

How to Build a Better Brain

Osher Lifelong Learning at CSUF

Barbara Cherry

Department of Psychology



WHAT IS IT ABOUT WORK THAT'S COGNITIVELY ENGAGING?



RETIREMENT AND COGNITIVE HEALTH

“WHEN I’M 64” (RAND CORP., 2010)

Retirement is associated with a reduction in cognitive performance

United States, England, Denmark
Italy, France, Spain



RETIREMENT: A NEW LIFESTYLE



ROAD MAP

Cognition

Cognitive Reserve

Epigenetics

Building a better brain

- Engage in meaningful activities
- Get moving
- Learn something new
- Be happy

WHAT IS COGNITION?

Sensation and Perception

Pattern Recognition

Attention/Executive Function

Consciousness

Memory

Representation of Knowledge

Decision Making

Imagery

Language

Processing Speed

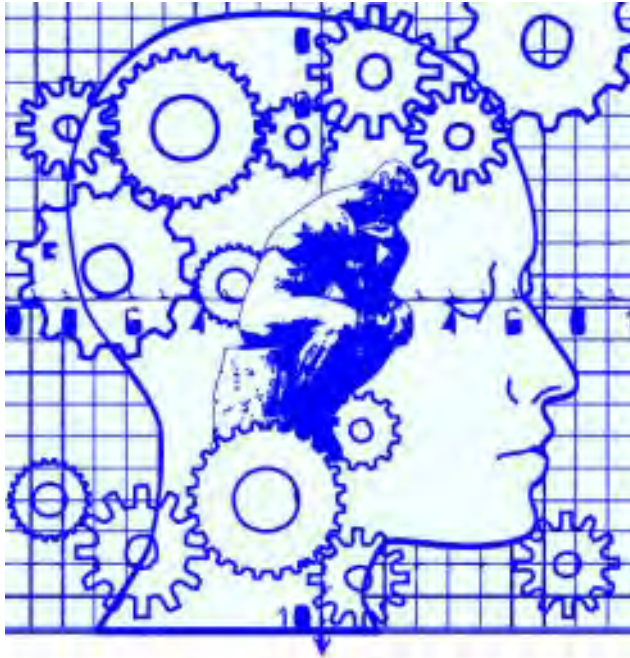
Thinking and Concept
formation

Artificial Intelligence

Problem Solving



WHAT IS COGNITIVE RESERVE?

