementia risk has important implications for efforts to prevent or delay the onset of dementia."

TAKING ACTION TO HELP LOWER DEMENTIA RISK

Although the collective findings to date on the association between obesity and dementia risk are complex and more research is needed to fully understand the relationship between the two, it is widely accepted that individuals should take appropriate actions to reduce obesity. As the Alzheimer Society of Canada notes on its website, obesity is one of the risk factors for Alzheimer's disease that "you can change."

Dr. Richard Isaacson is a neurologist who specializes in work related to preventing dementia, and is the Founder and Director of the Alzheimer's Prevention Clinic at Weill Cornell Medicine and NewYork-Presbyterian. The clinic works with individuals at risk of developing Alzheimer's disease, recommending a custom "prescription" of interventions tailored for each person based on her or his specific risk factors. Many of the interventions are lifestyle-related and have the potential to address obesity.

"Although our clinic develops individualized plans for patients to address their unique combination of risk factors, there are some basic lifestyle interventions that are pretty universal in their ability to help people reduce Alzheimer's risk," said Dr. Isaacson.



I WOULD RECOMMEND THAT EVERYONE WOULD BENEFIT FROM REGULAR EXERCISE, A BRAIN-HEALTHY DIET, STRESS MANAGEMENT AND OPTIMAL SLEEP, ALL OF WHICH CAN HELP WITH MANAGING ABDOMINAL FAT.

I try to convey to my patients that just relying on weight measurement alone can be misleading - it is important to know and track one's percentage body fat, as well as muscle mass. It is really essential for people at risk to 'know their numbers' and feel empowered to take control of their brain health considering that at least one out of every three cases of Alzheimer's may be preventable if a person does everything right."

Making healthy lifestyle choices can boost your health in countless ways, not just reduce dementia risk. So, do what you can to move more, eat well (a Mediterranean diet is often highly recommended), get enough good quality sleep, and manage your stress - for instance, through meditation, yoga, and/or creative pursuits.

Be sure to see a doctor regularly and control any vascular risk factors, such as high blood pressure, high cholesterol, and diabetes, which can also accelerate cognitive decline. By making everyday choices that support your health, there is so much to gain and nothing to lose (except excess body fat, of course). 🧠



ACCOUNTING FOR TASTE

WHAT SHOULD A WOMAN EAT TO HELP KEEP HER BRAIN FIT?

There is mounting research that what you eat has a significant impact on the health of your brain. In the second issue of Mind Over Matter®, we highlighted some of the research in support of the “MIND” diet – a hybrid diet combining factors of the Mediterranean diet and the Dietary Approaches to Stop Hypertension (DASH) diet, which includes consuming whole foods such as fruits, vegetables, and whole grains, as well as nuts and seeds (for their good fats and vitamin E content) and fish and legumes (for protein sources).

Just as important as what you eat is what you should not eat. Reducing consumption of red meat, cheese, margarine or butter, and sweets, as well as processed and fast foods, is crucial.

In the ninth issue of Mind Over Matter®, we wrote about the importance of paying closer attention to dietary needs as you age, since older adults’ bodies undergo organ, hormonal, and insulin-related changes, as well as lose muscle mass. Older →

adults need less calories per day than their younger counterparts and can eat less overall, but nutrient requirements do not change with age - meaning that healthy food choices are even more important.

A LACK OF RESEARCH FOCUSED ON WOMEN

Historically, most research (including nutrition research) has been conducted on male subjects, and biological (sex-based) and socio-cultural (gender-based) variables have been largely neglected. Fortunately, this has started to change in recent years with the National Institutes of Health (in the U.S.) and the Canadian Institutes of Health Research mandating researchers to integrate sex and gender into their research designs when appropriate.

