“So many vets have fought the fight, lost buddies, come back, and they’re 22, 24, 28 years old,” said Joshua Lewis, a Marine Corps veteran who did tours of duty in Iraq and Afghanistan. “You’ve lost your sense of purpose. Coming back from Afghanistan in 2010, I was 28, had led guys through combat, brought them back alive. I’m never going to have that responsibility again. You think, Now what? There’s really nothing for me anymore. I’ve completed the task.”

Then Lewis found Warrior Training, part of the Center for BrainHealth® at The University of Texas at Dallas, which is addressing these transition issues with its brain-training program, known as Strategic Memory Advanced Reasoning Training (SMART).

Now the Jordan Spieth Family Foundation has joined the effort to assist veterans encountering a difficult transition. It is underwriting the Jordan Spieth Family Foundation Training Room at the new state-of-the-art Brain Performance Institute™ facility that is part of the Center for BrainHealth. The Spieth Foundation was created in 2014 to help fund causes important to Jordan and his family, namely special needs youth, junior golf, and military families.

The Jordan Spieth Family Foundation also has set up an endowment to help support Warrior Training at no cost to veterans and active duty military, as well as military spouses and caregivers. Helping military families in this way, the foundation is fulfilling one of the tenets of its mission.

“I get to play golf for a living because of the sacrifices of our military. It’s truly an honor to have the Jordan Spieth Family Foundation support the Warrior Initiative,” says Jordan Spieth. “This room and these programs will serve countless of servicemen and women and their families, and I’m really excited that we can be a part of this amazing program.”

The Warrior Training program helps veterans on many levels. “I dealt with headaches,” Lewis said. “I used to get one about every six weeks. They were debilitating. I’d lose vision, and they would last 24 to 36 hours. I’ve had several concussions, so a little bit of stress can throw me over the line.

“They taught me how to handle stress, how to handle decision-making, how to back up and see the big picture. The largest thing they helped me with is to focus on two big things to accomplish every day. I've got these 20 things to do today, 18 are insignificant and don't matter. I wasn’t acknowledging that. I was letting those things catch me and trip me up.”

Today, Lewis, a graduate of The University of Texas at Dallas, is in corporate banking at J.P. Morgan in Dallas.

After going through the SMART program, 42 percent of those who suffered a traumatic brain injury experienced a reduction of stress-related symptoms, and 58 percent saw a reduction of depressive symptoms, according to clinical trial results.
Like it or not, experts agree that there’s a limit to how long humans can live. A new study that appears in *Nature* hypothesizes that limit is 125 years. Whether it is 125 or something greater is only an auspicious feat if those years are spent enjoying a rich quality of life that includes family, friends and fulfilling activities.

Do we really want this extended life if our brain health does not keep pace? Cognitive decline begins, on average, at age 42 – and continues to worsen with age. This pattern of accruing losses has remained largely unaddressed and persistent. That means most of us spend more than half of our lives with our brains in a state of decline, operating below optimal level.

At the Center for BrainHealth®, we are making this relentless brain decline a major frontier of exploration. Our team is exploring proactive ways to improve the quality of living longer by making sure we have maximal brainpower whether we are healthy, have had a brain injury or face brain disease.

This edition of Brain Matters focuses on scientific discoveries that can make longer life better. Scientists and clinicians at the Center for BrainHealth are:

- Collaborating with mindfulness experts to create science-based programs that can make it easier for first responders to leave their jobs at the door when they go home at night.
- Leveraging a virtual technology platform to improve cognitive and functional deficits for veterans who have experienced traumatic brain injuries.
- Revealing a key risk factor for obesity that can help tailor effective weight-loss strategies.
- Using an advanced brain imaging technique to study brain metabolism changes and cognitive slowing.
- Showing how brain-training can help a teenager make the transition to college.
- Developing a unique test that is more sensitive than traditional cognitive measures in traumatic brain injury – the findings may also have implications for promoting healthy aging.