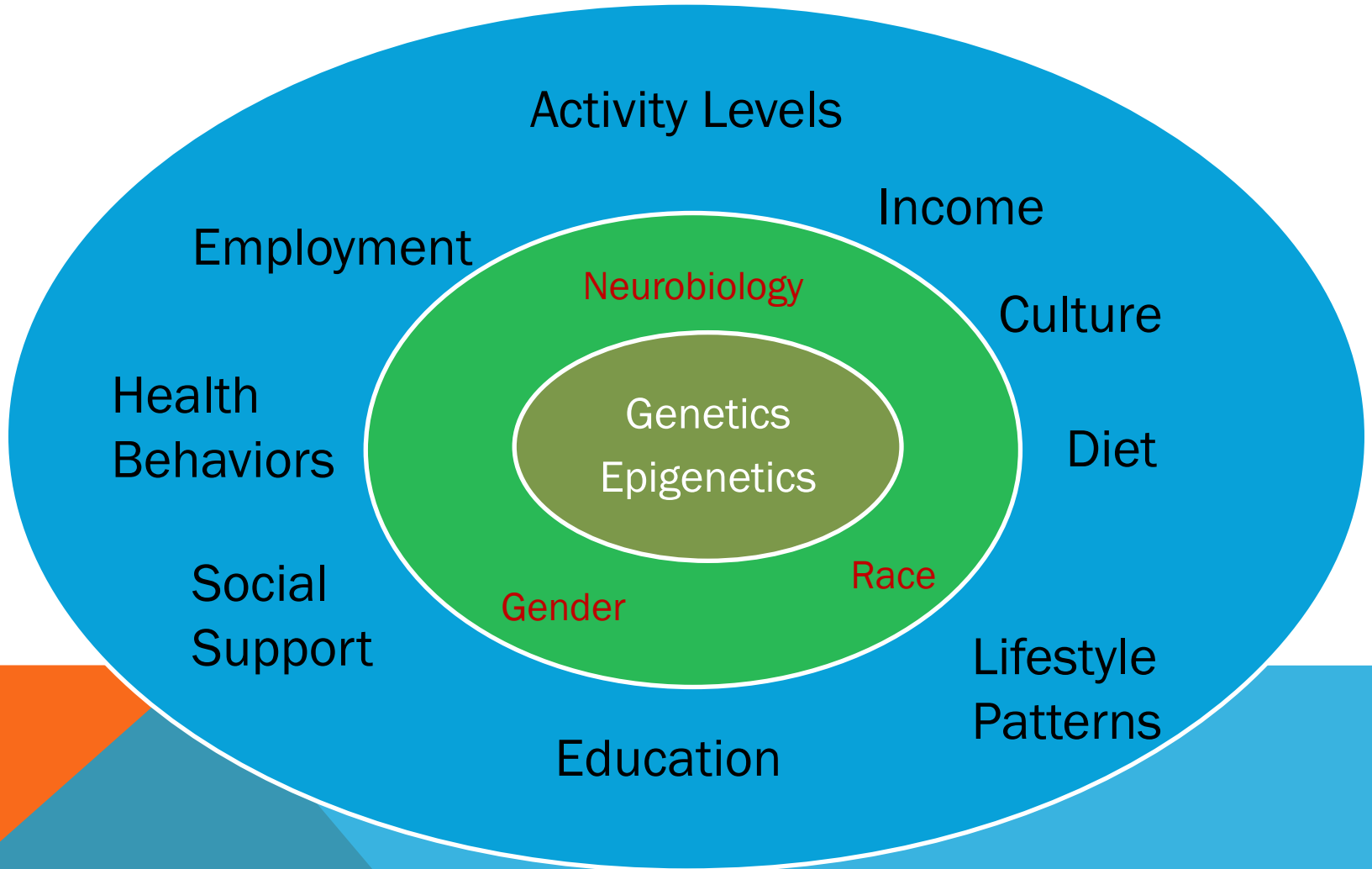


cognitive



biological


COGNITIVE RESERVE



EPIGENETICS



BUILDING COGNITIVE RESERVE

- ☐ Engage in meaningful activities
 - ☐ Get moving
 - ☐ Learn something new
 - ☐ Be happy
- 

ROBOT & FRANK



<http://www.youtube.com/watch?v=9jZISfsE730>

THE USC WELL ELDERLY STUDY RESEARCH PROGRAM

Randomized clinical trials of an activity-based
intervention

Well Elderly 1—1994 to 1997

- 9 month intervention
- Delivered in English/Mandarin

Well Elderly 2—2004 to 2008

6 month intervention

Delivered in English/Spanish

WELL ELDERLY STUDY I AND II

CONCLUSIONS

Those in the intervention group demonstrated better physical, mental and cognitive health

Physical and cognitive health benefits were indirect, that is, not due to the intervention per se but to an increase in meaningful activities

- Activity-related measures

- Activity frequency

Activity purpose

MEANINGFUL ACTIVITIES

Activities that can be done in one hour or less

- 1.
- 2.
- 3.

Activities that can be done in one day or less

- 1.
- 2.
- 3.

Activities that require more than one day

- 1.
 - 2.
 - 3.
- 

MEANINGFUL DAILY ACTIVITIES

All Support Personnel are asked to give some extra thought this month to finding ways of enhancing our own quality of life, and that of the Individuals we serve by engaging in meaningful daily activities.

**We say, that for any one of us to have a
“high quality of life”, we must regularly be
... engaged with others ... in meaningful
activities ... AND
...having a positive experience
with people we enjoy.**



BUILDING COGNITIVE RESERVE

- ❑ Engage in meaningful activities
- ❑ Get moving
- ❑ Learn something new



Be happy

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“What fits your busy schedule better, exercising one hour a day or being dead 24 hours a day?”

