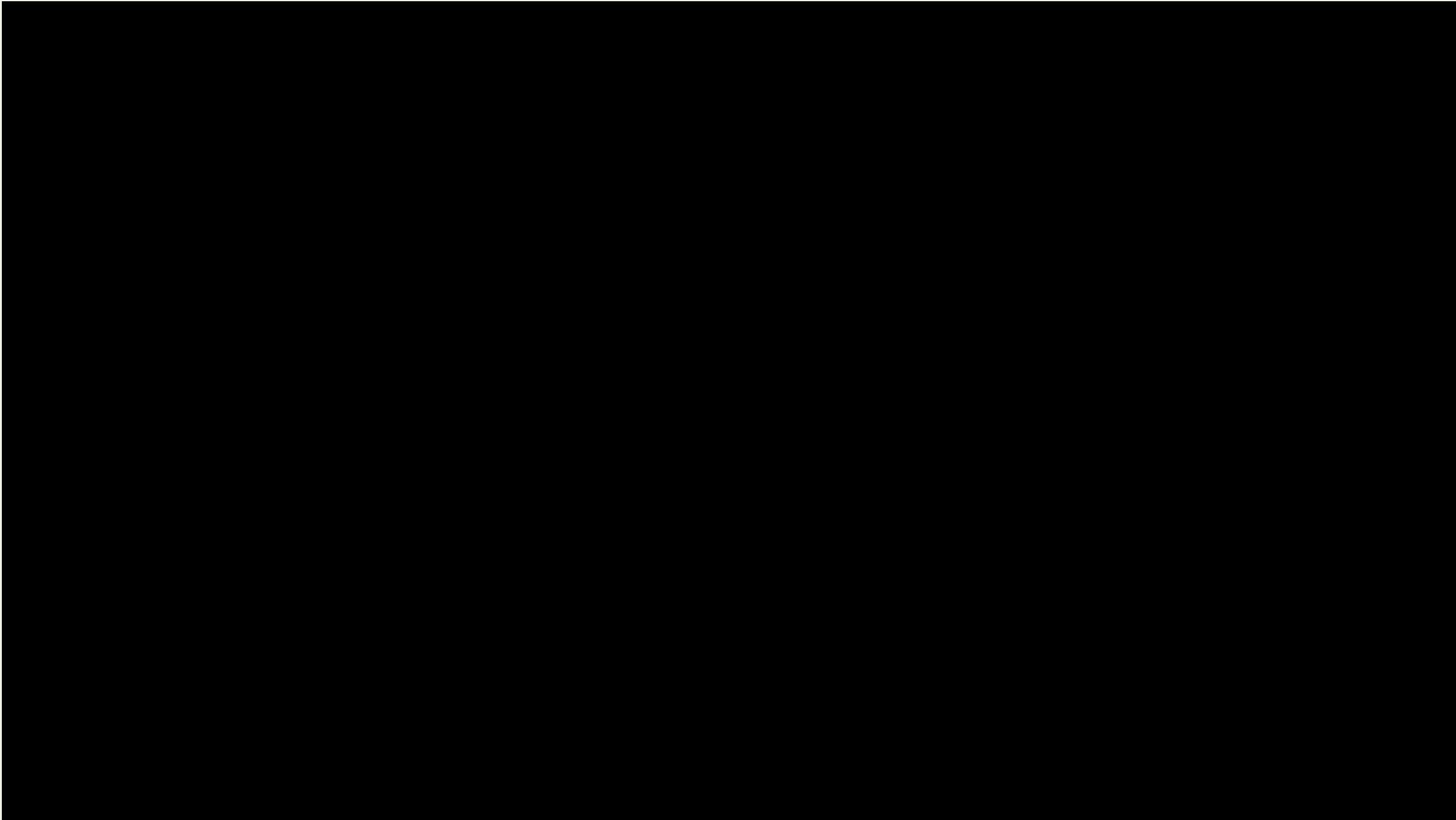