We now know that women will need to pay closer attention to generalized diet and lifestyle findings related to Alzheimer's disease (AD) due to the staggering Alzheimer's disease statistics. "Two-thirds of people with Alzheimer's are women, and two-thirds of caregivers are women, and caregiving for someone with dementia increases one's risk of developing dementia," said Dr. Nathaniel Chin, Director of Medical Services for the Wisconsin Alzheimer's Disease Research Center. Even in cases where a genetic component to AD has been identified in individuals (namely, the APOE-e4 gene), women with the genetic risk are more likely to develop the disease than men with the same genetic risk, noted Dr. Chin. "The sheer numbers should tell women, 'I have to be extra vigilant,'" said Dr. Chin.

WHY WOMEN ARE AT GREATER RISK FOR ALZHEIMER'S DISEASE

Researchers are beginning to uncover why women are more vulnerable to AD. A woman's intricate hormonal system is deeply connected to the brain's functionality throughout the lifespan. "The hormones inextricably involved with our sexuality turn out to be just as crucial in the overall functioning of our minds," noted Dr. Lisa Mosconi, Director of the Women's Brain Initiative and Associate Director of the Alzheimer's Prevention Clinic at Weill Cornell Medical College/NewYork-Presbyterian Hospital, in her new book entitled *The XX Brain: The Groundbreaking Science Empowering Women to Maximize Cognitive Health and Prevent Alzheimer's Disease*.

Dr. Mosconi and her colleagues also published findings of their research in the June 2020 issue of *Neurology* that found that menopause was strongly associated with brain biomarker differences consistent with AD.

MENOPAUSE SEEMS TO BE AN IMPORTANT MOMENT NOT JUST FOR A WOMAN'S HORMONAL SYSTEM, BUT ALSO FOR HER BRAIN.

The "ebb in hormones" causes the loss of a key protective element in the female brain. "In fact, diminishing hormones are known to accelerate the aging process," Dr. Mosconi observed. Alzheimer's disease does not emerge randomly or quickly; rather, it is "the result of a number of genetic, medical, and lifestyle events that

have been happening along the way," and menopause, for some (not all) women, appears to be a catalyst.

While lifestyle changes - including, very importantly, diet - make a substantial difference on brain health for pre-menopausal and post-menopausal women, those approaching midlife have "a critical window of opportunity," according to Dr. Mosconi, "to intercede with strategies to reduce or prevent that risk."

Dr. Chin agrees: **"We see this increase in risk at menopause or later. If there's ever a time for you to say okay, I really need to adjust the foods I'm eating, my level of activity, and my sleep, menopause should be that trigger."** He continued, "no offense to the cardiologists, [our brain] is the most important organ in the body." The brain "receives and uses over 20% of the blood flow, which means oxygen as well as sugar."

As an organ, the brain is also highly dependent on the food that we consume for good functioning because brain cells are "irreplaceable," noted Dr. Mosconi. The brain cells that we start with, more or less, are the ones that we have all through the lifespan, whereas the cells of other organs can replace themselves.



OF ALL THE ORGANS IN THE BODY, THE BRAIN IS THE MOST VULNERABLE TO THE RAVAGES OF A POOR DIET.

WHAT DIET BENEFITS WOMEN THE MOST

So, what should women eat? Most importantly, stay away from all the trend diets, suggests Dr. Mosconi in her book *The XX Brain*, including keto, gluten-free, and fat-free diets or veganism, unless, for example, you are celiac (in which case, you have to avoid gluten). None of these diets "adequately consider the female physiology," she writes. One diet severely limits healthy carbs, and another reduces fat, while still another substantially reduces protein. "Let's be clear that the body and brain alike need all kinds of nutrients for health, carbs and fats included."

Dr. Mosconi recommends the Mediterranean diet, which has been proven effective for brain health, heart health, and generalized longevity. The American Heart Association recommends the Mediterranean diet for heart health, along with the DASH diet, and we know that heart disease and stroke are risk factors for vascular dementia or AD. A 2013 study published in the *Journal of the American Heart Association* found that in postmenopausal women, cardiovascular disease, hypertension, and diabetes were all associated with a higher risk of cognitive decline.