EXERCISE YOUR BODY

Oxygen to the brain

Running in rats

- Improves learning
- Stimulates synaptic plasticity

AD mice and exercise

- Improves learning
- Less beta-amyloid



AGING & CHRONIC PAIN STUDY

Jessie Jones, Health Science

Dana Rutledge, School of Nursing

Laura Zettel-Watson, Psychology; Gerontology

Debbie Rose, Kinesiology

Jordan Aquino, Health Science

Jennifer Piazza, Health Science

Phyllis Talarico, FM support group leader

<http://fmcp.fullerton.edu/>

LONGITUDINAL STUDY OVERVIEW

Participants

■ 2008	70 FM	76 non-FM	
■ 2010	64 FM	51 non-FM	
■ 2012	46 FM	57 non-FM	
■ 2014	49 FM	45 non-FM	
■ 2016	50 FM	44 non-FM	...

Measures

- Medical history, medications, BMI, physical activity level (RAPA), MOS social support survey
19 symptoms (NFMAQ), Composite Physical Function, Beck Depression Inventory
Cognitive, physical performance

EXERCISE YOUR BODY

Better physical performance is related to higher cognitive function



ADULTS 50 YEARS AND OLDER WITH AND WITHOUT CHRONIC PAIN

2009

- 51 participants with fibromyalgia
- Physical performance predicted cognitive function

2012

- Physical & cognitive status of participants (50+ yrs.) with fibromyalgia
- Physical performance predicted cognitive function

2015

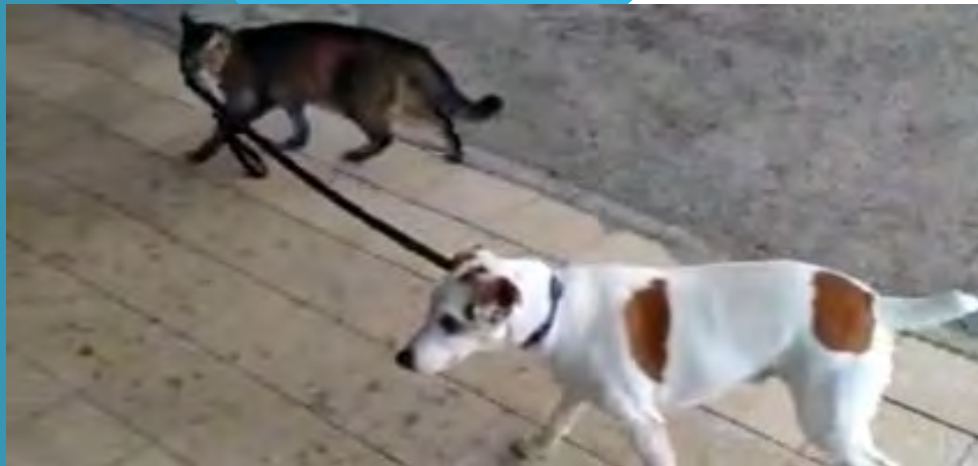
Well older adults: Balance and aerobic endurance predicted processing speed, inhibition and working memory

KEEP MOVING!