We are just beginning to unlock our brain potential with extended life expectancy. We share our progress as a reminder that you are a pivotal part of this journey.

The public’s ability to benefit from our brain health breakthroughs is rapidly becoming a real possibility with the opening of the Brain Performance Institute™ this fall.

Sandra Bond Chapman  
Founder and Chief Director  
Center for BrainHealth

**PARTNERS IN A NEW ERA OF BRAIN HEALTH**

Since joining the Brain Performance Institute™ last year, a lot of people have asked me, “What does the Brain Performance Institute actually do? How is it different from the Center for BrainHealth™?”

The short answer is that the Brain Performance Institute is part of the Center for BrainHealth™. So, like the Center for BrainHealth, we are a place where research is conducted and students are trained. But, more specifically, we are the Center for BrainHealth’s “translation arm,” meaning that we translate findings from basic science into practice. For example, a 2013 study found that a 12-hour brain training protocol increased brain blood flow and information communication across key brain regions, as well as expanded structural connections between brain regions related to new learning.

The researchers at the Center for BrainHealth published some important articles based upon this study, but journal articles don’t change lives. So, Dr. Chapman and her team began tailoring the program to help community and business leaders beat brain burnout and reignite innovation. Sounds simple, right?

Actually, most research sits on the shelves for a decade or more before benefiting the public. Siloed, scientific disciplines can make the distance between the lab and clinical delivery seem impossible. So, when Dr. Chapman and the UT System Regents decided to start the Brain Performance Institute, they were committing to do something that very few organizations do, and even fewer do well: translational research.

They were making an extraordinary commitment to:

- Create exciting training programs that can be delivered in one-, three-, six-, or nine-hour courses.
- Provide a high personal return on investment of time and money.
- Retain the scientific fidelity behind the programs and products they develop.
- Find philanthropic support to fund programs for those who cannot or should not have to pay.
- Educate the world about the importance of brain health and brain health best practices.

This commitment will only be made better with more data. So, as we perfect existing programs and develop new ones, we collect data. Some data provides clinicians with information they need to understand their own brain health and performance. Some data provides clients with information they need to understand their own brain health and performance. Some data provides clients with information they need to understand their own brain health and performance. Some data provides clients with information they need to understand their own brain health and performance.

In this way, the people we serve are not merely clients, but they are our partners in building a new era of brain health.

Leanne R Young  
Executive Director  
Brain Performance Institute

**OUR BRAIN’S HEALTH NEEDS ATTENTION NOW**

Morgan Luttrell a U.S. NAVY veteran, UT Dallas cognitive neuroscience doctoral student, and Boot Campaign interim CEO along with members of the Boot Campaign board tour the Brain Performance Institute construction progress. The Center is partnering with the Boot Campaign’s ReBOOT initiative to help secure the specific mental and physical care needed to provide our nation’s brave servicemen and women with a fulfilling life after serving our country.
Law enforcement is inherently a high-pressure profession. Police officers must routinely make tough decisions, often under extreme stress and/or facing threat of harm. The Center for BrainHealth®, part of The University of Texas at Dallas, and its Brain Performance Institute™ are collaborating to provide programs to help officers who serve on the front lines of the city of Dallas.

By equipping them with brain health-enhancing tools, the Center for BrainHealth and its Brain Performance Institute will aid officers in tactical decision-making, creative, real-time problem-solving and down-regulating emotional response to stress.

"I have learned, thanks in part to the work of the Center, that brain health is like physical health: You have to work to pursue it," said Lyda Hill, whose donation is funding the training. "Following the devastating day of July 7, 2016, in Dallas, where five law enforcement officers were killed in the line of duty, I knew I had to do something to help those who take care of us daily. I hope this effort gives the Dallas Police Department the foundation it needs to consistently make the brain health of its officers a top priority."