Additionally, the Mediterranean diet has been found to improve the gut microbiome. Recent research published in the July 2020 issue of *Gut* found that eating a Mediterranean diet for a year improved levels of frailty and overall health in older adults between

the ages of 65 and 79. In several recent studies, the health of the gut's delicate microbiome has been linked to Alzheimer's disease proliferation.

One study published in the *Journal of Neurogastroenterology and Motility* in 2019 found that "there is increasing evidence for the gut microbiota contribution to the pathogenesis of AD." Previous issues of Mind Over Matter® have also covered this topic in depth.

WHAT IS BECOMING CLEARER IS THAT GOOD HEART HEALTH, GUT HEALTH, AND GENERAL HEALTH IS LINKED WITH A DECLINE IN ALZHEIMER'S RISK, AND DIET PLAYS A SIGNIFICANT ROLE IN ALL OF THESE SYSTEMS.

A woman's hormonal system, as we have seen, appears to be part of the reason why Alzheimer's disease disproportionately affects women. During menopause, estrogen levels decline considerably, and consuming foods that contain phytoestrogens, such as soy, has been shown in studies to help women with menopausal symptoms because they convert "to usable estrogen in our human bodies," writes Dr. Mosconi. An article published in 2018 in the *International Journal of Nutrition Sciences* found that the use of phytoestrogens and their dietary sources such as soybeans can be beneficial in the prevention of Alzheimer's disease because of the way in which they positively impact brain cells.

Soy is a great source of phytoestrogens, but you need to make sure that it is organic, preferably fermented (as opposed to genetically modified and pesticide-laden soy), and do not consume more than two servings a day. Men may want to avoid consuming foods with too many phytoestrogens, as one study published in *Nutrients* in 2019 found that speed of processing in the brain declined in older men with high urinary levels of phytoestrogens, while it improved in women.

THE IMPACT OF DIET ON MENTAL HEALTH

How a woman's diet impacts her brain health goes beyond the severity of AD.

A STUDY PUBLISHED IN 2018 IN NUTRITIONAL NEUROSCIENCE FOUND THAT COMPARED WITH MEN, WOMEN MAY NEED A MORE NUTRIENT-RICH DIET, AS WELL AS A HEALTHY LIFESTYLE (E.G. REGULAR EXERCISE), TO EXPERIENCE "MENTAL WELLBEING."

Dr. Lina Begdache, an Assistant Professor at Binghamton University's Decker College of Nursing and Health Sciences and the lead author of the study, surveyed individuals internationally about diet and mental health status.

Dr. Begdache and her colleagues categorized the participants' eating patterns as healthy, moderately healthy, or very unhealthy,

and then looked at levels of anxiety and depression in women and men. The findings were surprising: men only experienced higher levels of anxiety and depression when they adhered to an unhealthy eating pattern (i.e. the "Western diet," which consists of high amounts of processed foods, red meat, high-fat dairy products, high-sugar foods, and pre-packaged foods). Women, on the other hand, experienced "an inverse relationship between healthy eating and exercise and mental health problems," said Dr. Begdache. The moderately healthy diet was not enough to maintain mental well-being for women.

Researchers can only speculate about the reasons for these findings, but Dr. Begdache believes that it may be due to brain connectivity: women have more connectivity in the regions of the brain that control emotions, the limbic system, and the prefrontal cortex - the communication between which is dependent on the myelin sheath, which turns over quickly in the brain. Nourishing the myelin sheath well may be why women require a larger spectrum of food compared with men.