Take the stairs

**Park farther from
the door**



Walk a dog

- borrow a dog

GO GREEN WHILE YOU MOVE



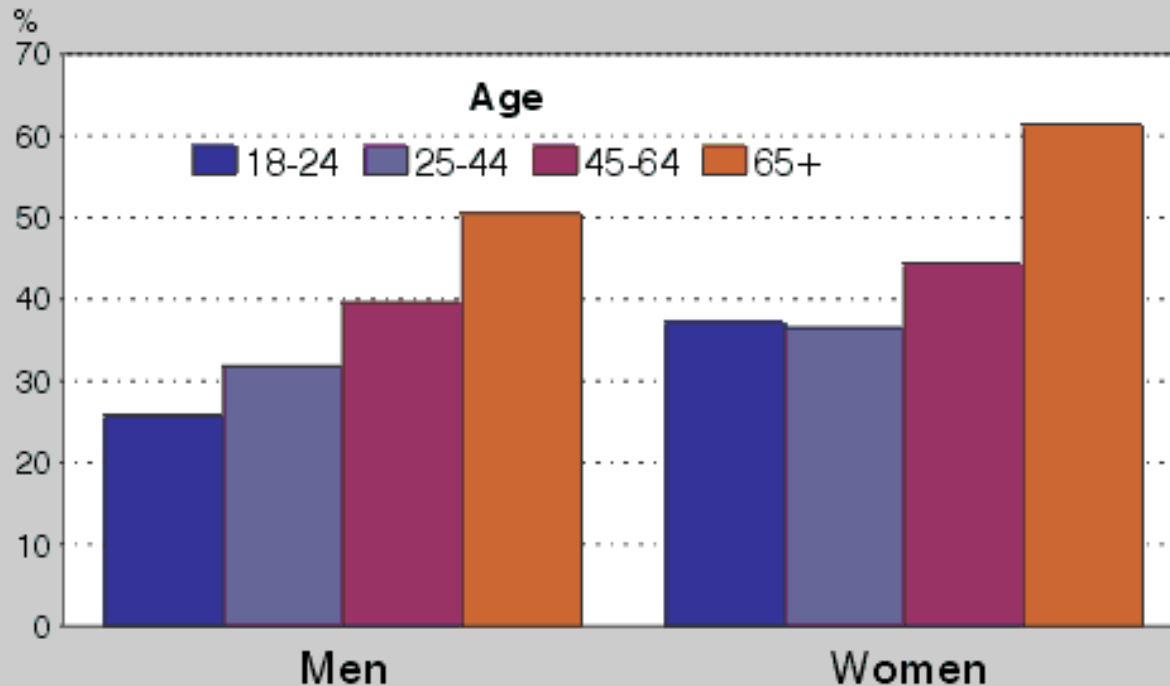
SITTING IS THE NEW SMOKING

SEDENTARY BEHAVIOR



SEDENTARY BEHAVIOR

Figure 1. Prevalence of sedentary leisure-time behavior among adults by sex and age, 1997



SOURCE: CDC/NCHS, National Health Interview Survey, 1997

<https://www.cdc.gov/nchs/data/hestat/sedentary/sedentary.htm>

BUILDING COGNITIVE RESERVE

- ❑ Engage in meaningful activities
- ❑ Get moving
- ❑ Learn something new
- ❑ Be happy



BRAIN GAMES

Nifty after Fifty

Memory Bootcamp (UCLA)

Posit Brain Fitness Program

Wii

Or..... visit your computer

LEARNING SOMETHING NEW

OLLI

[http://freebrainagegames.com/
recall.html](http://freebrainagegames.com/recall.html)

[https://www.mathsisfun.com/p
uzzles/farmer-crosses-
river.html](https://www.mathsisfun.com/puzzles/farmer-crosses-river.html)

[http://www.plastelina.net/game
3.html](http://www.plastelina.net/game3.html)

[http://www.learn4good.com/ga
mes/puzzle/boat.htm](http://www.learn4good.com/games/puzzle/boat.htm)



BUILDING COGNITIVE RESERVE

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POSITIVE PSYCHOLOGY: WHAT IS IT?

Seligman & Csikszentmihalyi, 2000

The Science of Happiness

The study of

- Positive emotions
- Positive character traits
- Enabling institutions

BACKGROUND

The Nun Study



Positive affect in writing samples predicted longer life 50 years later



Eichstaedt et al., 2014

Positive tweets (short messages of up to 140 characters) related to reduced risk of heart disease

6 VIRTUES; 24 CHARACTER STRENGTHS

PETERSON & SELIGMAN, 2004

Wisdom/Knowledge

Courage

Humanity

Justice

Temperance

Transcendence

■ Curiosity

■ Bravery

■ Kindness

■ Teamwork

■ Forgiveness

■ Gratitude

Love of Learning

Zest

Love

Fairness

Self-Regulation

Humor

INITIAL STUDY

Randomized controlled trial

- 577 adult participants (42% male)

Internet study

- 5 happiness exercises
- 1 placebo exercise

**Measured happiness at pre-test, post-test,
1 week and 1, 3 and 6 months**



MEASURING HAPPINESS

Steen Happiness Index

Adapted from Beck Depression Inventory

- 20 questions
- Three kinds of happy life: pleasant, engaged, meaningful
- Range of scores for each statement:



STEEN HAPPINESS INDEX

INSTRUCTIONS: PLEASE READ EACH GROUP OF STATEMENTS CAREFULLY. THEN PICK THE ONE STATEMENT IN EACH GROUP THAT BEST DESCRIBES THE WAY YOU HAVE BEEN FEELING FOR THE PAST WEEK, INCLUDING TODAY. BE SURE TO READ ALL OF THE STATEMENTS IN EACH GROUP BEFORE MAKING YOUR CHOICE.