"Lyda is always at the forefront of transformational beginnings," said Dr. Sandra Bond Chapman, founder and chief director of the Center for BrainHealth and Dee Wyly Distinguished University Professor in the School of Behavioral and Brain Sciences. "Thanks to her innovative, generous spirit and commitment to advancing scientific discovery, we will be able to provide those who serve and protect Dallas, day in and day out, with strategies to improve their brain health and unlock their brain potential."

Over an 18-month period, the Brain Performance Institute will offer 500 police officers Strategic Memory Advanced Reasoning Training (SMART) and a mindfulness program specific to law enforcement. SMART strengthens the brain’s frontal networks — regions that support planning, reasoning, decision-making, judgment and emotional management. The mindfulness program is being created in partnership with Hillsboro, Oregon, police Lt. Richard Goerling, a pioneer in the field of mindfulness, preventive mental health care and physical fitness in law enforcement as well as Mastermind, a Dallas-based mindfulness meditation studio. The program integrates positive psychology with accelerated training and short-form application of mindfulness strategies. The goal is to help officers manage high-stress, high-pace situations at work and in their day-to-day lives. Pre- and post-assessments will be administered to demonstrate the program’s efficacy.

"The Dallas Police Department continues to be progressive in the ever-changing law enforcement climate," interim Dallas Police Chief David Pughes said. "Members of the Dallas Police Department command staff recently completed the SMART program, and participants found it extremely valuable. The department is embracing the strategies taught to improve day-to-day decision-making, reasoning and critical-thinking skills when interacting with the citizens of Dallas. We are eager to share both of these innovative training opportunities with the entire department thanks to the generosity of Ms. Lyda Hill."

"How a life in law enforcement affects the brain is unknown and woefully understudied among the scientific community," said Dr. Leanne Young, executive director of the Brain Performance Institute. "With this work, we hope to not only improve and positively affect the lives of the men and women in blue but also contribute to the body of neuroscience research, advancing the study of brain health among police officers and other first responders."
TEEN CONCUSSION: BACK ON THE BALL

Gordan Gehan, a sophomore at Boston College, participated in Center for BrainHealth’s teen brain-training program when he was a senior in high school at Episcopal School of Dallas. We talked with Gordon and his mother, Caroline Gehan, about his experience.

HOW DID GORDON SUSTAIN A CONCUSSION?

CAROLINE: When my son was in his early teens, he was an active young man playing numerous club sports and was always outside with friends playing pick-up football or volleyball. In the course of about three years, he was diagnosed with several concussions. The last one was during a lacrosse game when he was checked on the helmet. He did not go down; he was not unconscious, but did not remember anything else during or after the game. He came home with a bad headache and tired. At that point, recognizing the symptoms, I put him to bed in a dark room and checked on him every few hours. His doctor confirmed another concussion.

WHY DID YOU INITIALLY SEEK HELP?

CAROLINE: After several weeks of rest, his school work was declining. One day he told me that he just didn’t get “it” anymore. He would be able to give me details on his school work, but he couldn’t get the big picture of what he was learning. Upon a friend’s recommendation, we enrolled my son in a Center for BrainHealth® research study on traumatic brain injury in youth. He worked one-on-one with Dr. Lori Cook, [head of pediatric brain injury programs at Center for BrainHealth] for several weeks. The program gave him confidence again, but most importantly, he was enjoying school again. His grades went up, and he seemed to be back to his usual self.

WHY DID YOU RETURN FOR TEEN BRAIN TRAINING?

GORDON: When I first heard about Teen SMART, I fought the idea of joining the program. As a senior in high school, my mind was on trying to do as little as possible the rest of the year. With some convincing, I became excited and intrigued by how this program could help me as I began my college career. Looking back now, I can say it was definitely worth my time, especially when I get overwhelmed with work and basketball.

DID THE BRAIN-TRAINING PROGRAM MAKE A DIFFERENCE?