It is becoming clearer that women, for both their brain health and mental health, need to pay close attention to diet, in addition to other lifestyle habits. "Every woman needs to know what they are at risk for, and when they're at risk," said Dr. Chin. More women die of Alzheimer's disease than they do breast cancer, which some women do not realize, and menopause is a key moment. 🌱

OTHER STUDIES WORTH NOTING

Women seem to respond to food stimuli differently than do men, according to a review paper published in 2017 in *Obesity Reviews*, which posits that "in response to visual food cues, females, compared to males, showed increased activation in the frontal, limbic, and striatal areas of the brain." The review concluded that while more research is needed, women may experience greater cognitive processing related to executive functioning, emotion, and reward when viewing food stimuli, which impacts obesity levels and therefore overall health.

Additionally, a 2014 *Journal of Nutrition* article found that emotional eating (i.e. eating energy-dense snack foods, chocolate, pastries, and the like), was linked to depression in women. Men, alternatively, who emotionally ate energy-dense foods were not found to be depressed. Researchers concluded that mental health status needs to be considered when recommending healthy diets, particularly in women.

Harissa Grilled Chicken Thighs With Lemon Mint Yogurt Sauce

 SERVES 2-4  TIME: 20 MINUTES

INGREDIENTS

FOR CHICKEN:

- + 4 boneless, skinless chicken thighs
- + 2 1/2 tsp harissa seasoning
- + 3 tsp avocado oil

FOR LEMON MINT YOGURT SAUCE:

- + 1/2 cup plain nonfat yogurt*
- + 2 tsp lemon juice
- + 2 tbsp fresh mint, finely chopped
- + Pinch freshly cracked black pepper

INSTRUCTIONS

1. Prepare yogurt sauce. Stir together yogurt, lemon juice, mint, and pepper. Refrigerate until ready to use.
2. Heat a grill or grill pan to medium heat (about 375-400°F).
3. Rub chicken thighs with harissa seasoning and oil.
4. Sear both sides of thighs for about

2 minutes per side over direct heat. Move to indirect heat or turn heat down and continue cooking until the thickest part of the thighs register at 165°F, about 8-10 minutes. Remove from grill.

5. Serve chicken thighs with prepared sauce and grilled onions (optional).

**If you use Greek-style yogurt, thin it out with 1-2 tbsp of cold water or milk.*

Chicken

Chicken is a great source of lean protein, rich in choline and vitamins B6 and B12, which provide neuroprotective benefits.

 @LIVELYTABLE

MEMORY MORSELS[®]

— A WOMEN'S BRAIN HEALTH INITIATIVE —



This edition's recipes are courtesy of Kaleigh McMordie, a food-loving registered dietitian and mom who shares real food recipes that take the stress out of eating.

For more recipes, morsels, and the latest from our Featured Foodie, Kaleigh McMordie, visit memorymorsels.org.

Fall Kale Salad With Apples, Pears & Sorghum

 SERVES 6-8  TIME: 1 HOUR (10 MINUTES PREP + 50 MINUTES COOK)



Kale

Kale tops the charts of nutrient density, with vitamins C, K, B6, iron, and folate to keep your brain sharp, plus fibre to promote gut health.

INGREDIENTS

- + 1/2 cup uncooked whole grain sorghum
- + 1 1/4 cups vegetable broth
- + 1 bunch kale
- + 1 medium pear
- + 1 medium apple
- + 1/4 cup toasted walnuts
- + 1/3 cup dried cranberries

MAPLE DIJON VINAIGRETTE:

- + 2 tbsp apple cider vinegar
- + 1 tbsp extra virgin olive oil
- + 1 tbsp maple syrup
- + 1 tbsp dijon mustard
- + 1 tbsp minced shallot
- + 1 tsp fresh thyme leaves
- + pinch of sea salt
- + pinch of black pepper

INSTRUCTIONS

1. Add sorghum and broth to a medium saucepan and bring to a boil. Reduce heat, cover, and simmer for about 50 minutes, or until sorghum is tender. Remove from heat and cool slightly.
2. Meanwhile, toast walnuts on a baking sheet at 350° F for about 10 minutes.
3. Whisk or shake all dressing ingredients together in a jar and set aside.
4. Wash and chop kale. Core and thinly slice pear and apple.
5. Add kale to a large bowl and drizzle with desired amount of maple dijon vinaigrette. Gently massage kale with your hands and set aside. Once sorghum is done, add remaining ingredients to the bowl with kale and toss to combine.