Question 1

- A. I dislike my daily routine. (1)**
- B. I neither enjoy nor dislike my daily routine. (2)**
- C. I enjoy my daily routine, but I do like to get away from it. (3)**
- D. I enjoy my daily routine so much that I rarely take breaks from it. (4)**
- E. I enjoy my daily routine so much that I almost never take breaks from it. (5)**

HAPPINESS EXERCISES

Gratitude visit

- Write and deliver a letter of gratitude

Three good things in life

- Write down 3 things each day that went well and why

You at your best

- Write about when you were at your best and reflect on personal strengths in the story. Review story each day.

HAPPINESS EXERCISES (CON'T.)

Identifying **signature strengths** (top five)

- www.authentichappiness.org
- www.viacharacter.org
- Use one of these each day in a new and different way.

Using **signature strengths**

- Use five highest strengths more often during the next week.

PLACEBO EXERCISE

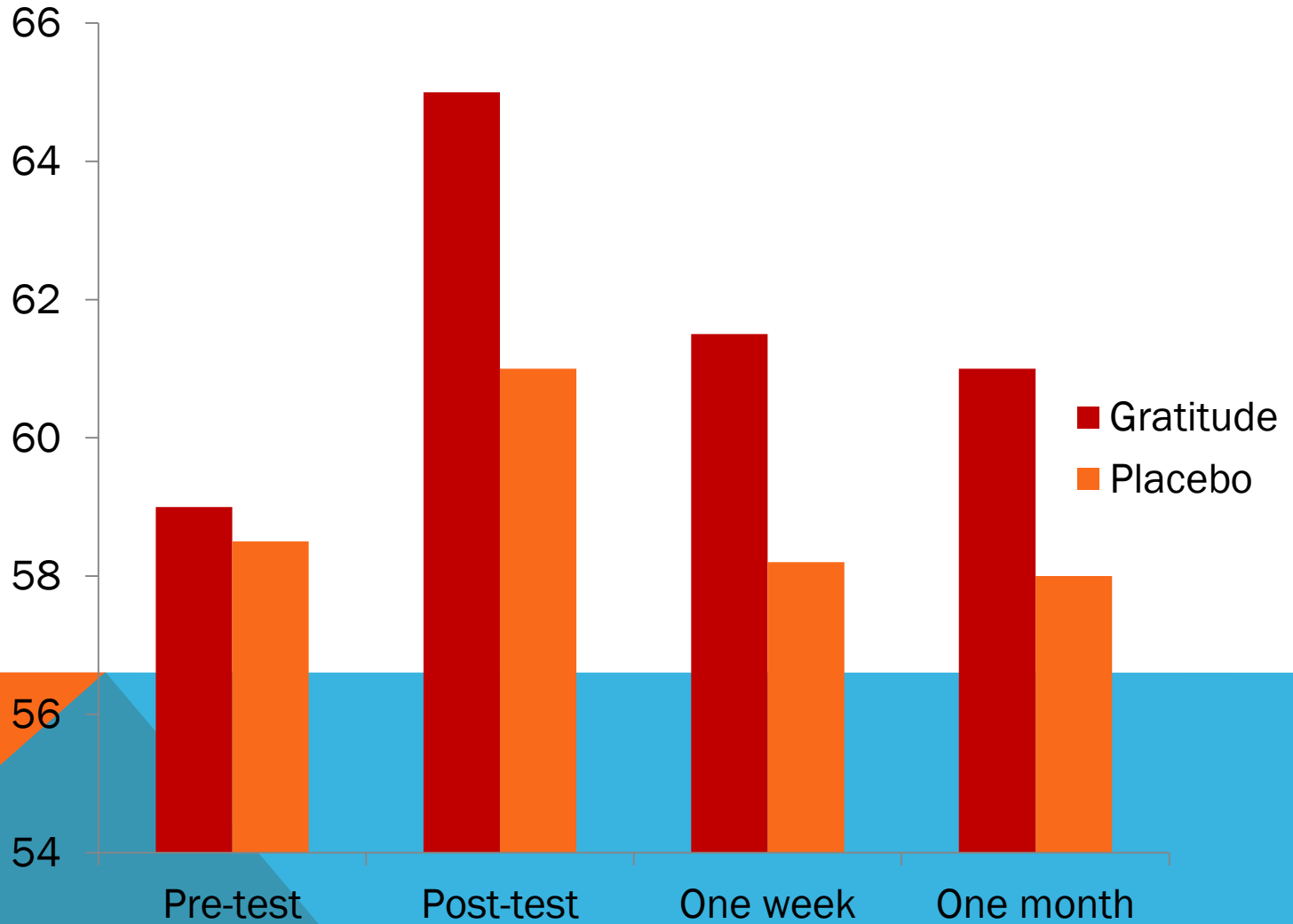
Early memories

- Write about your early memories every night for one week.