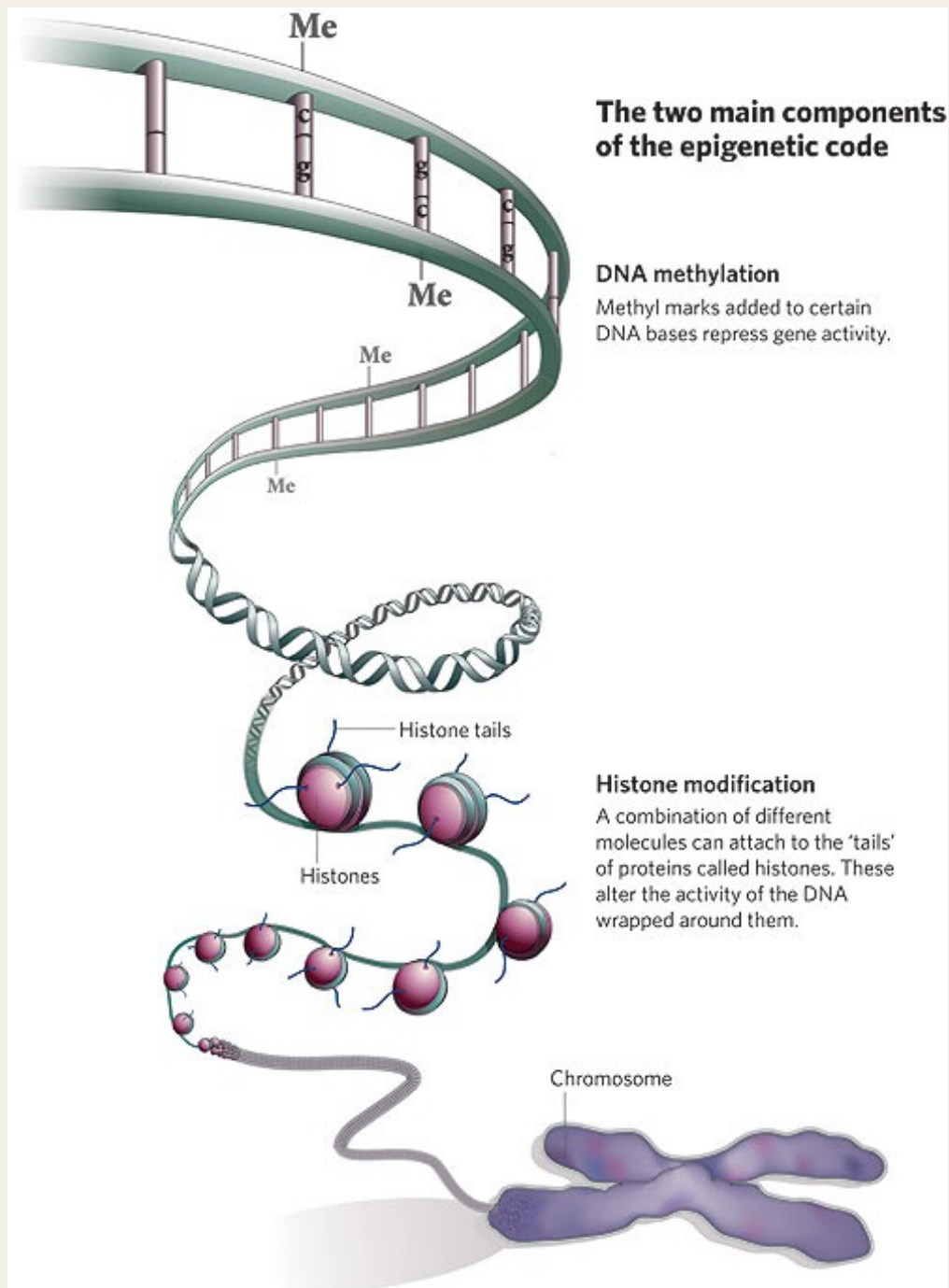