Fall Harvest Oatmeal Cookies

 SERVES 18  TIME: 35 MINUTES

INGREDIENTS

- + 1/2 cup butter, softened
- + 3/4 cup brown sugar
- + 2 tsp vanilla extract
- + 1 large egg
- + 1 1/4 cup white whole wheat flour or oat flour (ground oats) for gluten-free
- + 1 tsp ground cinnamon
- + 1/2 tsp ground nutmeg
- + 1/2 tsp salt
- + 1 1/4 cup rolled oats
- + 1/4 cup white chocolate chips
- + 1/4 cup unsweetened dried apricots, chopped
- + 1/4 cup unsweetened dried cranberries
- + 1/4 cup walnut pieces

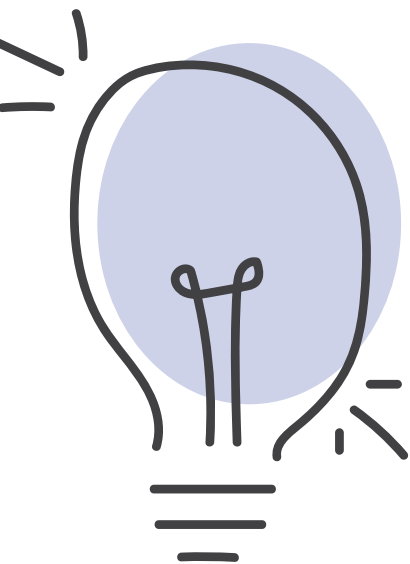
INSTRUCTIONS

1. In the bowl of a stand mixer or a large bowl with a hand mixer, cream butter and brown sugar until smooth. Beat in egg and vanilla.
2. Add flour or ground oats, cinnamon, nutmeg, and salt. Mix well to combine.
3. Stir in whole oats, white chocolate chips, apricots, cranberries, and walnuts. Place dough in the refrigerator to chill while you preheat the oven to 350° F.
4. Using a medium scoop, scoop dough onto a baking sheet lined with parchment or a silicone baking mat. Bake 12-15 minutes or until almost set. Remove from the oven and let cool on the baking sheet for 5 minutes before removing to a cooling rack. Cookies will firm up as they cool.

Oats

Oats contain antioxidants to reduce the damaging effects of chronic inflammation associated with cardiovascular disease and diabetes.





BRAIN BUZZ™

Women's Brain Health Initiative has created a series of impactful one-minute videos that give you evidence-based information on the best ways to protect your brain health. Check them out at brainbuzzvideos.org.



MIND WHAT YOU EAT

As you are making choices about what to chew on, digest this: research has shown that eating certain foods (such as leafy greens, whole grains, poultry, fish, nuts, berries, and even dark chocolate) could help reduce your chances of prematurely aging your brain. Foods to avoid include red meats, butter and margarine, cheese, and fried or fast food.



CALM YOUR MIND

As we live through uncertain times, we need to keep our stress levels down. Mindfulness meditation has been proven to keep our brain healthy. The practice of mindfulness meditation involves focusing on a particular object, thought, or activity, which is usually the breath or the body. Check out Brain Buzz™ for some helpful tips to try mindfulness meditation at home.



MUSIC IS MEDICINE FOR YOUR MIND

Listen up! Research has shown that music can stimulate your brain, keep your brain engaged as you age, and help with memory. It is a total brain workout! Listening to and playing music can make you feel happier, reduce blood pressure, and increase sleep quality. No matter what your age, it is never too late to fill your life with music.



TRUTH OR MYTH?

Starting to forget? Alzheimer's is not inevitable. You can reduce your risk and stay brain healthy longer by modifying your lifestyle. The younger you start making healthy brain choices, the more you can protect yourself against brain-aging disorders - especially if you are a woman.