GORDON: In college, and especially with basketball, I do not have much time to get things done. However, with my Teen SMART strategies, I can effectively read large amounts texts and comprehend the material well enough to recall later on, without reading every single word. Also, when I have a lot of things to do in a day, as I wake up, I make my to-do list using the SMART technique of elephants and rabbits. This helps me organize and prioritize the many things I have to do in a day or a week. I know for sure I have integrated many of the different strategies into the way I tackle work and a variety of tasks.

WHAT ARE YOUR PLANS FOR THE FUTURE?

GORDON: I plan on either working in Boston or New York after completion of my undergrad, or continue school to receive my MBA. My long-term career goal is to work in private equity or be a hedge fund manager.

ANY FINAL THOUGHTS?

CAROLINE: Often people ask me if SMART is worth doing for older kids – YES, I would recommend it for anyone. The Center is able to adjust the program for all different ages; it is well worth it.

BRAIN TRAINING FOR TEENS

June 19-23, 2017 or July 17-21, 2017
9AM – 3PM

For students going into grades 7 to 12†. Strategies that target:

- School performance
- Intellectual engagement
- Comprehension
- Homework efficiency
- Innovation and creativity
- Self-reliance
- Study skills
- Perspective taking

†5th and 6th graders are considered on a case-by-case basis.
“Exercise regularly; keep your blood pressure down; avoid developing diabetes; and stay mentally stimulated with new, challenging things throughout your life. But of course, you should already be doing all of these things. They are the key not just to reducing your risk for Alzheimer’s, but to increasing your chance of having a happy and productive life.”

—Gregory Petsko, PhD

“If we can confirm the utility of this unique approach to the MS patient with compromised functional capabilities, the dividends will be incalculable.”

—Elliot Frohman, MD, PhD

“The brain is looking for exploration and novelty, and adolescents get that through taking risks. If we hover too much and preclude all risk, then, I think, we are robbing them of the opportunity to change the brain in really important ways.”

—Adriana Galván, PhD

“Can the brain be trained to change? Yes. Correction in biology is called learning.”

—Read Montague, PhD
Monroe Turner, a graduate student and research assistant in professor Dr. Bart Rypma’s lab at the Center for BrainHealth® is looking at Multiple Sclerosis (MS) brain pathology in a fundamentally new way. With the support of the 2016 Dianne Cash predoctoral fellowship award, Turner is studying the relationship between brain metabolism and the severity of cognitive decline in MS.

“People with MS often report that their thinking ability feels slower than it was before they had the disease,” explained Turner. “Traditionally, scientists have framed this phenomenon as a myelin disorder, blaming the reduction of myelin around neurons for a decreased ability to send the neural signals that enable speedy thinking, movement, listening and all the other things that brain cells allow us to do. We are investigating different types of brain cells – glial cells – that are key to providing nutrients to neurons. If glial cells are damaged, they are unable to take nutrients from blood and get it to neurons, leaving them without the energy they need to send signals.”

“Monroe’s work builds on the latest findings from basic neuroscience showing that neurons do not do their work in isolation but as part of a system that includes the glial cells and blood vessels,” explained his mentor, Dr. Bart Rypma, a Center for BrainHealth principal investigator.

Using advanced brain imaging, Turner is collecting data on the differences between brain metabolism in MS patients and healthy controls and investigating how those differences affect participants’ speed on cognitive tasks. This study seeks to investigate whether reduced nutrient delivery to neurons from glial cell disruption leads to cognitive slowing in MS.

“If our hypotheses pan out, it would have implications for research into treatments that have traditionally targeted myelin exclusively,” said Turner. “Our work suggests that the entire subset of brain cells that are part of the neuron nutrient delivery system should be targeted.”

“This could also have implications for healthy aging. We know that vascular changes happen in age – blood vessels become less elastic,” says Turner. “How does this affect our brain performance as we age, and what can we do about it?”

Monroe Turner plans to defend his dissertation and earn his PhD in cognition and neuroscience spring 2018.

Each year, the Dianne Cash Graduate Fellowship award supports the research of a graduate student who is pursuing a doctoral degree under the guidance of a Center for BrainHealth faculty member.

“IF WHAT WE ARE HYPOTHEZING PANS OUT, IT WOULD HAVE IMPLICATIONS FOR RESEARCH AND PHARMACEUTICAL COMPANIES THAT SAY WE SHOULDN’T JUST BE LOOKING AT MYELIN, BUT THIS ENTIRE SUBSET OF BRAIN CELLS THAT ARE PART OF THE NEURON NUTRIENT DELIVERY SYSTEM.”

— MONROE TURNER

“WHEN BRAIN CELLS AND BLOOD VESSELS GET TOGETHER

Scientists refer to the process in which glia cells act as a conduit for oxygen and nutrients to reach neurons as neurovascular coupling.

- Glial cell takes nutrients from the blood stream to the neuron. Oxygen flows through glia to the neuron.
- Neuron sends signal to glia requesting nutrients.
- Molecules dilate blood vessel, so more blood, and therefore nutrients, can flow through.

CINCO DE DERBY

Mexican food – Open bar – Silent auction
5 / 5 / 2017 | 8PM – 12AM
Marie Gabrielle | 2728 N Harwook St. | Dallas, TX 75202
PURCHASE TICKETS: www.thinkaheadgroup.org/events
Proceeds benefit Center for BrainHealth® and Brain Performance Institute™ research and pro-
$2.7 MILLION GRANT TO STUDY TRAUMATIC BRAIN INJURY IN MILITARY SERVICE MEMBERS

Dr. Daniel Krawczyk, deputy director of the Center for BrainHealth®, has been awarded a $2.7 million grant from the Department of Defense (DoD) under the Joint Warfighter Medical Research Program.

The grant will fund research, via a virtual technology platform, to improve cognitive and functional deficits for veterans who have experienced traumatic brain injuries (TBI).

The project is a follow-up effort from a Cognitive Rehabilitation for Traumatic Brain Injury Clinical Trial Award previously given by the DoD’s Psychological Health and Traumatic Brain Injury Research Program. It was conducted under the strategic oversight of the DoD’s Clinical and Rehabilitative Medicine and Military Operational Medicine Research Programs.

"Those who experience a traumatic brain injury often struggle with working memory, planning and cognitive control, which impacts real-life functionality," said Krawczyk who is also associate professor of cognitive neuroscience and cognitive psychology and Debbie and Jim Francis Chair at UT Dallas. "Utilizing an innovative virtual-reality platform, we hope to improve cognitive difficulties in individuals with chronic TBI by training strategies to accomplish complex real-life tasks.”

The team also will use Expedition, a virtual-reality platform developed by Virtual Heroes, a division of Applied Research Associates Inc., to establish training remotely over a four-week period. The real-life training scenarios include packing for a trip, planning and executing various modes of transportation, selecting and remembering locations as well as money and time management.

“Perhaps, in the future, the gist reasoning test could be used as a marker for BrainHealth at the time of the study. "The gist test requires multiple cognitive functions to work together.”

The study will include more than 100 veterans, regardless of service status, who have sustained traumatic brain injuries. The research team will collect structural and functional brain imaging, and neuropsychological evaluations from participants before and after training.

The research was supported by the Dee and Jim Francis Chair at UT Dallas and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

WHAT THE ABILITY TO “GET THE GIST” SAYS ABOUT YOUR BRAIN

Many who have a chronic traumatic brain injury (TBI) report struggling to solve problems, understand complex information and maintain friendships, despite scoring normally on cognitive tests. New research from the Center for BrainHealth® at UT Dallas finds that a gist reasoning test, developed by clinicians and cognitive neuroscientists at the center, is more sensitive than other traditional tests at identifying certain cognitive deficits.

The study, published in Journal of Applied Behavioral Research, suggests the gist reasoning test may be sensitive enough to help doctors and clinicians identify previously undiagnosed cognitive changes that could explain the daily life difficulties experienced by TBI patients and subsequently guide appropriate therapies.

The gist reasoning measure, called the Test of Strategic Learning, accurately identified 84.7 percent of chronic TBI cases, a much higher rate than more traditional tests that accurately identified TBI between 42.3 percent and 67.5 percent of the time.

"Being able to 'get the gist' is essential for many day-to-day activities such as engaging in conversation, understanding meanings that are implied but not explicitly stated, creating shopping lists and resolving conflicts with others," said study lead author Dr. Asha Vas of Texas Woman’s University who was a postdoctoral fellow at the Center for BrainHealth at the time of the study. "The gist test requires multiple cognitive functions to work together.”

The test featured 70 participants ages 18 to 55, including 30 who had experienced a moderate to severe chronic traumatic brain injury at least one year ago. All the participants had similar socioeconomic status, educational backgrounds and IQ.

Researchers were blinded to the participant’s TBI status while administering four different tests that measure abstract thinking – the ability to understand the big picture, not just recount the details of a story or other complex information.

During the cognitive tests, the majority of the TBI group easily recognized abstract or concrete information when given prompts in a yes–no format. But the TBI group performed much worse than controls on tests, including gist reasoning, that required deeper level processing of information with fewer or no prompts.

Past studies have shown that higher scores on the gist reasoning test in individuals in chronic phases of TBI correlate to better ability to perform daily life functions.

"Perhaps, in the future, the gist reasoning test could be used as a tool to identify other cognitive impairments," said Dr. Jeffrey Spence, study co-author and director of biostatistics at the Center for BrainHealth. “It may also have the potential to be used as a marker of cognitive changes in aging.”

The research was supported by the Deo Wally Distinguished Chair fund at University of BrainHealth.

"There are no right or wrong answers. The test relies on your ability to derive meaning from important story details and arrive at a high-level summary: Two young lovers from rival families scheme to build a life together and it ends tragically. You integrate existing knowledge, such as the concept of love and sacrifice, to create a meaning from your perspective. Perhaps, in this case, 'true love does not conquer all,'” she said.
NEW RESEARCH: THE BRAIN AND OBESITY

Researchers at the Center for BrainHealth® have found a link between impulsive personality and high body mass index (BMI).

The findings published in the journal Obesity demonstrate that having an impulsive personality — the tendency to consistently react with little forethought — is the key factor that links brain patterns of impulsivity and a high BMI. BMI is a measure of body fat for adults, based on height and weight.

“Our research points to impulsive personality as a risk factor for weight gain,” said Dr. Francesca Filbey, principal investigator and Bert Moore Chair in Behavioral and Brain Science at the Center for BrainHealth. “Thus, addressing impulsive personality traits is essential to developing effective weight management programs that can help the 70 percent of Americans who are overweight or obese.”

Participants were asked to rate how much they agreed with statements such as: “I tend to change interests frequently” or “I tend to begin a new job without much advance planning on how I will do it.”

The neuropsychological measure sought to assess whether an individual’s decision-making style was more impulsive or cautious. It evaluated a participant’s ability to distinguish between visual images on a screen and indicate an accurate response while being tested for speed. An fMRI was used to examine brain activation and connectivity during an impulse control task that required participants to push one of two buttons depending on visual cues and refrain from pushing a button if an audio cue occurred at the same time as the visual cue.

“Despite performing similarly to controls on the impulse-control task in the scanner, individuals with a high BMI exhibited altered neural function compared to normal weight individuals,” Filbey said. “We expected that an impaired ability to inhibit impulses would be the factor linking high BMI and brain change, but our study showed that having the inherent, impulsive personality trait, not an impulsive decision-making state in a specific situation or in response to vices, is the mediating factor.

Study findings show higher impulsivity score correlated with lower activation in the areas of the brain associated with inhibition when researchers controlled for differences in BMI.

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