A thick, dark grey L-shaped frame surrounds the text. It starts at the top left, goes right, then down, then right again at the bottom right.

WELLNESS & THE SENIOR BRAIN

Dr. Robbin Gibb
Canadian Centre for Behavioral Neuroscience
University of Lethbridge



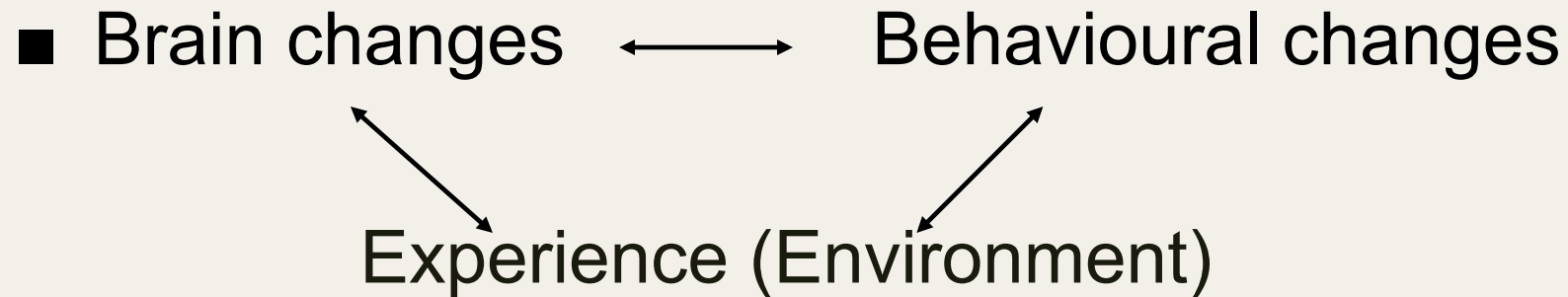


Each gene contains a unique set of instructions that is carried out if endorsed (signed) by the environment. This is what is known as the “signature effect”



Epigenetic Changes Cause Brain Changes: Brain Plasticity

- Brain plasticity offers an adaptive advantage. We can “**learn**” from our **experiences** and that should allow us to engage more appropriate behavioural responses in future situations



- **But - Not all brain plasticity is positive!**
(Think of bad habits)

Brain Plasticity through the Lifespan: Opposing Progressive and Regressive Processes

Progressive (Gain or Growth)

- Neurogenesis
- Synaptogenesis
- Myelination

Regressive (Loss or Decline)

- Loss of neurons
and glia
- Synaptic Pruning

Lifelong process of change is
multidimensional and multidirectional

The Roots of Brain Health and Disease form in Childhood

■ Adverse Childhood Experience Study

- *17,000+ middle-aged adults in USA*

■ Findings:

- 1. ACEs are more common than recognized
- 2. ACEs have a powerful relation to adult health 50 yrs later.

Turning Gold into Lead

Examples of ACEs:

- family violence: spousal or child related
- parental alcohol or drug addictions
- sexual, physical, or emotional abuse
- growing up in a household where someone is in jail
- parental chronic depression or other 'mental' illness
- loss of one parent for whatever reason