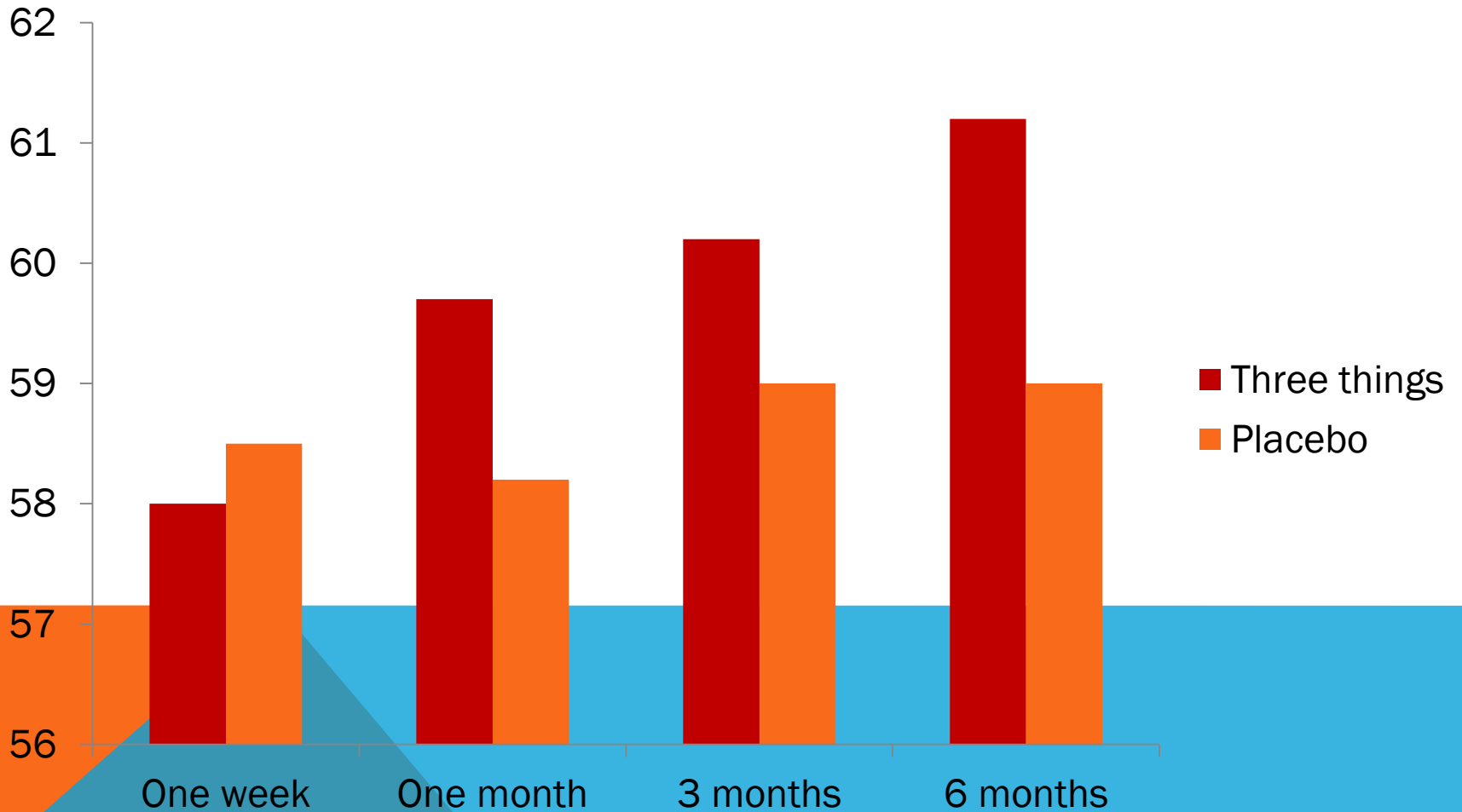
RESULTS

GRATITUDE



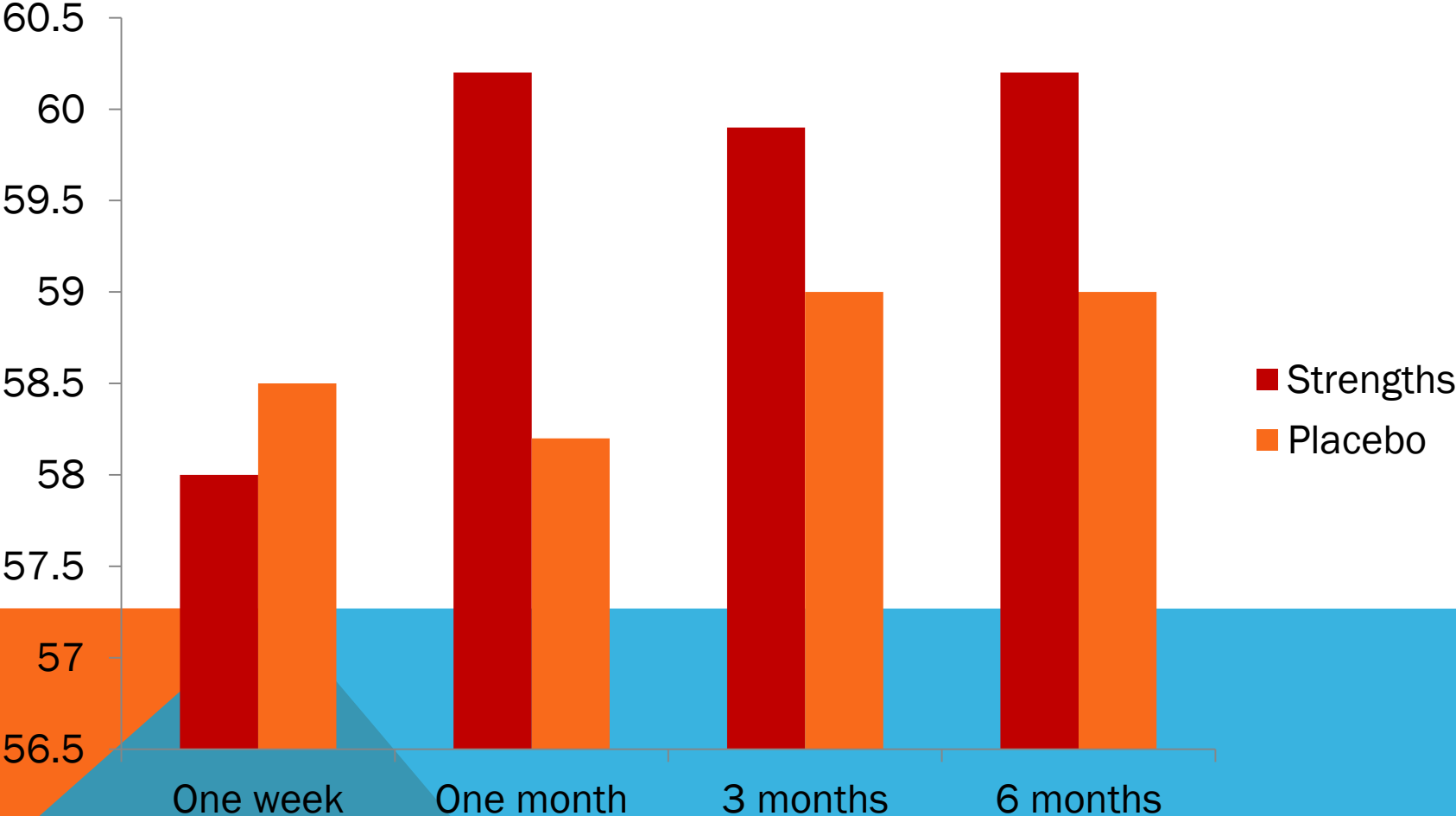
RESULTS

THREE GOOD THINGS



RESULTS

USING SIGNATURE STRENGTHS



CONCLUSIONS

Gratitude – highest increase in happiness

“Lasting” happiness

- Three good things
- Using signature strengths

Those who persisted with exercises showed
highest gain

BE HAPPY

<https://www.youtube.com/watch?v=y6Sxv-sUYtM>