WHAT DREAMS ARE MADE OF

Want a reason to get a good night's sleep? Studies have shown that sleep is extremely important to boost brain health. A sleep-deprived brain may be more vulnerable to diseases such as Alzheimer's. When you sleep, your brain runs a "clean cycle" to remove the day's metabolic debris - an action that might protect against the disease.



STAY TWO STEPS AHEAD OF MEMORY LOSS

Dancing is not only a great body workout - it is a great brain workout too. Dance requires mental, physical, emotional, and social skills, and helps to improve strength, endurance, and balance. Some of the many benefits of dancing include pumping blood to your brain, building new neural pathways, and helping to prevent depression. So, dust off your dancing shoes!



USE IT OR LOSE IT

Your memory is like muscle strength, you either use it or lose it. The more you work out your brain, the more you process and remember information. You need to keep learning and developing new skills. But not all activities are equal; the best brain exercises break your routine and challenge you to use and develop new brain pathways.



PUMP UP YOUR BRAIN

Exercise is not only good for your body, but also your brain. Getting your heart pumped helps blood and nutrients flow to your brain and removes waste. Studies have shown that just ten minutes of exercise a day can boost your brain power. So pump up your brain to prevent or slow down the progression of cognitive decline.



THE HEART OF THE MATTER

Heart disease is the leading cause of death for women, but symptoms for women may be different than men. Research shows that individuals with heart issues (such as high blood pressure) can also be at risk for Alzheimer's disease. Protecting your heart can help keep your brain healthy.



CONTROL & PEACE OF MIND

We are living longer than ever before, which is why we have to think about the long term and plan for the unplanned. Most of us have a will but not a power of attorney (POA), which impacts you while you are still alive. Find out more about appointing someone to make important decisions on your behalf when you are unable to do so yourself.



ON THE COVER

WITH TRACI MELCHOR & ROSELLA LEONCE MELCHOR

From a childhood in St. Lucia, through marriage in England, to single motherhood in Canada, Rosella Leonce Melchor quickly learned how to take care of herself and her children - lessons that resonate with her daughter, Traci Melchor.

"My mother is an amazingly strong, smart, extroverted person who knows about everything," said Traci.

Appearing on the cover of a national magazine is something new for Rosella, unlike Traci, who is familiar with being in the public eye as Senior Correspondent for ETALK on CTV. Now, the mother-daughter duo are sharing the spotlight in the latest issue of *Mind Over Matter*®.

"It means a lot to me. An 81-year-old cover girl!" said Rosella. "This wasn't in her wheelhouse, but it's a really beautiful thing," added Traci.

Their career experiences could not be more different: Traci, an entertainment reporter who covers glittering Hollywood red carpets and interviews stars like Beyoncé, Justin Bieber, and Denzel Washington, and her mother, who worked at Eaton's for decades and raised two daughters on her own in Pickering, Ontario.

But in a riveting conversation with *Mind Over Matter*®, full of laughter, reminiscence, and bittersweet moments where they often finished each other's sentences, Traci stressed that Rosella's wisdom and unique experiences helped teach her how to maintain her own physical and mental health, and to cope with life's challenges. She cited her mother's knowledge of herbal teas, her resourcefulness in sewing her children's clothing, and her determination to remain active into her eighties.

Rosella grew up in the St. Lucia capital, Castries. She learned about the importance of community service while visiting senior's residences, and witnessed firsthand the devastating impact of dementia when her grandmother's cognitive health began to deteriorate.

"She'd go out and get lost, nobody knew where she was. So, finally, my grandfather said she couldn't go out anymore."

At the age of 22, Rosella moved to England to join her mother, married a fellow St. Lucian, and gave birth to her first daughter, Gloria. Later, the family emigrated to Canada, where Traci was

born. When Traci was ten, her parents divorced and Rosella took up the mantle of single motherhood.