Outcomes after age 55

Health in midlife is related to ACEs

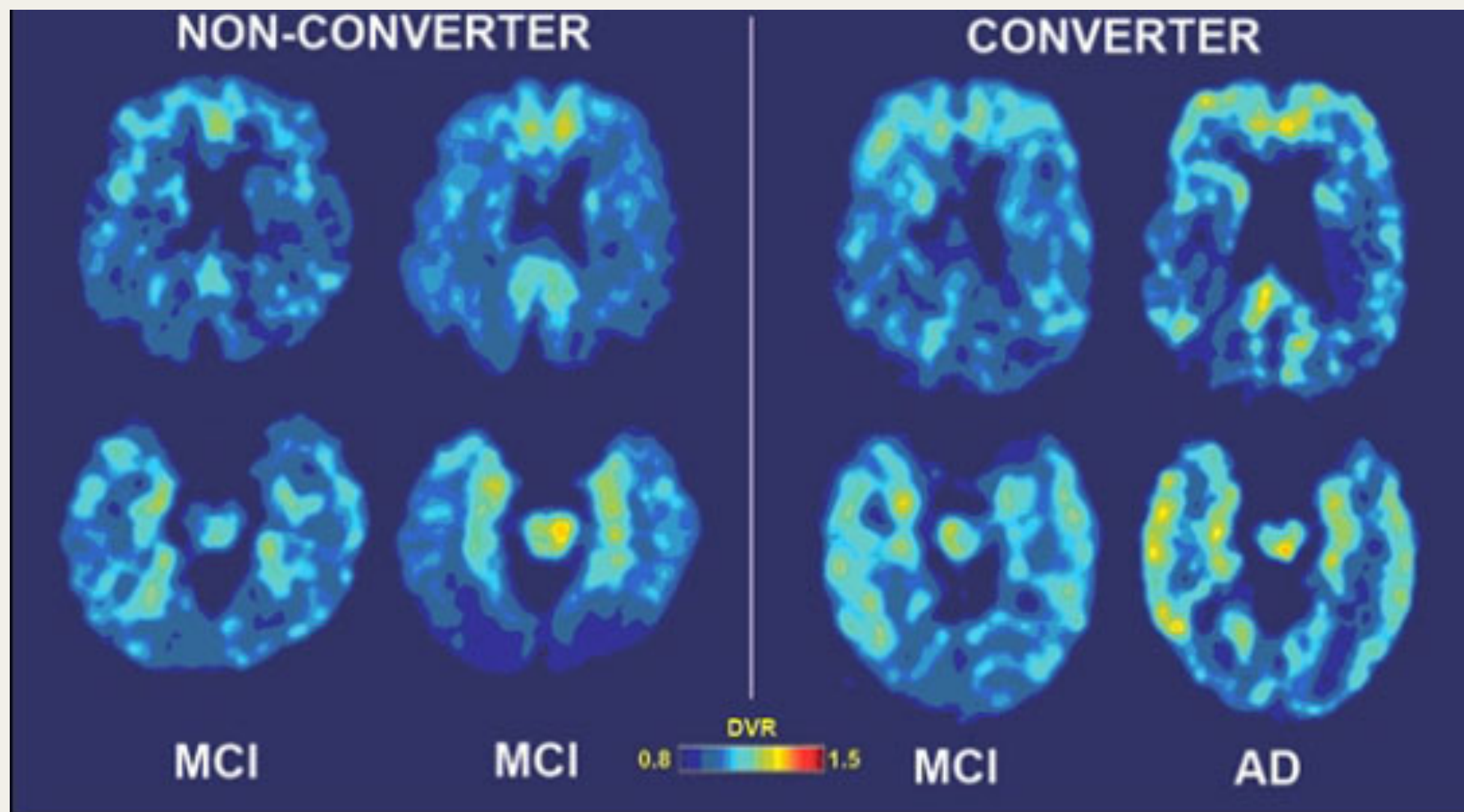
- smoking or other addictions
- heart and lung disease
- depression
- diabetes
- hypertension
- macular degeneration
- psoriasis
- suicide (or attempted)

The increase in incidence varies from about 3X for smoking to 50X for drug addiction, and 50X for attempted suicide with more than 2 ACE's

BIGGEST FEAR AMONGST SENIORS

- Losing cognitive abilities
 - *Loss of independence & altered self-perception*
- 90 yr. olds 75% more likely to show signs of cognitive decline than those in their 70s.
- Cognitive decline is **NOT** a direct effect of aging





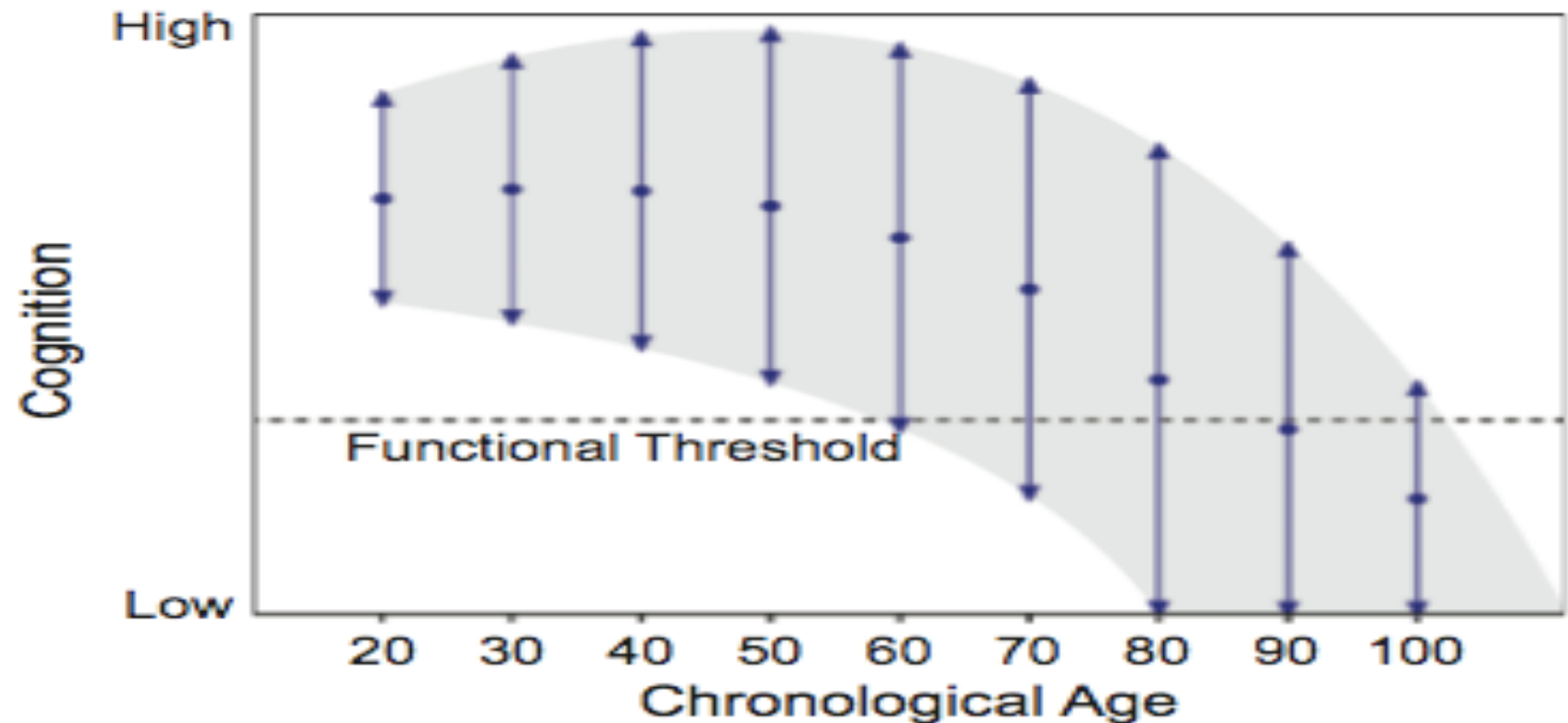
BEST RESULTS FOR WELLNESS APPROACH

- Start early –
- Healthy lifestyle changes early in life have big payoffs for cognitive health later