When Traci began her career in broadcasting, her fiercely supportive mother would drive her to early morning shifts at CITY TV in downtown Toronto, and then sleep in the car before going off to work herself.

Shortly after giving birth to twins, Traci's own marriage ended and she too became a single mother. Traci's professional life continued to thrive, but she encountered mental health challenges along the way. The death of a close friend, coupled with a variety of life stresses, pushed her into a difficult period during her time as co-host of the CTV daytime talk show *The Social*.

"I felt like I was having a breakdown on live TV. My boss came up to me and said, 'what's going on, how can I help?' I broke down and I realized I needed to take care of myself, of my pain." With the support of her employers, she took a leave of absence. "I'm so grateful that I had that opportunity. I see with hindsight that I wasn't taking care of myself. Now I have a therapist and now I take care of myself."

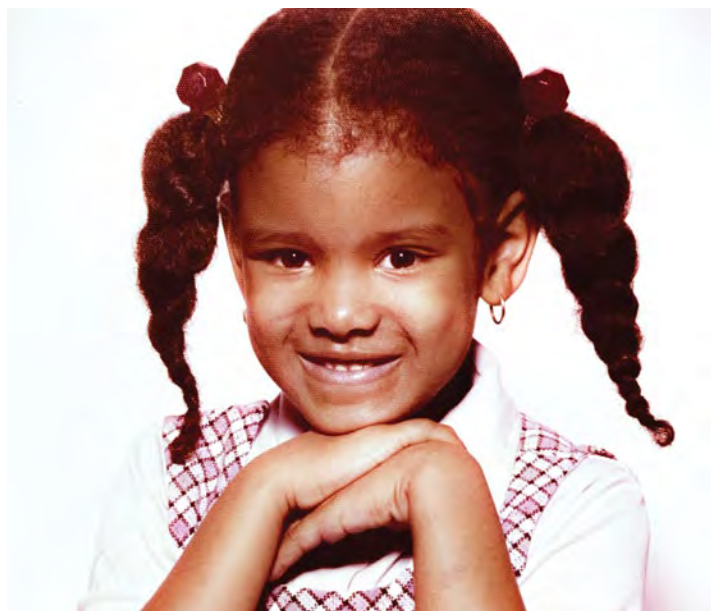
Traci's experience inspired her to become an advocate for mental health, speaking openly about her personal struggles and supporting various charitable organizations. It was a natural step for her to help stand up against research bias and to combat women's brain-aging diseases through the work of Women's Brain Health Initiative.

"I just have so much respect for the organization. As a woman, I know that they have really taken the lead, to do research when it comes to women's health, and to understand the differences between men and women when it comes to brain health."

She has come to understand the importance of maintaining a proper diet and a healthy lifestyle - something that her mother does instinctively. Rosella's morning routine includes stretching, engaging in deep-breathing exercises, taking long walks, and making time for prayer. She will proudly tell you that she still cuts the lawn herself at her home in Pickering, where she has lived for 55 years.

Both Traci and Rosella revelled in the opportunity to appear together on the cover of *Mind Over Matter*®. It was an uplifting experience for both mother and daughter, a much-needed emotional reprieve after the recent loss of Traci's older sister, Gloria, after a long battle with cancer.

"It means everything. I'm the product of my mother, my father, and my sister who's no longer with us," said Traci. "Not just to be on the cover with my mom, but on the cover of a magazine that's really making a difference. She's given me a voice. It fills my heart with love. I'm so proud of her. It's a really beautiful thing. We've had a hard summer. To come together like this, I feel very motivated, inspired, and joyful. Things we haven't felt in a while." 🌍



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You can support Women's Brain Health Initiative and be a Champion for women and their brain health. Your charitable donation can further intensify our impact, allowing us to reach more and teach more.

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WE ARE TRULY GRATEFUL TO



and all those who generously supported this publication:

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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 is not responsible for the accuracy of the contents of this magazine.



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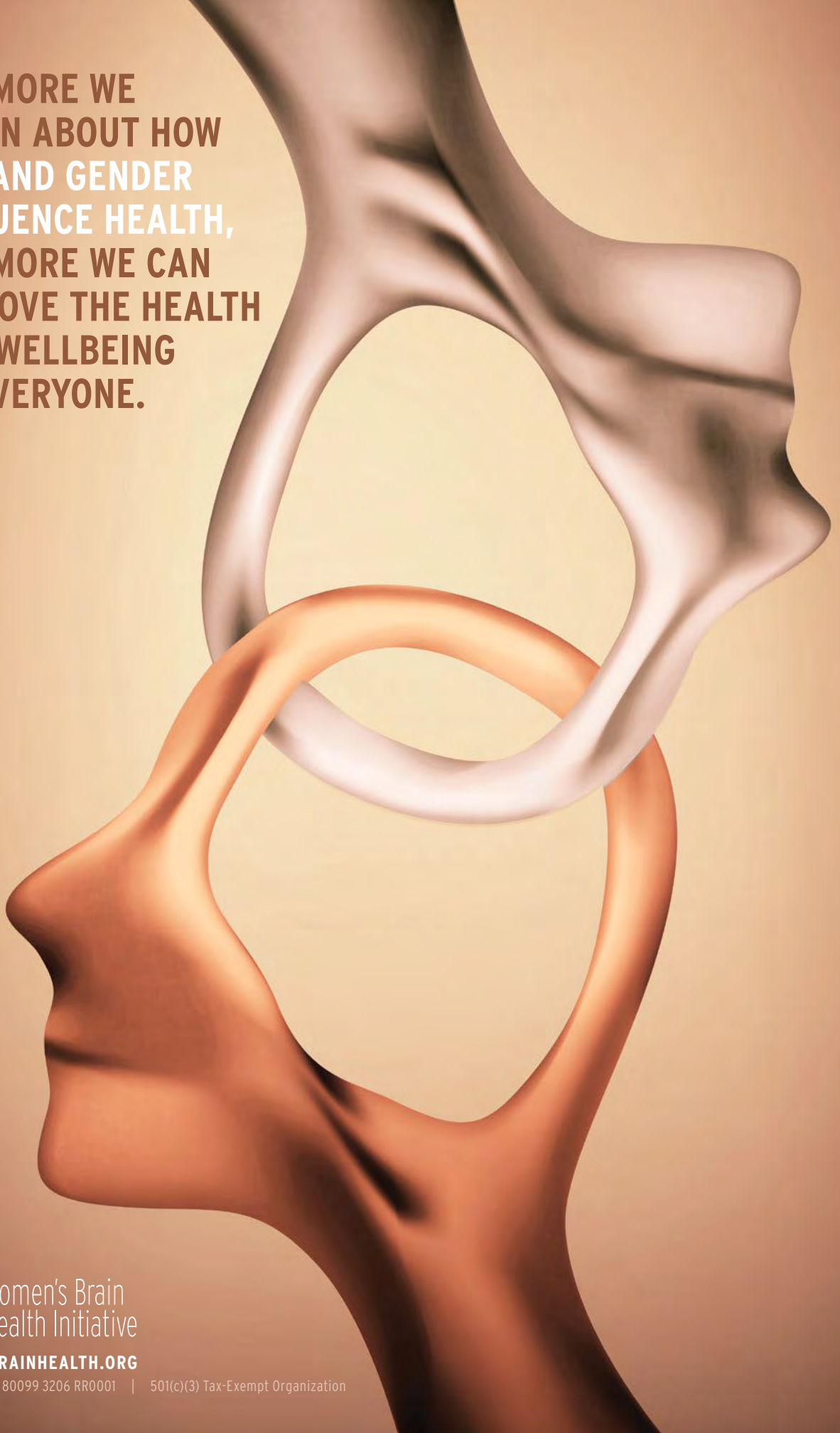
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