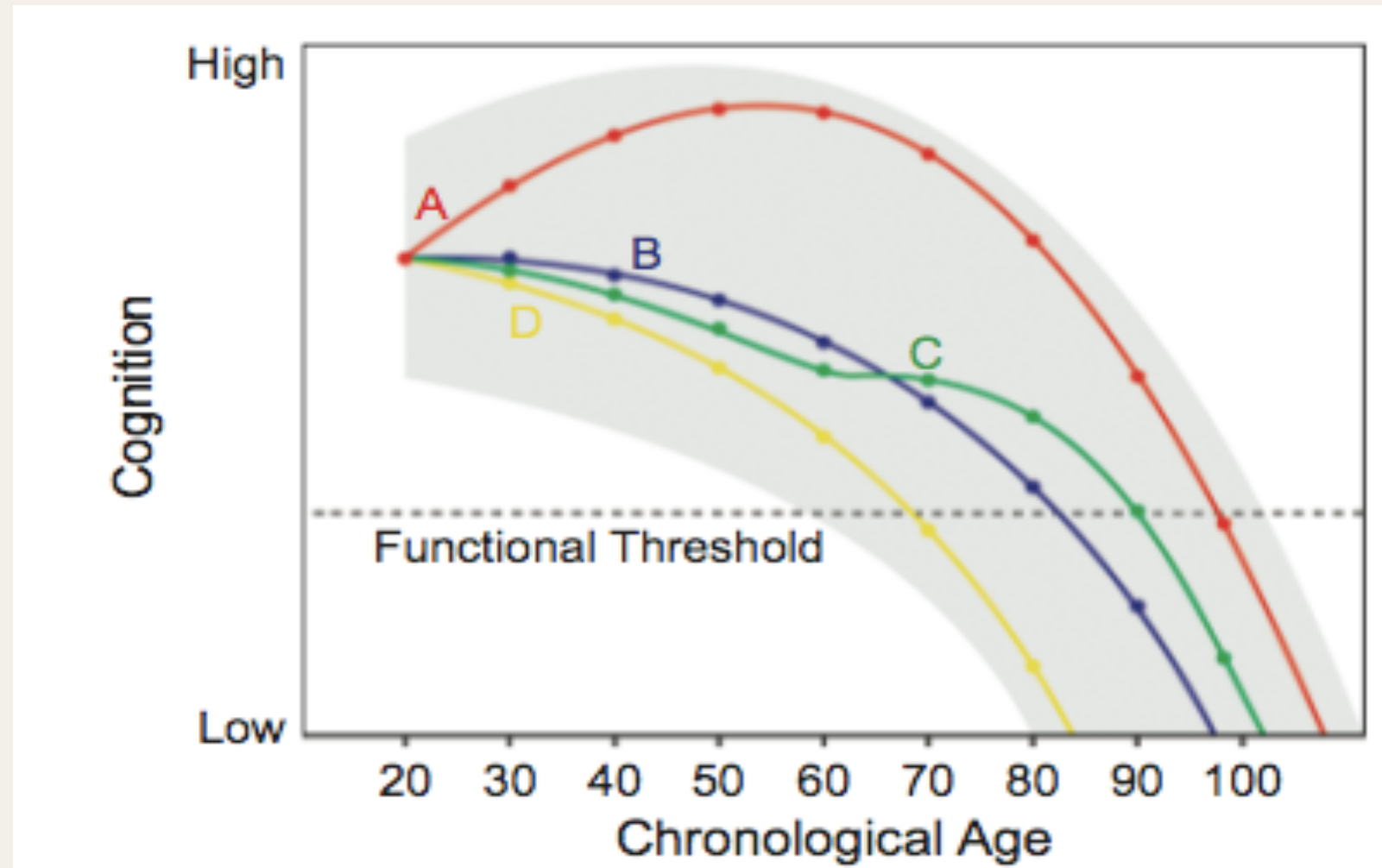
BEST RESULTS FOR WELLNESS APPROACH

- BUT even older adults can benefit from adhering to healthy lifestyle choices
- Wellness interventions in this population can have a positive impact

Zone of Possible Cognitive Performance in Adulthood



Possible Cognitive Performance of an Individual



BIGGEST PROBLEM WITH PHYSICAL AND INTELLECTUAL ACTIVITIES THAT PROMOTE IMPROVED BRAIN FUNCTION?

- What works for one may not be of benefit for another
- Using a multifaceted approach may be the answer
- A **range** of effective behavioral interventions must to provide sound advice to a **range** of individuals

WELLNESS

- Both a **Holistic** and **Multidimensional** state that can be achieved and leads to optimizing an individual's potential

SIX DIMENSIONS OF WELLNESS

- Social
- Intellectual
- Physical
- Emotional
- Spiritual
- Occupational

SOCIAL

- Relationships- ability to maintain and nurture both personal and community relationships
- Remember: Social situations promote healthy stress that helps to optimize brain function

SOCIAL

- Have lots of close friends in community
- Count on friends for
 - *Support*
 - *Companionship*
- Involved in Community
- Actively pursue involvement in daily life*
- Not Lonely * (Self-Report)

INTELLECTUAL

- Lifelong learning.
- Actively pursuing new knowledge and or skills and sharing it and the joys that come with learning it.

INTELLECTUAL

- Crossword puzzles (Must be challenging)
- Crafts or Arts
- Educational Courses (U of L is free after 65)
- Computer activities *
- Reading*



PHYSICAL

- Committed to regular participation in physical activity, healthy eating habits
- Interested in self-care and maintaining good health

PHYSICAL

- Resistance training *
- Biking, pilates, yoga, Tai-chi, swimming, walking**
- 3 or more hours of exercise in last 3 days**
- Going outside at least 3 times in last three days*

SEDENTARY BEHAVIOUR

- Activities that are characterized by sitting.
- Adults spend ~70% of their time doing this
- Older adults- even more
- Associated with less successful aging:
physically, psychologically, and socially

SEDENTARY BEHAVIOUR

- BUT, no-one has ever characterized the nature of sedentary behavior and not all sedentary behavior is equal
- Two beneficial activities that are associated with sitting- *cognitive stimulation* ie computer use and reading
 - *Socializing* ie BINGO and visiting

EMOTIONAL

- Takes personal responsibility for life decisions and outcomes
- Emotional stability. Able to regulate emotions and maintain an overall positive outlook

EMOTIONAL

- Not anxious or sad
- Feels valued
- Interest and/or pleasure in usual activities *
- Delighted or pleased with life*

SPIRITUAL

- Having purpose in life
- Value system

SPIRITUAL

- Finding meaning in day-to-day life
- **Spiritual needs are met***

OCCUPATIONAL

- Ability to contribute skills to meaningful work
 - *Paid*
 - *unpaid*

OCCUPATIONAL

- No strong correlations on tested domains with cognitive improvement
- NOT MANY STUDIES DONE TO DATE WITH WELL DEFINED FACTORS AND ASSESSMENTS

CHARACTERISTICS OF PARTICIPANTS WHO BENEFIT

- Motivated
- Able and willing to participate

CHARACTERISTICS OF INTERVENTIONS THAT WORK

- Stick with it for more than 12 weeks
- Based on joint-decisions with health professional and participant. Preferences of participant are honored
- Increases: engagement, confidence, and adherence to treatment options

WHAT WE STILL NEED TO ADDRESS

- Do interventions work equally well for all seniors regardless of age (65-100)?
- Tools that are used universally would give better comparisons across studies
- Difficulty in controlling for non-assessed factors
- Most studies done on seniors dwelling in senior housing- not those in private homes
- THIS IS VERY COMPLEX

AND WHAT ARE THE BRAIN EFFECTS?

- Sometimes don't see behavioral improvements (testing methods too crude to see subtle improvements) but see positive effects on brain

PREVENTING COGNITIVE DECLINE USING A MULTIFACTED APPROACH

- Positive changes seen all over brain (Temporal lobe- memory; Thalamus- sensorimotor processing; PFC: executive function)
- Enhanced blood flow

RECAP OF PROTECTIVE INTERVENTIONS AGAINST COGNITIVE DECLINE

- 3 or more hours of physical activity over 3 days
- Swimming, biking, hiking, walking
- Computer Activities
- Reading
- Feeling delighted with life
- Pursuing involvement in everyday life
- Not lonely

DIFFERENT STROKES FOR DIFFERENT FOLKS

- Important to recognize the enjoyment that a participants feels while engaged in an intervention
- Not everyone will LOVE the same activities
- TRY TO BE INVOLVED IN MORE THAN ONE!

MAXIMUM EFFECT?

- An enjoyable and engaging experience





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- Howard, E.P. Morris, J.N., Steel, K., Fries, B.E., Moore, A., Garms-Homolva, V. (2016). Short- term lifestyle strategies for sustaining cognitive status. *Biomedical Research International*. <http://dx.doi/10.1155/2016/7405748>
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- Anda, R. F., Felitti, V.J., Bremner, J.D., Walker, J.D., Whitfield, C., Perry, B.D., Dube, S.R., Giles, W.H. (2006). The enduring effects of abuse and related adverse experiences in childhood. *European Archives of Psychiatry and Clinical Neuroscience*, 256, 174-186.

The Healthy Aging Brain



MOTOR AND COGNITIVE STUDY
thebraininaction@gmail.com

Please consider participating in an exciting study at the University of Lethbridge!

Where?

The study takes place at the University of Lethbridge and Senior Centres in Lethbridge.

The Study:

Investigating the relationship between motor & cognitive function

The study requires answering questions and playing with Lego blocks. It will take approximately 2 hours (this could be split into two sessions).
If interested please contact: